1.0 PURPOSE

This procedure covers the Company's preferred system for flange tightening when using manual, click, break back torque wrenches or by the use of a hydraulic torque wrench; and should be used as the best practice guideline to follow. It is the objective of the guideline to provide a leak free sealed connection in a correct and safe manner by the use of manual and/or hydraulic torque wrenches.

2.0 SCOPE

All GIS Holdings, LLC Companies and affiliates including, Blanchard Industrial, LLC, GIS Engineering, LLC, Grand Isle Shipyard, LLC., GWIS, Mack Steel, NuWave, Valvemax, Discovery Industries, Inc., Global Inspections, LLC, and EIS, hereafter identified as "Company".

3.0 APPLICATION

This procedure applies to any joint or flange, which has been assembled to be torque tightened.

4.0 DEFINITIONS

Applied Torque - Torque applied to a nut/bolt assembly by means of a calibrated Torque Wrench.

Joint Completion Certificate - A report completed giving details of the tightened joint

MODS - Software used for planning, managing and tracking of bolted joint integrity .

Tag - A Tag, which is affixed to the joint before & after tightening to detail joint status for quick verification and traceability

Manual Click Torque Wrench - Manual Torque Wrench, which is normally rated to a maximum output of 1000 ft/lbs The wrench contains a mechanism that clicks when the required torque value is achieved

Manual Break Back Torque Wrench - Manual Torque Wrench, which is normally rated from 100Nm to 1000Nm maximum output . The wrench contains a linkage half way down which a breaks/activates when the required torque value is achieved

Hydaulic Torque Wrench – Hydraulic actuated ratchet design torque wrench with interchangeable square drive and hexagon cassettes which are normally powered by an air or electric operated pump unit up to a maximum operating pressure of 10,000 psi.

5.0 RELATED DOCUMENTS/REFERENCES

ASME PCC -1 2013 Guidelines for the Pressure Boundary Bolted Flange Joint Assembly

- **ASME PCC 1-2010 Guidelines for Pressure Boundary Bolted Flange Joint Assembly**
- **ASME B31.3 Process Piping**
- **ASME Section VII Division: Bolier Pressure Vessel Code**
- **GP 32-20 (section 8.3): Site Inspection, Testing and Commissioning of Plant**
- **GP 42-31 DRAFT Flanges-Joint Assembly Requirements**

6.0 APPROVED OPERATORS

Manual and hydraulic torque tightening is a trained specialist skill.

Only technicians trained and competent in the use of bolt tightening equipment, who have completed a recognised competence assessment program, can carry out the controlled breakout/assembly and tightening of bolted joints.

7.0 SAFETY SPECIFICS

Manual and hydraulic torque tightening tools enable the user to more easily accomplish bolting tasks with increased force, accuracy and efficiency. This also includes the assembly and assessment of bolted flange joints prior to any bolt torque activities on the flange joints.

Due to the nature of the tools (powered nature for electrical and hydraulic), with large forces generated by gravity, motion, or for hydraulic, fluid, air and electricity, strict safety issues should be followed through the tools proper design and documentation. The user must accept the primary responsibility of safety when using torque tightening tools by carrying out required site related documentation, LIFE documentation as well as reading, understanding, and complying with all operating instructions prior to, and during operation.

In a commitment to facilitate user understanding of all operating instructions, Company or equipment OEM supplies operation manuals and provides craft specific training courses.

This guideline is designed to assist in the proper use and care of torque tightening tools while playing a major role in preventing incidents.

7.0 EQUIPMENT

Manual Torque Wrenches
Manual torque wrenches have different size square drives and can also be supplied with a spigot to enable the fitting of an open end or ring type spanner attachment for using on torque applications where access is restricted. Square drive vs. torque output data can be found in operating manuals or technical date spec sheets.

Hydraulic Torque Wrenches
Hydraulic torque wrenches have different size square drive or direct fit hexagon cassettes that output various torque values and bolt/nut sizes. Square drive vs. torque output data can be found in operating manuals or technical data spec sheets. All hydraulic wrenches are normally powered from an air or electric operated hydraulic power pack with a maximum working pressure of 10,000psi / 700 Bar.

