
CENTRAL
PIPING

ÍNDICE / INDEX

.

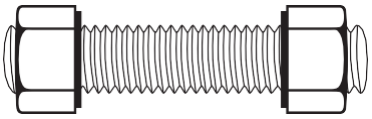
Espárragos
Studbolts

ANSI/DIN

ASTM A-193 / ASME SA-193

Aceros aleados e inoxidables para servicios de alta presión y alta temperatura

DIMECO T.I. Alloy steel and stainless steel bolting for high-temperature



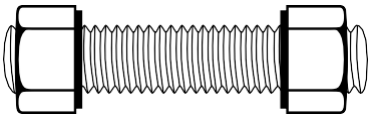
	FERRITIC STEEL					AUSTENITIC STEEL			
	B5	**B6**	**B7**	**B7M**	**B16**	**B8**	**B8M**	**B8T**	**B8C**
AISI	501	410	4140			304	316	321	347
DIN	12CrMo 19-5	X10Cr13	42CrMo4		40CrMo V4-7	X5CrNi 18-8	X5CrNiMo 17-12-2	X6CrNiTi 18-10	X6CrNiNb 18-10
W.-Nr.	1.7362	1.4006	1.7225		1.7711	1.4301	1.4401	1.4541	1.4550
COMPOSICIÓN QUÍMICA / CHEMICAL REQUIREMENTS									
C %	0,10 min	0,08-0,15	0,37-0,49		0,36-0,47	0,08 max.	0,08 max.	0,08 max.	0,08 max.
Mn %	1 max.	1 max.	0,65-1,10		0,45-0,70	2 max.	2 max.	2 max.	2 max.
Si %	1 max.	1 max.	0,15-0,35		0,15-0,35	1 max.	1 max.	1 max.	1 max.
P max.%	0,040	0,040	0,035		0,035	0,045	0,045	0,045	0,045
S max.%	0,030	0,030	0,040		0,040	0,030	0,030	0,030	0,030
Cr %	4-6	11,5-13,5	0,75-1,20		0,80-1,15	18-20	16-18	17-19	17-19
Ni %						8-11	10-14	9-12	9-12
Mo %	0,40-0,65		0,15-0.25		0,50-0,65		2-3		
V %					0,25-0,35				
Al Max. %					0,015				
Tl %								5x(C+N) min. 0,70 max.	
Cb+Ta									10xC min. 1,10 max.
PROPIEDADES MECÁNICAS / MECHANICAL REQUIREMENTS									
Diameter	up to 4"	up to 4"	2 1/2" and under	2 1/2" and under	2 1/2" and under	Class 1: all Diameters			
T.S.min. Mpa	690	760	860	690	860	515	515	515	515
Y.S min. 0.2% Mpa	550	585	720	550	725	205	205	205	205
Elongation min.%	16	15	16	18	18	30	30	30	30
Red. of Area min.%	50	50	50	50	50	50	50	50	50
Hardness max. HB			321	235	321	223	223	223	223
			B7	**B7M**	**B16**	**B8 CL2 - B8T CL2 - B8C CL2**			
Diameter			over 2 1/2" to 4	over 2 1/2" to 4	over 2 1/2" to 4	3/4" and under	over 3/4" to 1"	over 1" to 1 1/4"	over 1 1/4" to 1 1/2"
T.S.min. Mpa			795	690	760	860	795	725	690
Y.S min. 0.2% Mpa			655	550	655	690	550	450	345
Elongation min.%			16	18	17	12	15	20	28
Red. of Area min.%			50	50	45	35	35	35	45
Hardness max. HB			321	235	321	321	321	321	321
			B7	**B7M**	**B16**	**B8M CL2**			
Diameter			over 4" to 7"	over 4" to 7"	over 4" to 7"	3/4" and under	over 3/4" to 1"	over 1" to 1 1/4"	over 1 1/4" to 1 1/2"
T.S. min. Mpa			690	690	690	760	690	655	620
Y.S min. 0.2% Mpa			515	515	586	655	550	450	345
Elongation min.%			18	18	16	15	20	25	30
Red. of Area min.%			50	50	45	45	45	45	45
Hardness max. HB			321	235	321	321	321	321	321

DIMECOT.I.

