



Crescent Point | Liquid Leak Testing & Flange Bolt up Specifications

Date	2017-06-29	Field Name	Pierson
Equipment Name	Sivall's Treater	Location (LSD)	9-32-1-28 w1
Equipment Serial #	117025	Equipment CRN#	N7780.123
Reason for Leak Testing	Treater service		
Leak Test Pressure	34 psi		
The leak testing pressure should be 50% of the MAWP of the Pressure Vessel.			
Leak Test Duration	10 Minutes		
Gauge or Chart ID#	Vessel guage and chart		
Leak Test Acceptance	Acceptable <input checked="" type="checkbox"/> Not Acceptable <input type="checkbox"/>		
Comments	Test is a couple psi below but ran out of fluid when filling for test		
Leak Testers Name	Doug Moberg	Leak Testers Signature	Doug Moberg

**This document is used for leak testing only. If/when a Pressure Test is required the Licenced Contractor will be required and documentation will be utilized from their approved Quality Program.*

Please refer to the TSASK table below for testing and documentation requirements:

Reinstalling the firetube assembly after ¹ :	Type of Test or Examination Required for the Vessel	QCP Program/Licensed Contractor Required	TSASK Notification	Required TSASK documents
Maintenance to the Firetube Assembly	2	No	No	None
Minor Repair to the Firetube Assembly	2	No	Yes	TSK-1009
Major Repair to the Firetube Assembly	3	Yes	Yes	TSK-0001 TSK-1009
Alteration to the Firetube Assembly	3	Yes	Yes	TSK-0001 ⁴ TSK-1009 ⁴
New Firetube Assembly	3	Yes	Yes	TSK-0001 ^{4,5} TSK-1009 ^{4,5}



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Notes for table

1. Where a repair or alteration is performed on the oilfield vessel, such as nozzle replacement or shell repairs, all rules pertaining to a repair or alteration of a pressure vessel apply. This table is not intended to be used for pressure vessel repairs.
2. Owner approved procedures shall be followed for such things as the leak test, torquing the flange bolts, etc.
3. If the firetube assembly followed the NDE requirements of NBIC Part 3 Section 4, then a leak test is acceptable. When a non-QCP holder is performing the vessel leak test, an owner approved procedure shall be followed.
4. Where the firetube assembly installed is not the original design, the change shall be reflected as an alteration on the TSK-0001 and TSK-1009 forms and to a registered design.
5. Any fabrication of a new firetube assembly shall be to a registered design and documented on a partial data report. Partial data reports shall be signed by TSASK, jurisdictional authority or authorized inspector as applicable.

The liquid leak test should be completed with a calibrated gauge or chart.

Below attached to this document is the assembly procedure for firetube flange bolt up and torquing specifications.



Assembly Procedure for Firetube Flange Bolt-up

Scope

This procedure specifies the methods, tasks and specific criteria for bolt-up Assembly systems on fire-tube flanges.

Gasket

1. Ensure that gasket specifications are adhered to per vendor or engineering recommendation.
2. Never reuse gasket that has been used prior.
3. The gasket should be transported to the job site in a protective package until time of install. If there is no protective packaging or it is to be stored at the job site, secure the gasket so that it will not be bent, broken, exposed to adverse chemical or elements, stepped on or receive damage of any kind.
4. Check to be certain that the gasket remain free of obstructions or trash.
5. Center the gasket.
6. Always be sure that the gap between the flanges is at least 1/16" wider than the thickness of the gasket. On eight of an inch is preferred when possible.

Flange Torque Procedure

1. Before the start of bolt-up, ensure that the weight of the fire tube is suspended with a picker truck or crane, and the flange properly aligned to avoid studs being loaded in bending during bolt up.
2. Studs shall be tightened to the specified torque values shown in table 2.
3. For stud diameters less than 3/4" use a hand wrench to tighten.
4. A torque control wrench should be used for tightening on stud diameters 3/4" and higher. Torque level achieved should be verifiable.
5. Install studs on the bottom half of the flange assembly, and held in place.
6. The gasket shall be located centrally in the flange assembly, and held in place.



