


T-BOLT PRESSURE RATINGS

Attached are the updated pressure – temperature ratings for the following T-Bolt Closure combinations:

Type	Head & Hub	Externals	Bolting	Page #
All Carbon Steel	CS	CS	CS(SA 325)	1 - 3
All Carbon Steel	CS	CS	CS(SA193-B7)	4 - 6
Maximum Pressure	CS	CS	CS(SA193-B7)	7
Stainless Steel/Carbon Externals	SS	CS	CS(SA 325)	8 - 10
Stainless Steel/B7 Bolting	SS	CS	CS(SA193-B7)	11 - 13
Stainless Steel	SS	SS	SS(SA193 B8 CL1)	14 - 16
Rubber Lined All Carbon	CS	CS	CS(SA 325)	17 - 19
Salene Water Gasket All Carbon	CS	CS	CS(SA 325)	20

 8/20/10
Revised By/Date

 8-20-10
Approval/Date

CL 75 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA325 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO 500 °F								
		NO.	DIA.									
6												
8												
10	1/2	3	1/2	115								
12	1/2	4	5/8	170								
14	1/2	4	5/8	140								
16	1/2	4	5/8	105								
18	1/2	4	3/4	125								
20	1/2	4	3/4	100								
22	1/2	5	3/4	100								
24	1/2	5	7/8	115								
26	1/2	6	7/8	115								
28	1/2	7	7/8	110								
30	1/2	8	7/8	105								
32	1/2	9	7/8	100								
34	5/8	9	1 1/8	150								
36	5/8	9	1 1/8	120								
38	5/8	10	1 1/8	125								
40	5/8	10	1 1/8	105								
42	5/8	11	1 1/8	110								
48	3/4	14	1 1/8	120								

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 150 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA325 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO 500 °F								
		NO.	DIA.									
6	1/2	3	1/2	320								
8	1/2	3	1/2	185								
10	1/2	4	5/8	245								
12	1/2	4	3/4	255								
14	1/2	4	3/4	210								
16	1/2	7	5/8	185								
18	1/2	6	3/4	185								
20	1/2	7	3/4	175								
22	1/2	7	7/8	200								
24	1/2	8	7/8	190								
26	1/2	9	7/8	180								
28	1/2	11	7/8	190								
30	1/2	12	7/8	180								
32	1/2	10	1 1/8	175								
34	5/8	10	1 1/8	170								
36	5/8	11	1 1/8	165								
38	5/8	13	1 1/8	175								
40	5/8	14	1 1/8	170								
42	5/8	15	1 1/8	165								
48	3/4	16	1 1/8	135								

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|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 300 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA325 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO 500 °F								
		NO.	DIA.									
6	1/2	3	5/8	510								
8	1/2	4	5/8	390								
10	1/2	4	3/4	365								
12	1/2	6	3/4	380								
14	1/2	7	3/4	365								
16	1/2	7	7/8	385								
18	1/2	6	1 1/8	375								
20	1/2	7	1 1/8	355								
22	1/2	8	1 1/8	330								
24	1/2	9	1 1/8	310								
26	1/2	9	1 1/8	265								
28	1/2	10	1 1/8	255								
30	1/2	11	1 1/8	240								
32	1/2	11	1 1/8	210								
34	5/8	12	1 1/8	205								
36	5/8	12	1 1/8	185								
38												
40												
42												

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|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 75 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

CARBON STEEL EXTERNALS (SA 193 GR. B7 BOLTS)

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		TO 500 °F								
		NO.	DIA.									
6												
8												
10	1/2	3	1/2	125								
12	1/2	4	5/8	185								
14	1/2	4	5/8	155								
16	1/2	4	5/8	115								
18	1/2	4	3/4	130								
20	1/2	4	3/4	105								
22	1/2	5	3/4	110								
24	1/2	5	7/8	115								
26	1/2	6	7/8	115								
28	1/2	7	7/8	110								
30	1/2	8	7/8	105								
32	1/2	9	7/8	100								
34	5/8	9	1 1/8	150								
36	5/8	9	1 1/8	120								
38	5/8	10	1 1/8	125								
40	5/8	10	1 1/8	105								
42	5/8	11	1 1/8	110								
48	3/4	14	1 1/8	140								