ASTM A-320 / ASME SA-320

Aceros aleados e inoxidables para baja temperatura

Alloy steel bolting for low-temperature

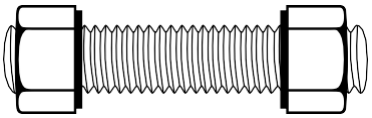


ASTM A-307 / SA-307

Aceros para tornillos y tuercas / Carbon steel bolts and nuts

	ASTM A-320 / ASME SA-320 Alloy steel bolting for low-temperature							ASTM A-307/SA-307 Carbon steel bolts and nuts		
	FERRITIC STEEL			AUSTENITIC STEEL				CARBON STEEL		
	L7	L7M	L43	B8	B8M	B8T	B8C	GR.A	GR.B	GR.C
AISI	4140		4340	304	316	321	347			
DIN	42CrMo4		40NiCrMo6	X5CrNi18-8	X5CrNiMo 17-12-2	X6CrNiTi 18-10	X6CrNiNb 18-10			
W.-Nr.	1.7225		1.6565	1.4301	1.4401	1.4541	1.4550			
COMPOSICIÓN QUÍMICA / CHEMICAL REQUIREMENTS										
C %	0,38-0,48		0,38-0,43	0,08 max.	0,08 max.	0,08 max.	0,08 max.	0,29 max.		
Mn %	0,75-1,00		0,60-0,85	2 max.	2 max.	2 max.	2 max.	0,90 max.		
Si %	0,15-0,35		0,15-0,35	1 max.	1 max.	1 max.	1 max.	0,50 max.		
P max.%	0,035		0,035	0,045	0,045	0,045	0,045	0,04 max.		
S max.%	0,040		0,040	0,030	0,030	0,030	0,030	0,15	0,05	
Cr %	0,80-1,10		0,70-0,90	18-20	16-18	17-19	17-19			
Ni %			1,65-2,00	8-11	10-14	9-12	9-12			
Mo %	0,15-0,25		0,20-0,30		2-3					
TI %						5xC min.				
Cb+Ta							10 x C min. 1,10 max.			
PROPIEDADES MECÁNICAS / MECHANICAL REQUIREMENTS										
Diameter	2 1/2" and under	2 1/2" and under	4" and under	Class 1: all Diameters				All Diameters		
T.S min. Mpa	860	690	860	515	515	515	515	415	415-690	400-500
Y.S min. 0.2% Mpa	725	550	725	205	205	205	205			248
Elongation min.%	16	18	16	30	30	30	30	18	18	23
Red. of Area min. %	50	50	50	50	50	50	50			
Impact.Test Min. (J)	Ind. (20) med. (27)									
Temp.	-101°C	-73°C	-101°C							
Hardness max. HB		235		223	223	223	223	121-241	121-212	
				B8 CL2 - B8T CL2 - B8C CL2						
Diameter				3/4" and under	over 3/4" to 1"	over 1" to 1 1/4"	over 1 1/4" to 1 1/2"			
T.S min. Mpa				860	795	725	690			
Y.S min. 0.2% Mpa				690	550	450	345			
Elongation min.%				12	15	20	28			
Red. of Area min.%				35	35	35	45			
Hardness max. HB				321	321	321	321			
				B8M CL2						
Diameter				3/4" and under	over 3/4" to 1"	over 1" to 1 1/4"	over 1 1/4" to 1 1/2"			
T.S min. Mpa				760	690	655	620			
Y.S min. 0.2% Mpa				655	550	450	345			
Elongation min.%				15	20	25	30			
Red. of Area min.%				45	45	45	45			
Hardness max. HB				321	321	321	321			