8.0 CALIBRATION

The wrench (manual wrenches) or pump (for hydraulic wrenches) must have a Certificate of Accuracy (COA) valid for the date of the task. If the wrench and/or pump have no valid certificate, it should be re-calibrated or changed. The interval of calibration is 12 months.

9.0 BOLTED FLANGE JOINT ASSEMBLIES

9.1 Preparation & Examination of Flange Contact Surfaces

Examine all gasket contact surfaces of both mating flanges for any damages to surface finishes including scratches, nicks, burrs, gouges and corrosion. Indications running radially across the facing are of particular concern and should be reported. Remove any previous gasket installation materials from the gasket surface contact areas. Use only vendor approved solvents compatible with flange and gasket materialsand/or soft wire brushes.

Examine the gasket contact surface of both flange faces for flatness, both radially and circumferentially. Report any questionable readings not conforming to ASME PCC-1 2-13 Appendix D.

Examine washer face of each nut and bolt and nut threads for rust, corrosion and burrs. Replace any questionable components. Test bolt/nut combinations to assure the nuts will not turn freely past where they will come to rest after tightening, should be replacedd. This includes tapped hole threads. If any separate washers are cupped or scored from previous use, replace with new through hardened washers. If re-using any botling materials, follow ASME PCC-1 2013 Appendix A guidelines.

Examine nut bearing and/or washer bearing surfaces of both flanges for coating, scoring, burrs and visual evidence of out-of-squareness. Remove or reduce any roughness, giuges, protrusions or coatings over 0.005 in (0.133mm) thickness.

Table D-1M Flange Seating Face Flatness Tolerances (Metric)

Measurement	Hard Gaskets	Soft Gaskets
Acceptable variation in circumferential flange seating surface flatness	$T1 < 0.15$ mm	$T1 < 0.25$ mm
Acceptable variation in radial (across surface) flange seating surface flatness	$T2 < 0.15$ mm	$T2 < 0.25$ mm
Maximum acceptable pass-partition surface height vs. flange face	-0.25 mm $< P < 0.0$ mm	-0.5 mm $< P < 0.0$ mm

GENERAL NOTE: See Figs. D-1 and D-2 for description of $T1$ and $T2$ measurement methods.

Table D-1 Flange Seating Face Flatness Tolerances (U.S. Customary)

Measurement	Hard Gaskets	Soft Gaskets
Acceptable variation in circumferential flange seating surface flatness	$T1 < 0.006$ in.	$T1 < 0.01$ in.
Acceptable variation in radial (across surface) flange seating surface flatness	$T2 < 0.006$ in.	$T2 < 0.01$ in.
Maximum acceptable pass-partition surface height vs. flange face	-0.010 in. $< P < 0.0$ in.	-0.020 in. $< P < 0.0$ in.

GENERAL NOTE: See Figs. D-1 and D-2 for description of $T1$ and $T2$ measurement methods.

Table D-2M Allowable Defect Depth vs. Width Across Face (Metric)

Measurement	Hard-Faced Gaskets	Soft-Faced Gaskets
$r_d < w/4$	< 0.76 mm	< 1.27 mm
$w/4 < r_d < w/2$	< 0.25 mm	< 0.76 mm
$w/2 < r_d < 3w/4$	Not allowed	< 0.13 mm
$r_d > 3w/4$	Not allowed	Not allowed

GENERAL NOTE: See Figs. D-3 and D-4 for description of defect measurement.

Table D-2 Allowable Defect Depth vs. Width Across Face (U.S. Customary)

Measurement	Hard-Faced Gaskets	Soft-Faced Gaskets
$r_d < w/4$	< 0.030 in.	< 0.050 in.
$w/4 < r_d < w/2$	< 0.010 in.	< 0.030 in.
$w/2 < r_d < 3w/4$	Not allowed	< 0.005 in.
$r_d > 3w/4$	Not allowed	Not allowed

GENERAL NOTE: See Figs. D-3 and D-4 for description of defect measurement.