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

Note: For sizes 34-48", lower MDMT may be attained by using a weld bevel smaller than full size cap thickness. (i.e. 48" T-Bolt, 0.375" Wall MDMT is -50F)

CL 150 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

CARBON STEEL EXTERNALS (SA 193 GR. B7 BOLTS)

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		TO 500 °F								
		NO.	DIA.									
6	1/2	3	1/2	350								
8	1/2	3	1/2	200								
10	1/2	4	5/8	265								
12	1/2	4	3/4	270								
14	1/2	4	3/4	225								
16	1/2	7	5/8	200								
18	1/2	6	3/4	200								
20	1/2	7	3/4	185								
22	1/2	7	7/8	215								
24	1/2	8	7/8	205								
26	1/2	9	7/8	200								
28	1/2	11	7/8	210								
30	1/2	12	7/8	195								
32	1/2	10	1 1/8	175								
34	5/8	10	1 1/8	180								
36	5/8	11	1 1/8	180								
38	5/8	13	1 1/8	205								
40	5/8	14	1 1/8	200								
42	5/8	15	1 1/8	195								
48	3/4	16	1 1/8	160								

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

Note: For sizes 34-48", lower MDMT may be attained by using a weld bevel smaller than full size cap thickness. (i.e. 48" T-Bolt, 0.375" Wall MDMT is -50F)

CL 300 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

CARBON STEEL EXTERNALS (SA 193 GR. B7 BOLTS)

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		TO 500 °F								
		NO.	DIA.									
6	1/2	3	5/8	555								
8	1/2	4	5/8	425								
10	1/2	4	3/4	390								
12	1/2	6	3/4	410								
14	1/2	7	3/4	395								
16	1/2	7	7/8	420								
18	1/2	6	1 1/8	440								
20	1/2	7	1 1/8	415								
22	1/2	8	1 1/8	390								
24	1/2	9	1 1/8	365								
26	1/2	9	1 1/8	305								
28	1/2	10	1 1/8	285								
30	1/2	11	1 1/8	265								
32	1/2	11	1 1/8	210								
34	5/8	12	1 1/8	240								
36	5/8	12	1 1/8	210								
38												
40												
42												

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

Note: For sizes 34-48", lower MDMT may be attained by using a weld bevel smaller than full size cap thickness. (i.e. 48" T-Bolt, 0.375" Wall MDMT is -50F)

CARBON STEEL T-BOLT CLOSURE - MAXIMUM PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA 193 GR. B7 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO 500 °F								
		NO.	DIA.									
6												
8												
10												
12												
14												
16												
18	1/2	9	1 1/8	700								
20	1/2	10	1 1/8	620								
22	1/2	12	1 1/8	610								
24	1/2	13	1 1/8	560								
26	1/2	14	1 1/8	510								
28	1/2	15	1 1/8	470								
30	1/2	16	1 1/8	430								
32	1/2	17	1 1/8	400								
34	5/8	18	1 1/8	380								
36	5/8	19	1 1/8	360								
38	5/8	20	1 1/8	340								
40	5/8	21	1 1/8	320								
42	5/8	22	1 1/8	300								
48	3/4	25	1 1/8	260								

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F* | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA516 | All | -50F | Impact Tested material |
| Grade 70 Impact Tested at -50F | | | |
| Bolts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

Note: For sizes 34-48", lower MDMT may be attained by using a weld bevel smaller than full size cap thickness. (i.e. 48" T-Bolt, 0.375" Wall MDMT is -50F)

CL 75 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

CARBON STEEL EXTERNALS (SA325 BOLTS)

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		TO 500 °F								
		NO.	DIA.									
6												
8												
10	1/2	3	1/2	115								
12	1/2	4	5/8	170								
14	1/2	4	5/8	140								
16	1/2	4	5/8	105								
18	1/2	4	3/4	125								
20	1/2	4	3/4	100								
22	1/2	5	3/4	100								
24	1/2	5	7/8	105								
26	1/2	6	7/8	105								
28	1/2	7	7/8	100								
30	1/2	8	7/8	95								
32	1/2	9	7/8	90								
34	5/8	9	1 1/8	135								
36	5/8	9	1 1/8	110								
38	5/8	10	1 1/8	115								
40	5/8	10	1 1/8	95								
42	5/8	11	1 1/8	100								
48	3/4	14	1 1/8	115								