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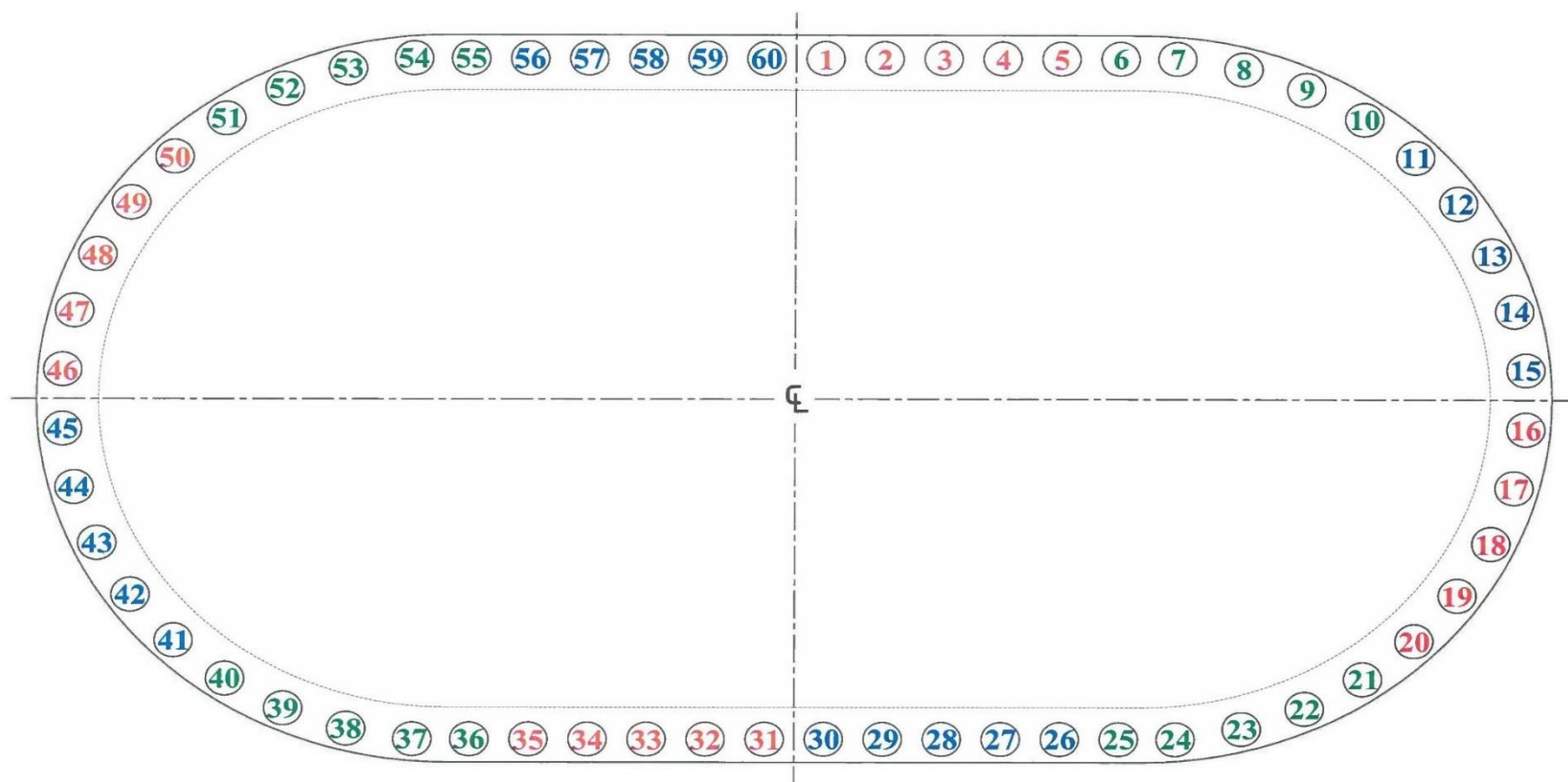
7. Bring the opposing flange into contact with the gasket.
8. Install the rest of bolts and nuts finger tight. Ensure that at least one full thread is visible beyond the nut for all studs.
9. Tighten studs in sequence order per table 2 with minimal torque to bring a snug tight, and flanges close fitting. Start at stud #1 as show in attached figure 1.
10. Apply torque to the stud in three passes per sequential order in table 2, for each pass follow specific instructions below. Do not over torque studs.
11. First pass: at 20% of the final torque value. Start at #1 and follow the sequence through per table 2.
12. Second pass: at 70% of final torque value. Start at #1 and follow sequence through per table 2.
13. Third pass: at 100% of full torque value. Start at #1 and follow the sequence through per table 2.
14. Fourth pass: at 100% a full torque – start at stud #1 on the flange and follow sequential numbering back to bolt #1 (1, 2, 3, 4, 5, 6....1).
15. Wait for minimum of 6 hours after completing the above bolt torque sequence and re-torque at 100% of full torque – start at #1 on the flange and end at #1.
16. Repeat flange re-torque every 4 weeks following procedure 15, as to maintain preload on assembled flange.