Fig. D-1 Flange Circumferential Variation Tolerance, *T1*

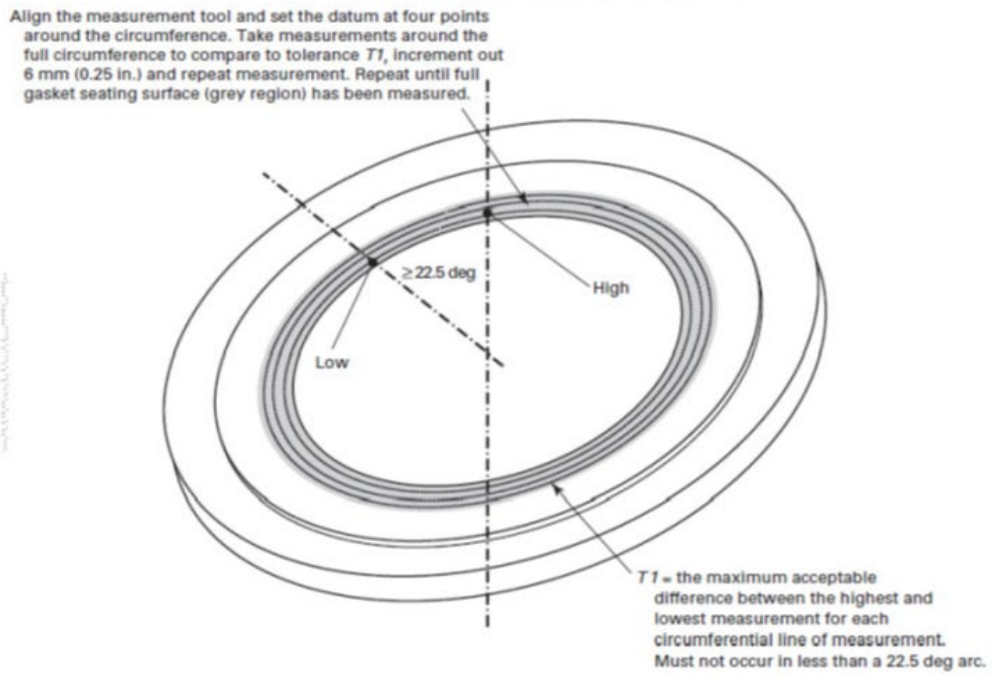


Fig. D-2 Flange Radial Variation Tolerance, *T2*