ALEACIONES ESPECIALES ASTM
SPECIAL ALLOYS ASTM



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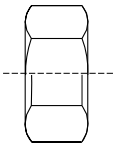
ASTM	A-453	B-164	F-467	B-446	B-166	B-408	B-574	A-182	A-182	A-182
	GR.660	400	K500	625	600	800H	C276	F-44	F-51	F-55
AISI	-	-	-	-	-	-	-	-	-	-
UNS	S66286	N04400	N05500	N06625	N06600	N08810	N10276	S31254	S31803	S32760
W.-Nr.	1.4980	2.4360	2.4375	2.4856	2.4816	1.4876	2.4602	1.4547	1.4462	-
COMPOSICIÓN QUÍMICA / CHEMICAL REQUIREMENTS										
C max. %	0,08	0,30	0,25	0,10	0,15	0,05-0,10	0,02	0,02	0,03	0,03
Mn max. %	2,00	2,00	1,5	0,50	1,00	1,50	1,00	1,00	2,00	1,00
Si max. %	1,00	0,50	0,5	0,50	0,50	1,00	0,08	0,80	1,00	1,00
P max.%	0,04			0,015			0,030	0,030	0,030	0,030
S max.%	0,03	0,024	0,01	0,015	0,015	0,015	0,030	0,010	0,020	0,010
Cr %	13,5-16,0			20,0-23,0	14,0-17,0	19,0-23,0	14,5-16,5	19,5-20,5	21,0-23,0	24,0-26,0
Ni %	24,0-27,0	63 Min.	63,0-70,0	58 Min.	72 Min.	30,0-35,0	Bal.	17,5-18,5	4,5-6,5	6,0-8,0
Mo %	1,0-1,5			8,0-10,0			15,0-17,0	6,0-6,5	2,5-3,5	3,0-4,0
V %	0,10-0,50						0,35			
TI %	1,9-2,35		0,35-0,85	0,40 Max.		0,15-0,60				
Al max.%	0,35		2,30-3,15	0,40		0,15-0,60				
Fe max. %		2,50	2,0	5,0	6,0-10,0	39,5 Min.	4,0-7,0			
Cu max. %		Bal.	Bal.		0,50	0,75		0,50-1,00		
N %								0,18-0,22	0,08-0,20	0,20-0,30
Co max.%				1,0			2,50			
Cb+Ta %				3,15-4,15						
W %							3,0-4,5			
B %	,001-,010									
PROPIEDADES MECÁNICAS / MECHANICAL REQUIREMENTS										
T.S.min. Mpa	895	480	900	827	550	450	690	650	620	750-895
Y.S min. 0,2% Mpa	585	170	590	413	240	170	283	300	450	550
Elongation min.%	15	35	20	30	30	30	40	35	25	25
Red. of Area min.%	18							50	45	45
Hardness HB	248-341		24-37 HRC							

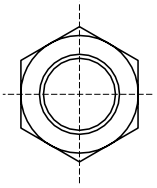
Gr. 660: Stress Rupture Test: Temperature 650°C: stress min.385 Mpa, Time to rupture min. 100 h. elongation min. 5%

DIMECOT.I.