- | 1. Ratings apply for following materials: | Size | MDMT | Comments |
|---|--------|-------|--|
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 150 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA325 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO								
		NO.	DIA.	450 °F	500 °F							
6	1/2	3	1/2	320	320							
8	1/2	3	1/2	185	185							
10	1/2	4	5/8	245	245							
12	1/2	4	3/4	255	255							
14	1/2	4	3/4	210	210							
16	1/2	7	5/8	185	185							
18	1/2	6	3/4	185	185							
20	1/2	7	3/4	175	175							
22	1/2	7	7/8	195	195							
24	1/2	8	7/8	190	185							
26	1/2	9	7/8	180	180							
28	1/2	11	7/8	190	185							
30	1/2	12	7/8	180	175							
32	1/2	10	1 1/8	160	160							
34	5/8	10	1 1/8	165	165							
36	5/8	11	1 1/8	160	160							
38	5/8	13	1 1/8	170	170							
40	5/8	14	1 1/8	165	165							
42	5/8	15	1 1/8	160	160							
48	3/4	16	1 1/8	130	130							

- | | | | |
|---|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 300 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA325 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO								
		NO.	DIA.	450 °F	500 °F							
6	1/2	3	5/8	510	510							
8	1/2	4	5/8	390	390							
10	1/2	4	3/4	365	365							
12	1/2	6	3/4	380	380							
14	1/2	7	3/4	365	365							
16	1/2	7	7/8	380	375							
18	1/2	6	1 1/8	365	360							
20	1/2	7	1 1/8	345	340							
22	1/2	8	1 1/8	320	320							
24	1/2	9	1 1/8	305	300							
26	1/2	9	1 1/8	255	255							
28	1/2	10	1 1/8	245	245							
30	1/2	11	1 1/8	235	230							
32	1/2	11	1 1/8	190	190							
34	5/8	12	1 1/8	200	200							
36	5/8	12	1 1/8	180	175							
38												
40												
42												

- | | | | |
|---|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 75 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA 193 GR. B7 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO								
		NO.	DIA.	450 °F	500 °F							
6												
8												
10	1/2	3	1/2	125	125							
12	1/2	4	5/8	185	185							
14	1/2	4	5/8	150	150							
16	1/2	4	5/8	115	115							
18	1/2	4	3/4	130	125							
20	1/2	4	3/4	105	100							
22	1/2	5	3/4	105	105							
24	1/2	5	7/8	105	105							
26	1/2	6	7/8	105	105							
28	1/2	7	7/8	100	100							
30	1/2	8	7/8	95	95							
32	1/2	9	7/8	90	90							
34	5/8	9	1 1/8	135	135							
36	5/8	9	1 1/8	110	110							
38	5/8	10	1 1/8	115	115							
40	5/8	10	1 1/8	95	95							
42	5/8	11	1 1/8	100	100							
48	3/4	14	1 1/8	115	115							

- | | | | |
|---|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F* | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 150 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA 193 GR. B7 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO								
		NO.	DIA.	450 °F	500 °F							
6	1/2	3	1/2	350	345							
8	1/2	3	1/2	200	200							
10	1/2	4	5/8	265	260							
12	1/2	4	3/4	265	260							
14	1/2	4	3/4	215	215							
16	1/2	7	5/8	200	200							
18	1/2	6	3/4	195	190							
20	1/2	7	3/4	180	180							
22	1/2	7	7/8	195	195							
24	1/2	8	7/8	190	185							
26	1/2	9	7/8	180	180							
28	1/2	11	7/8	190	185							
30	1/2	12	7/8	180	175							
32	1/2	10	1 1/8	160	160							
34	5/8	10	1 1/8	165	165							
36	5/8	11	1 1/8	160	160							
38	5/8	13	1 1/8	170	170							
40	5/8	14	1 1/8	165	165							
42	5/8	15	1 1/8	160	160							
48	3/4	16	1 1/8	130	130							