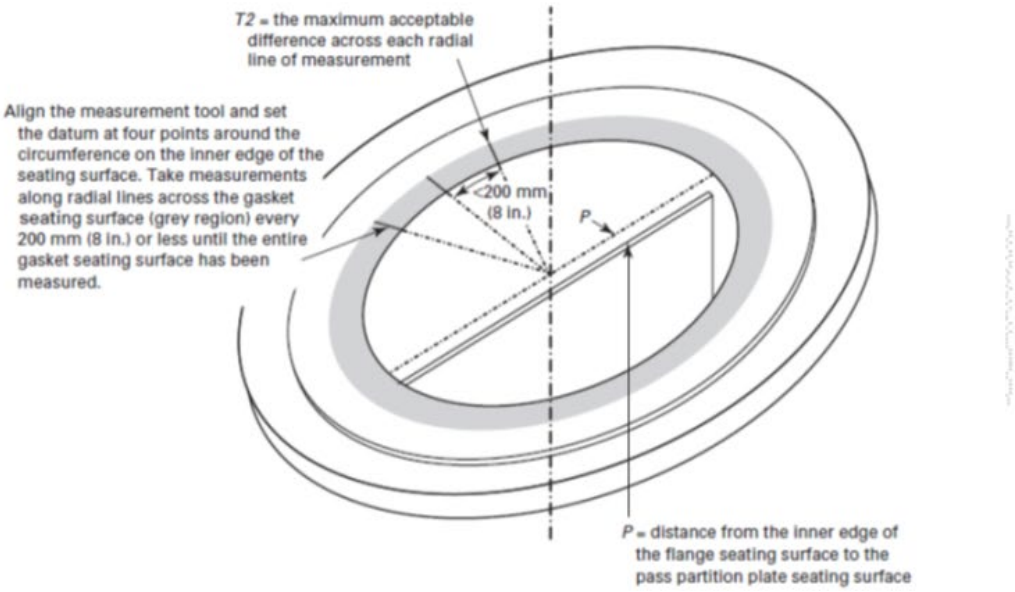


Fig. D-3 Flange Surface Damage Assessment: Pits and Dents

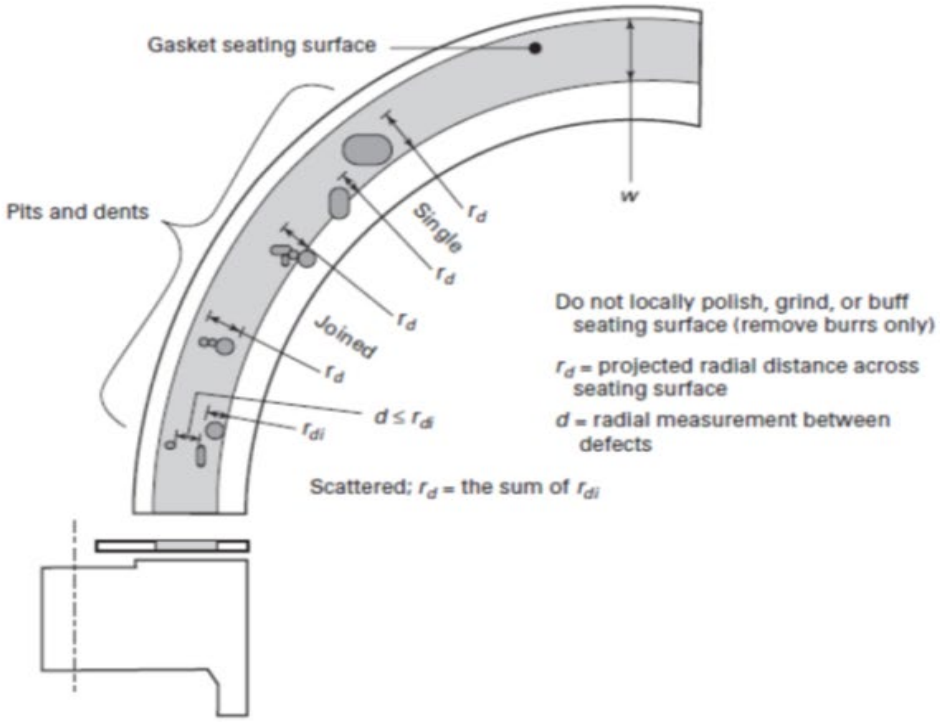
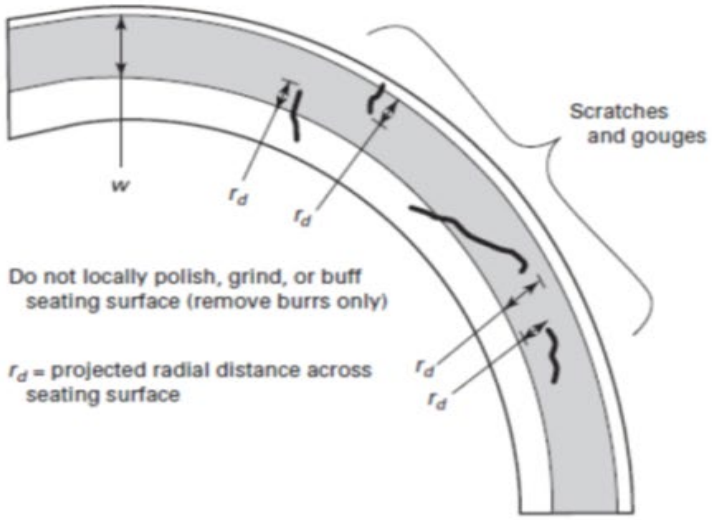