ASTM A-194 / ASME SA 194

Aceros para tuercas / Carbon and Alloy Steel Nuts





Grade	2H	2HM	3	4	6	6F	7	7M	8	8T	8M	8C
COMPOSICIÓN QUÍMICA / CHEMICAL REQUIREMENTS												
C %	≥ 0.40	≥ 0.40	≥ 0.10	0.40-0.50	≤ 0.15	≤ 0.15	0.37-0.49	0.37-0.49	≤0.08	≤0.08	≤0.08	≤0.08
Mn %	≤ 1	≤ 1	≤ 1	0.70-0.90	≤ 1.00	≤ 1.25	0.65-1.10	0.65-1.10	≤ 2	≤ 2	≤ 2	≤ 2
P max. %	0.04	0.04	0.04	0.035	0.04	0.06	0.035	0.035	0.045	0.045	0.045	0.045
S max. %	0.05	0.05	0.03	0.04	0.03	0.06	0.04	0.04	0.03	0.03	0.03	0.03
Si %	≤ 0.40	≤ 0.40	≤ 1	0.15-0.35	≤ 1	≤ 1	0.15-0.35	0.15-0.35	≤ 1	≤ 1	≤ 1	≤ 1
Ni %									8-11	9-12	10-14	9-12
Cr %			4-6		11.5-13.5	12-14	0.75-1.20	0.75-1.20	18-20	17-19	16-18	17-19
Mo %			0.40-0.65	0.20-0.30			0.15-0.25	0.15-0.25			2-3	
Ti %										5xC+N min. 0.7 max.		
Se %						≥ 0.15						
Cb + Ta %												10xC. min.
PROPIEDADES MECÁNICAS / MECHANICAL REQUIREMENTS												
Brinell Hardness Limits	To 1 1/2" inc. 248-327	159	248	248	228	228	248	159	126	126	126	126
	Over 1 1/2" 212-327	235	327	327	271	271	327	235	300	300	300	300
EQUIVALENCE												
AISI	1040	1040	501		410	416 Se	4140	4140	304	321	316	347
UNS	K04002	K04002	550100	K14510	S41000	S41623	G41400	S 30400	S 32100	G 41400	S 31600	S34700
DIN	C45	C45	12CrMo 19-5		X10Cr13		42CrMo4	42CrMo4	X5CrNi 18.8	X10CrNi Ti 18.10	X5CrNi Mo 17-12-2	X6CrNi Nb 18.10
W-NR	1.1191	1.1191	1.7362		1.4006		1.7225	1.7225	1.4301	1.4541	1.4401	1.4550

DIMECOT.I.

SELECCIÓN DE MATERIALES DE TORNILLERÍA

SELECTION OF RECOMMENDED MATERIALS FOR SCREW FASTENINGS(5)

De aceros al carbono, aleados e inoxidables / Of carbon steels, steel alloys, and stainless steels

Screw	Screw fastening material (generic)	Material	ASTM Specifications (1)	
			Screw	Nuts
B5	5 Cr	501	A 193 Gr. B5	A 194 Gr. 3
B6	12 Cr	410	A 193 Gr. B6	A 194 Gr. 6
B7, B7M	Cr-Mo	4140, 4142 or 4145	A 193 Gr. B7, B7M	A 194 Gr. 2H, 2HM
B8 (3)	18 Cr - 8 Ni	304	A 193 Gr. B8, Cl. 1 or Cl. 2	A 194 Gr. 8
B8T	18 Cr-10 Ni-Ti	321	A 193 B8T	A 194 Gr. 8
B8M	18 Cr-10 Ni-2 Mo	316	A320 Gr. B8M Cl. 1	A 194 Gr. 8M
B16	Cr MoV		A 193 Gr. B16	A 194 Gr. 4 or 7
A-307	Carbon steel		A 307 Gr. B	A 194 Gr. 2H
A-325	Carbon steel		A 325 (4)	A 325 (4)
L7	Cr-Mo	4140, 4142, 4145	A 320 Gr. L7	A 194 Gr. 4 or 7
310	25 Cr-20 Ni		A 276, type 310	A 276, type 310

(1) The ASME specifications are preceded by SA instead of A, and have the same numeric designation (SA 193).
(2) Screws will only be marked with the specifications applicable to the material.
(3) Both classes, class 1, treated, and class 2, treated and hardened, can be used.
(4) Available with resistance to atmospheric corrosion and wear properties, type 3A.
(5) This table is for information purposes only, and the final decision as to the materials is to be provided by the client.