Table 2: Bolting Sequence for FWKO

Fire tube size	Stud Dia	Stud length and # of stud	Stud and Nut	Gasket	Installed Torque	Bolting Sequence
24" OD	1"	5.75" length – 60 total	ASTM A193 B7M Stud c/w ASTM A194 2HM Nut	NA1001 1/8"	408 Ft. lbs	1-2-3-4-5→31-32-33-34-35→46-47-48-49-50→16-17-18-19-20→56-57-58-59-60→26-27-28-29-30→11-12-13-14-15→41-42-43-44-45→6-7-8-9-10→36-37-18-39-40→51-52-53-54-55→21-22-23-24-25



Vessel Liquid Leak Testing & Flange Bolt up Specifications





Torqueing Specifications

Bolt Diameter	Threads Per Inch	Socket Size	Torque for Used Bolts (35,000 PSI Stress)	Torque for New Bolts
3/4"	10	1-1/4"	145 Ft. Lbs.	180 Ft. Lbs.
7/8"	9	1-7/16"	235 Ft. Lbs.	290 Ft. Lbs.
1"	8	1-5/8"	350 Ft. Lbs.	440 Ft. Lbs.
1-1/8"	8	1-13/16"	520 Ft. Lbs.	650 Ft. Lbs.
1-1/4"	8	2"	730 Ft. Lbs.	910 Ft. Lbs.
1-3/8"	8	2-3/16"	990 Ft. Lbs.	1,240 Ft. Lbs.
1-1/2"	8	2-3/8"	1,300 Ft. Lbs.	1,625 Ft. Lbs.
1-5/8"	8	2-9/16"	1,680 Ft. Lbs.	2,100 Ft. Lbs.
1-3/4"	8	2-3/4"	2,120 Ft. Lbs.	2,650 Ft. Lbs.
1-7/8"	8	2-15/16"	2,635 Ft. Lbs.	3,300 Ft. Lbs.
2"	8	3-1/8"	3,230 Ft. Lbs.	4,050 Ft. Lbs.
2-1/4"	8	3-1/2"	4,670 Ft. Lbs.	5,850 Ft. Lbs.
2-1/2"	8	3-7/8"	6,475 Ft. Lbs.	8,100 Ft. Lbs.
2-3/4"	8	4-1/4"	8,700 Ft. Lbs.	10,875 Ft. Lbs.
3"	8	4-5/8"	11,390 Ft. Lbs.	14,250 Ft. Lbs.
3-1/4"	8	5"	14,600 Ft. Lbs.	18,250 Ft. Lbs.
3-1/2"	8	5-3/8"	18,340 Ft. Lbs.	22,875 Ft. Lbs.
3-3/4"	8	5-3/4"	22,600 Ft. Lbs.	28,250 Ft. Lbs.
4"	8	6-1/8"	27,500 Ft. Lbs.	34,400 Ft. Lbs.