Fig. D-4 Flange Surface Damage Assessment: Scratches and Gouges

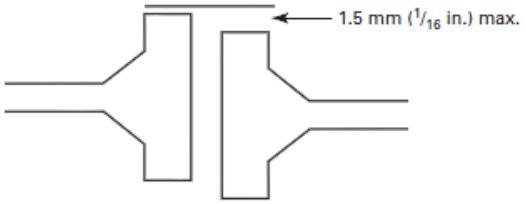


9.2 Alignment of Flange Joints

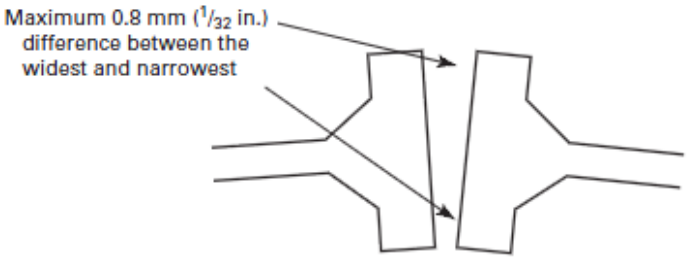
Proper flange alignment is necessary to maximize seating surface contact maximize uniform gasket loading and improve the effectiveness of overall bolt tighening methods. Flanges should be brought together slowly carefully as to not let them slam or strike each other or the gasket during assembly.

Ensure that the flanges are aligned based on centerline, parallelism, rotational and spacing or gap per the guidlines as follows:

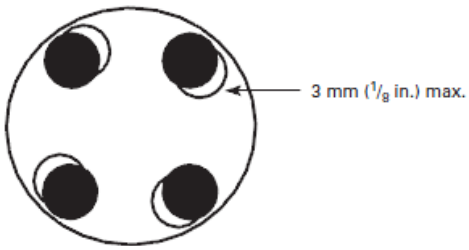
- Centerline/High Low – This will align the mating flanges so that the seating surfaces, inner diameter of the bore or the outer diameter of the mating flanges contact with the greatest amount of contact surfaces. This is measured by using a straight edge on the outer diamter of one flange and extending to the mating flange outer edge. This is to be conducted at four points, 90 degrees from each other. The tolerance at any point should not exceed 1/16” inch.



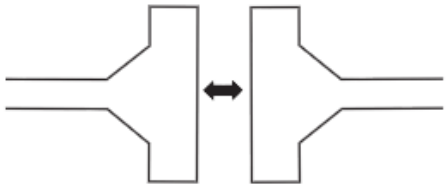
- Parallelism – This will create equal parallel spacing between the two mating flange face surfaces at all points around the joint circumference. The parallelism should be checked by measuring the points closest and farthest distances between the two flange faces and comparing. Acceptable distances (widest & narrowest) between the flange faces should be no more than 1/32” inch at the O.D. of the sealing surface. NO force greater than 10% of the MAXIMUM torque/bolt load should be used to achieve this measurement.



- Rotational – This will align the bolt holes so that the bolt holes align with each other allowing the bolts/studs to pass freely through the perpendicular flanges. The rotational alignment is measured by observing the 90 degree angle of the bolt holes where the bolt passes through the flange or holes are within 1/8” inch.



- Excessive spacing or gap – Spacing or gap will ensure that the flanges are not separated by a distance **greater than twice the thickness of the gasket** when the flanges are at rest and will not come together using reasonable force.



If no external alignment tooling is used, the flanges should be brought together with the uncompressed gasket uniformly across the flange faces using less than 10% of the equivalent total target assembly bolt load. When aligning the flanges no single bolt should be torqued above 20% of the **single bolt** maximum torque **OR** target bolt load.

If external alignment tooling is used, the flanges should be brought together to the compressed gasket thickness uniformly across the flange faces using an external load equivalent to less than 20% of the total target assembly bolt load.

9.3 Installation of Gaskets

Prior to the installation of the gasket, check both mating flange face surfaces assuring they are free of any unacceptable gasket sealing surface imperfections or flatness intolerances. Consult ASME PCC-1 Appendices D for allowable gasket contact surface flatness and defect tolerances.

Visually and physically inspect the gasket to verify the gasket complies with the dimensional O.D & I.D. thicknesses and material specifications. **REUSE OF A GASKET IS NOT RECOMMENDED.** Reuse of any gaskets will be considered and approved by the equipment owner's appropropriate and authorized personnel.