- | | | | |
|---|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F* | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 300 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

CARBON STEEL EXTERNALS (SA 193 GR. B7 BOLTS)

NOM SIZE	HEAD THICKNESS	BOLTING		TO								
		NO.	DIA.	450 °F	500 °F							
6	1/2	3	5/8	550	545							
8	1/2	4	5/8	420	415							
10	1/2	4	3/4	380	375							
12	1/2	6	3/4	395	395							
14	1/2	7	3/4	380	375							
16	1/2	7	7/8	380	375							
18	1/2	6	1 1/8	365	360							
20	1/2	7	1 1/8	345	340							
22	1/2	8	1 1/8	320	320							
24	1/2	9	1 1/8	305	300							
26	1/2	9	1 1/8	255	255							
28	1/2	10	1 1/8	245	245							
30	1/2	11	1 1/8	235	230							
32	1/2	11	1 1/8	190	190							
34	5/8	12	1 1/8	200	200							
36	5/8	12	1 1/8	180	175							
38												
40												
42												

- | | | | |
|---|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F* | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 75 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4
8/20/2010

STAINLESS STEEL EXTERNALS (SA193 B8 CL1 BOLTS - NOT STRAIN HARDENED)

NOM SIZE	HEAD THICKNESS	BOLTING		100 °F	150 °F	200 °F	250 °F	300 °F	350 °F	400 °F	450 °F	500 °F
		NO.	DIA.									
6												
8												
10	1/2	3	1/2	95	85	80	80	75	70	65	65	65
12	1/2	4	5/8	140	130	125	115	110	105	100	100	95
14	1/2	4	5/8	115	110	100	95	90	85	85	80	80
16	1/2	4	5/8	85	80	75	70	70	65	65	60	60
18	1/2	4	3/4	100	95	90	85	80	75	75	70	70
20	1/2	4	3/4	80	75	70	65	65	60	60	55	55
22	1/2	5	3/4	85	80	75	70	65	65	60	60	55
24	1/2	5	7/8	95	90	85	80	75	75	70	65	65
26	1/2	6	7/8	100	90	85	80	80	75	70	70	65
28	1/2	7	7/8	100	95	85	80	80	75	70	70	65
30	1/2	8	7/8	95	90	85	80	75	75	70	70	65
32	1/2	9	7/8	90	90	85	80	75	75	70	70	65
34	5/8	9	1 1/8	135	135	125	120	115	110	105	100	95
36	5/8	9	1 1/8	110	110	110	105	100	95	90	90	85
38	5/8	10	1 1/8	115	115	110	105	100	95	90	90	85
40	5/8	10	1 1/8	95	95	95	95	90	85	85	80	75
42	5/8	11	1 1/8	100	100	100	95	90	85	80	80	75
48	3/4	14	1 1/8	110	105	100	90	85	85	80	80	75

- | | | | |
|---|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F* | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA182 Grade F304 | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Hub Nut Mounts: ASME SA312 Type 304(W) | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Bolts: ASME SA193 Grade B8 Class 1 | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Nuts: ASME SA193 Grade B8 Class 1 | All | -50F | Exempt from Impact Testing per UHA-51(d) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 150 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

STAINLESS STEEL EXTERNALS (SA193 B8 CL1 BOLTS - NOT STRAIN HARDENED)