DIAMETER AND LENGTH OF ALLOY STEEL STUD BOLTS FOR 1/16 AND 1/4 INCH RAISED FACE FLANGES — ANSI B16.5

Nominal Pipe Size	150 1/16 Raised Face	300 1/16 Raised Face	400 1/4 Raised Face	600 1/4 Raised Face	900 1/4 Raised Face	1500 1/4 Raised Face	2500 1/4 Raised Face
1/2	4-1/2 x 2 1/4	4-1/2 x 2 1/2	4-1/2 x 3	4-1/2 x 3	4-3/4 x 4 1/4	4-3/4 x 4 1/4	4-3/4 x 4 3/4
3/4	4-1/2 x 2 1/2	4-5/8 x 3	4-5/8 x 3	4-5/8 x 3 1/2	4-3/4 x 4 1/4	4-3/4 x 4 1/2	4-3/4 x 5
1	4-1/2 x 2 1/2	4-5/8 x 3	4-5/8 x 3 1/2	4-5/8 x 3 1/2	4-7/8 x 5	4-7/8 x 5	4-7/8 x 5 1/2
1 1/4	4-1/2 x 2 3/4	4-5/8 x 3 1/4	4-5/8 x 3 3/4	4-5/8 x 3 3/4	4-7/8 x 5	4-7/8 x 5	4-1 x 6
1 1/2	4-1/2 x 2 3/4	4-3/4 x 3 1/2	4-3/4 x 4 1/4	4-3/4 x 4 1/4	4-1 x 5 1/2	4-1 x 5 1/2	4-1 1/8 x 6 3/4
2	4-5/8 x 3 1/4	8-5/8 x 3 1/2	8-5/8 x 4 1/4	8-5/8 x 4 1/4	8-7/8 x 5 3/4	8-7/8 x 5 3/4	8-1 x 7
2 1/2	4-5/8 x 3 1/2	8-3/4 x 4	8-3/4 x 4 3/4	8-3/4 x 4 3/4	8-1 x 6 1/4	8-1 x 6 1/4	8-1 1/8 x 7 3/4
3	4-5/8 x 3 1/2	8-3/4 x 4 1/4	8-7/8 x 5 1/2	8-7/8 x 5 1/2	8-7/8 x 5 3/4	8-1 1/8 x 7	8-1 1/4 x 8 3/4
3 1/2	8-5/8 x 3 1/2	8-3/4 x 4 1/2	8-7/8 x 5 1/2	8-7/8 x 5 3/4	8-1 1/8 x 6 3/4	8-1 1/4 x 7 3/4	8-1 1/2 x 10
4	8-5/8 x 3 1/2	8-3/4 x 4 3/4	8-7/8 x 5 3/4	8-1 x 6 1/2	8-1 1/4 x 7 1/2	8-1 1/2 x 9 3/4	8-1 3/4 x 11 3/4
5	8-3/4 x 3 3/4	12-3/4 x 4 3/4	12-7/8 x 6	12-1 x 6 3/4	12-1 1/8 x 7 1/2	12-1 3/8 x 10 1/4	8-2 x 13 1/2
6	8-3/4 x 4	12-7/8 x 5 1/2	12-1 x 6 3/4	12-1 1/8 x 7 1/2	12-1 3/8 x 9 1/4	12-1 7/8 x 13 1/4	12-2 x 15
8	8-3/4 x 4 1/4	16-1 x 6 1/4	16-1 1/8 x 7 1/2	16-1 1/4 x 8 1/2	16-1 3/8 x 10	16-2 x 14 3/4	12-2 1/2 x 19 1/2
10	12-7/8 x 4 1/2	16-1 1/8 x 6 3/4	16-1 1/4 x 8	20-1 1/4 x 8 3/4	20-1 1/2 x 10 3/4	16-2 1/4 x 16	12-2 3/4 x 21 1/4
12	12-7/8 x 4 3/4	20-1 1/8 x 7	20-1 1/4 x 8 1/4	20-1 1/2 x 10	20-1 5/8 x 11 1/4	16-2 1/2 x 17 1/2	
14	12-1 x 5 1/4	24-1 1/4 x 7 3/4	24-1 3/8 x 9	20-1 5/8 x 10 3/4	20-1 7/8 x 12 3/4	16-2 3/4 x 19 1/2	
16	16-1 x 5 1/4	24-1 1/2 x 9	24-1 3/4 x 10 1/2	24-1 7/8 x 13	20-2 x 13 3/4	16-3 x 21 1/4	
18	16-1 1/8 x 5 3/4				20-2 1/2 x 17 1/4	16-3 1/2 x 24 1/4	
20	20-1 1/8 x 6 1/4						
24	20-1 1/4 x 6 3/4						