Position the gasket to be concentric with the flange I.D., taking precautionary measures to ensure that the gasket is adequately supported durgin the positioning process. No part of the gasket should be exposed to the flow path. If necessaray, only an approved light adhesive spray on the gasket ONLY, not the flanges, may be used to assist in positioning the gasket. Do not use any type of tape strips radially across the gasket to hold it in position. Do not use grease on the gasket or flange face.

Ensure the gasket will remain in postion during the joint assembly process. Installing one more than half the flange bolts and carefully inserting the gasket in place is an acceptable practice.

9.4 Lubrication of Bolts/Nuts

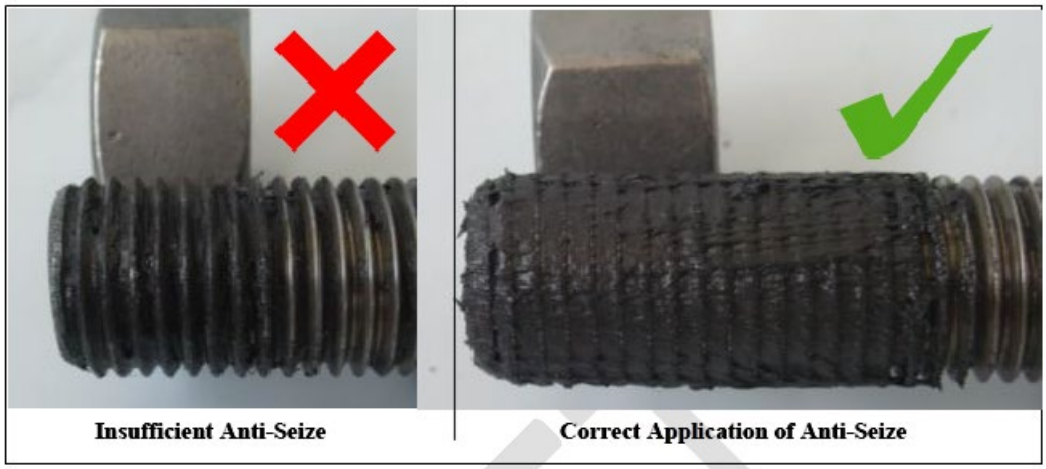
Before lubricant is applied to the botl and but threads, the nuts must turn freely by hand past the point they will come to rest after final tightening. Antisieze compounds are applied to all working surfaces of the nut and bolt to reduce the coefficient of friction, resulting in less required torque, while improving the consistency of achieving the proper bolt load within the joint.

Ensure the following:

- Lubricant is chemically compatible with the bolt, nut and washer materials.
- Lubricant is suitable for the expected range of service temperatures and antisieze requirements.
- Lubricant published K factor (nut factor) or coeffecient of friction is used to calculate the torque value.
- Lubricant is approved by client for use on their equipment.

Apply lubricant liberally and completely to all contact surfaces of the nut that is to be torqued, including all end threads, nut bearing faces and nut-to-washer bearing faces if applicable. The lubricant should be applied to the bolts AFTER they are inserted through the flange bolt holes to avoid possible contamination with any solid particles that may create unwanted reaction torque.

Do not apply lubricants to the gasket or gasket contact surfaces.



9.5 Installation of Bolts

Verify compliance of bolt and nut specifications such as material, diameter, length, thread pitch and nut thickness equal to the nominal bolt diameter (2H heavy hex nut series). Check all bolts for adequate length and damages. Lengths should consider the presence of washers, nut height (x2) and required protruding threads. The acceptable thread protrusion should be 1-3 threads beyond the nut face on the torquing side of the flange.

Corrosion of the excess bolt threads can hinder the joint disassembly due to corrosion, paint and thread damage. To facilitate joint disassembly, fully engage the nut on one end (no bolt protrusion beyond the nut) so that any excess bolt threads are located on the opposite end.

Install the bolts and nuts so they are hand-tight with the marked ends of the bolts and nuts loacted on the same side of the flange joint and facing outward to allow visual inspection. Once installation of the studs and nuts are complete, snug up the nuts to 10 ft/lbs-20 ft/llbs but do not exceed 20% of the target torque value.