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		100 °F	150 °F	200 °F	250 °F	300 °F	350 °F	400 °F	450 °F	500 °F
		NO.	DIA.									
6	1/2	3	1/2	260	245	230	220	210	200	190	185	180
8	1/2	3	1/2	150	140	130	125	120	115	110	105	100
10	1/2	4	5/8	200	190	175	170	160	150	145	140	135
12	1/2	4	3/4	205	195	185	175	165	160	150	145	140
14	1/2	4	3/4	170	160	150	145	135	130	125	120	115
16	1/2	7	5/8	150	145	135	130	120	115	110	110	105
18	1/2	6	3/4	150	145	135	125	120	115	110	105	105
20	1/2	7	3/4	140	135	125	120	115	110	105	100	95
22	1/2	7	7/8	160	155	145	135	130	125	120	115	110
24	1/2	8	7/8	155	145	140	130	125	120	115	110	105
26	1/2	9	7/8	150	140	130	125	120	115	110	105	100
28	1/2	11	7/8	155	145	140	130	125	120	115	110	105
30	1/2	12	7/8	150	140	130	125	115	110	110	105	100
32	1/2	10	1 1/8	160	160	160	150	140	135	130	125	120
34	5/8	10	1 1/8	160	150	140	135	125	120	115	110	110
36	5/8	11	1 1/8	155	145	140	130	125	120	115	110	105
38	5/8	13	1 1/8	165	155	145	140	130	125	120	115	110
40	5/8	14	1 1/8	160	150	140	135	125	120	115	115	110
42	5/8	15	1 1/8	155	145	140	130	125	120	115	110	105
48	3/4	16	1 1/8	125	120	110	105	100	95	90	90	85

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|---|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F* | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA182 Grade F304 | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Hub Nut Mounts: ASME SA312 Type 304(W) | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Bolts: ASME SA193 Grade B8 Class 1 | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Nuts: ASME SA193 Grade B8 Class 1 | All | -50F | Exempt from Impact Testing per UHA-51(d) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 300 STAINLESS STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

STAINLESS STEEL EXTERNALS (SA193 B8 CL1 BOLTS - NOT STRAIN HARDENED)

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		100 °F	150 °F	200 °F	250 °F	300 °F	350 °F	400 °F	450 °F	500 °F
		NO.	DIA.									
6	1/2	3	5/8	415	395	370	350	330	320	305	295	285
8	1/2	4	5/8	320	300	285	270	255	245	235	225	220
10	1/2	4	3/4	295	280	265	250	235	225	215	210	205
12	1/2	6	3/4	310	295	275	260	250	240	230	220	215
14	1/2	7	3/4	300	280	265	250	240	230	220	210	205
16	1/2	7	7/8	315	295	280	265	250	240	230	220	215
18	1/2	6	1 1/8	350	330	310	295	280	265	255	245	240
20	1/2	7	1 1/8	330	310	290	275	260	250	240	230	225
22	1/2	8	1 1/8	310	290	275	260	245	235	225	220	210
24	1/2	9	1 1/8	290	275	260	245	230	220	210	205	200
26	1/2	9	1 1/8	245	230	220	205	195	190	180	175	170
28	1/2	10	1 1/8	235	220	210	200	185	180	170	165	160
30	1/2	11	1 1/8	225	210	200	190	180	170	165	160	155
32	1/2	11	1 1/8	190	185	175	165	155	150	145	140	135
34	5/8	12	1 1/8	190	180	170	160	150	145	140	135	130
36	5/8	12	1 1/8	170	160	150	145	135	130	125	120	115
38												
40												
42												

- | | | | |
|---|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA240 Type 304, 304L, 316, or 316L | 6"-48" | -50F* | Exempt from Impact Testing per UHA-51(d) |
| Head Lugs: ASME SA182 Grade F304 | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Hub Nut Mounts: ASME SA312 Type 304(W) | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Bolts: ASME SA193 Grade B8 Class 1 | All | -50F | Exempt from Impact Testing per UHA-51(d) |
| Nuts: ASME SA193 Grade B8 Class 1 | All | -50F | Exempt from Impact Testing per UHA-51(d) |

*Controlling material for MDMT

2. Ratings in above table are based upon O-Ring being suitable for customer's media.

3. Corrosion Allowance = 0.125"

CL 75 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

CARBON STEEL EXTERNALS (SA325 BOLTS) - RUBBER LINED

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		TO 250 °F								
		NO.	DIA.									
6												
8												
10	1/2	3	1/2	115								
12	1/2	4	5/8	170								
14	1/2	4	5/8	140								
16	1/2	4	5/8	105								
18	1/2	4	3/4	125								
20	1/2	4	3/4	90								
22	1/2	5	3/4	90								
24	1/2	5	7/8	75								
26	1/2	6	7/8	75								
28	1/2	7	7/8	75								
30	1/2	8	7/8	70								
32	1/2	9	7/8	65								
34	5/8	9	1 1/8	100								
36	5/8	9	1 1/8	80								
38	5/8	10	1 1/8	80								
40	5/8	10	1 1/8	70								
42	5/8	11	1 1/8	70								
48	3/4	14	1 1/8	95								

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Temperature rating to be determined by lining material (customer to specify).