9.6 Flange Bolt Tightening

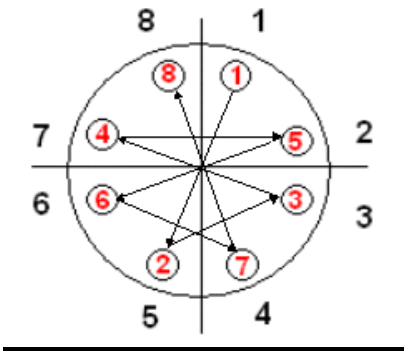
Visually check that the flange has been correctly assembled and the correct gasket is fitted. Check nut stampings are the correct way around.

Measure the flange gap at a minimum of four points around the flange (larger flanges should be at eight points). The bolt tightening sequence should begin at the point of the largest gap. Mark the correct tightening sequence on the studs in a clockwise direction with chalk as per diagram. For the correct sequence see (ASME-PPC-1 or Customer/equipment owner specification).

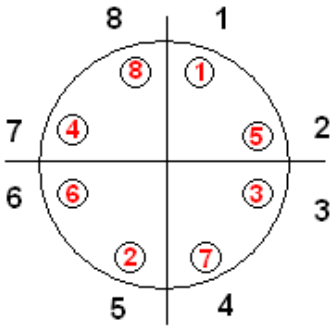
Determine the torque value for the flange and bolt material being tightened as recommended by the manufacturer, Client, MODS or ASME PCC-1 and that it is achievable with the tools being used. Check that the flange size, class, rating and bolt material match those on the data sheet.

Ensure the studs are numbered using the star pattern as indicated in the diagrams below.

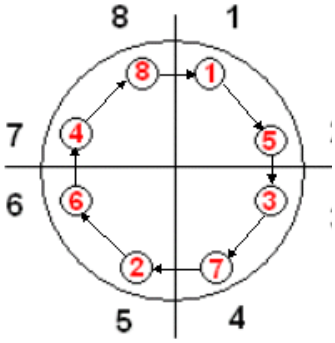
Marked Up 8 Bolt Flange

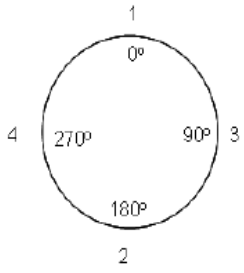


1st , 2nd , & 3rd Stage



4th & 5th Final Stage

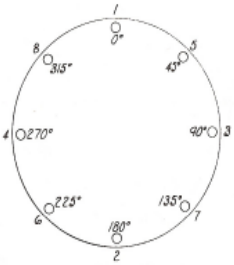




4-BOLTS

Sequential Order	Rotational Order
1-2	1
3-4	3
	2
	4

BOLT TORQUE PROCEDURE



8-BOLTS

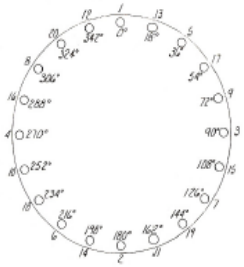
SEQUENCIAL ORDER	ROTATIONAL ORDER
1-2	1
3-4	5
5-6	3
7-8	7
	2
	6
	4
	8

BOLT TORQUE PROCEDURE

16-BOLTS

SEQUENTIAL ORDER	ROTATIONAL ORDER
1-2	1 2
3-4	9 10
5-6	5 6
7-8	13 14
9-10	3 4
11-12	11 12
13-14	7 8
15-16	15 16

BOLT TORQUE PROCEDURE



20-BOLTS

SEQUENTIAL ORDER	ROTATIONAL ORDER
1-2	1 2
3-4	13 14
5-6	5 6
7-8	17 18
9-10	9 10
11-12	3 4
13-14	15 16
15-16	7 8
17-18	19 20
19-20	11 12

38

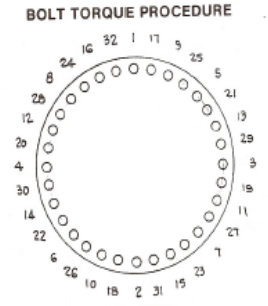
BOLT TORQUE PROCEDURE

24-BOLTS

SEQUENTIAL ORDER	ROTATIONAL ORDER
1-2 13-14	1 2
3-4 15-16	9 10
5-6 17-18	17 18
7-8 19-20	5 6
9-10 21-22	13 14
11-12 23-24	21 22
	3 4
	11 12
	19 20
	7 8
	15 16
	23 24