3. Corrosion Allowance = 0.125"

CL 150 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

CARBON STEEL EXTERNALS (SA325 BOLTS) - RUBBER LINED

8/20/2010

NOM	HEAD	BOLTING		TO								
6	1/2	3	1/2	320								
8	1/2	3	1/2	185								
10	1/2	4	5/8	245								
12	1/2	4	3/4	255								
14	1/2	4	3/4	210								
16	1/2	7	5/8	185								
18	1/2	6	3/4	185								
20	1/2	7	3/4	175								
22	1/2	7	7/8	170								
24	1/2	8	7/8	160								
26	1/2	9	7/8	145								
28	1/2	11	7/8	155								
30	1/2	12	7/8	140								
32	1/2	10	1 1/8	115								
34	5/8	10	1 1/8	120								
36	5/8	11	1 1/8	120								
38	5/8	13	1 1/8	135								
40	5/8	14	1 1/8	135								
42	5/8	15	1 1/8	130								
48	3/4	16	1 1/8	120								

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Temperature rating to be determined by lining material (customer to specify).

3. Corrosion Allowance = 0.125"

CL 300 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

CARBON STEEL EXTERNALS (SA325 BOLTS) - RUBBER LINED

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		TO 250 °F								
		NO.	DIA.									
6	1/2	3	5/8	510								
8	1/2	4	5/8	390								
10	1/2	4	3/4	365								
12	1/2	6	3/4	380								
14	1/2	7	3/4	365								
16	1/2	7	7/8	385								
18	1/2	6	1 1/8	375								
20	1/2	7	1 1/8	310								
22	1/2	8	1 1/8	285								
24	1/2	9	1 1/8	265								
26	1/2	9	1 1/8	200								
28	1/2	10	1 1/8	190								
30	1/2	11	1 1/8	175								
32	1/2	11	1 1/8	140								
34	5/8	12	1 1/8	170								
36	5/8	12	1 1/8	140								
38												
40												
42												

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |

*Controlling material for MDMT

2. Temperature rating to be determined by lining material (customer to specify).

3. Corrosion Allowance = 0.125"

CL 75 AND 150 CARBON STEEL T-BOLT CLOSURE - PRESSURE - TEMPERATURE RATINGS

REPORT NO. 90.7339 REV 4

CARBON STEEL EXTERNALS (SA325 BOLTS) - SALINE WATER GASKET

8/20/2010

NOM SIZE	HEAD THICKNESS	BOLTING		TO 300 °F								
		NO.	DIA.									
CLASS 75												
18	1/2	4	3/4	80								
20	1/2	4	3/4	60								
24	1/2	5	7/8	60								
CLASS 150												
18	1/2	6	3/4	125								
20	1/2	7	3/4	125								
24	1/2	8	7/8	100								

- | | | | |
|--|-------------|-------------|--|
| 1. Ratings apply for following materials: | Size | MDMT | Comments |
| Head & Hub: ASME SA516 Grade 70N | 6"-32" | -50F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 34"-42" | -48F | Exempt from Impact Testing per UCS-66(a) Curve D |
| | 48" | -42F | Exempt from Impact Testing per UCS-66(a) Curve D |
| Head Lugs: ASME SA105 | All | -50F | Exempt from Impact Testing per UCS-66(b) |
| Hub Nut Mounts: ASME SA106 Grade B | All | -50F | Exempt from Impact Testing per UCS-66(d) |
| Bolts: ASME SA325 Type 1 | All | -20F* | Exempt from Impact Testing per UCS-66(a) |
| Huts: ASME SA193 Grade B7 | All | -50F | Exempt from Impact Testing per UCS-66(a) |
| *Controlling material for MDMT | | | |
| 2. Gasket: Ethylene Propylene | | | |
| 3. Corrosion Allowance = 0.125" | | | |