39

BOLT TORQUE PROCEDURE



32 BOLTS

SEQUENTIAL ORDER	ROTATIONAL ORDER
1-2	1
3-4	17 18
5-6	9 10
7-8	25 26
9-10	5 6
11-12	21 22
13-14	13 14
15-16	29 30
17-18	3 4
19-20	19 20
21-22	11 12
23-24	27 28
25-26	7 8
27-28	23 24
29-30	15 16
31-32	31 32
	2

40

Table 2
Torque Increments for Legacy Cross-Pattern Tightening Using a Single Tool

Step	Loading
Install	Hand tighten, then "snug up" to 15 N-m (10 ft-lb) to 30 N-m (20 ft-lb) (not to exceed 20% of Target Torque). Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.
Round 1	Tighten to 20% to 30% of Target Torque (see target torque table). Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening/ loosening before proceeding.
Round 2	Tighten to 50% to 70% of Target Torque (see target torque table). Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening/ loosening before proceeding.
Round 3	Tighten to 100% of Target Torque (see target torque table). Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening/ loosening before proceeding.
Round 4	Continue tightening the bolts, but on a circular clockwise pattern until no further nut rotation occurs at the Round 3 Target Torque value. For indicator bolting, tighten bolts until the indicator rod retraction readings for all bolts are within the specified range.
Round 5	Time permitting, wait a minimum of 4 hr and repeat Round 4; this will restore the short-term creep relaxation/ embedment losses. If the flange is subjected to a subsequent test pressure higher than its rating, it may be desirable to repeat this round after the test is completed.

10.0 MANUAL TORQUE WRENCH OPERATION

1. Square drive tools only: Check that the correct size impact socket has been selected and that it has a retaining ring and pin.

2. Check that the square drive is in the correct position for tightening operations.

3. Attach the impact socket and secure it with the retaining ring and pin.

4. Spigot drive tools only: Check that the correct size of open end or ring attachment has been selected for the relevant wrench and that it is fitted correctly.

5. All Tools: Decide what torque setting is to be used depending upon scope supplied by client or recommendation from MODS bolt load calculation software.

6. Adjust torque setting for the wrench by turning the handle or nut at the end of the wrench clockwise to increase the spring tension, which will increase the torque value. Turning the handle counter clockwise will reduce the spring tension, which will reduce the torque output.

7. The torque value selected will be visible either on a graduated scale inside a window of the handle on smaller click type wrenches or a graduated scale on the end of larger break back wrenches

8. Fit the wrench via the socket or spigot fitting to the application.

9. Position feet apart with one foot in front of the other.

10. Prepare body for sudden movement in case of ratchet or wrench slippage or back nut turning.
Note: When working at height safety harness must be worn!

11. When using larger manual torque wrenches assistance may be required to pull the wrench safely. If assistance is not available or the activity cannot be completed safely then the hydraulic torque tightening method should be used.

12. Pull the wrench clockwise towards the body using both hands, applying a steady force and constant load.

Note:

- If the back nut begins to move while tightening a backing spanner must be fitted to the nut and react off the next adjacent nut to prevent turning.
- Backing spanners must be secured to prevent accidental release by being tied off or other methods. Backing spanners also introduce pinch points.
- Do not activate the wrench by pulling erratically
- When using larger manual torque wrenches assistance may be required to pull the wrench safely.
- If assistance is not available or the activity cannot be completed safely then the hydraulic torque tightening method should be used.
- Do not use a “cheater pipe or bar” to gain leverage when operateing a manual torque wrench or back up spanner wrench.

13. Continue tightening operations by pulling the wrench clockwise until maximum travel or the torque value is achieved by activating the click or linkage mechanism.

14. Repeat steps 8 to 13 for all bolts/nut to be tightened.

15. After use reset the torque setting to zero prior to storing the wrench, this helps to maintain the calibration of the wrench.

HYDRAULIC TORQUE WRENCH OPERATIONS

Note : Operation by one person is always recommended unless the wrench cannot be handled safely. When two personnel are required then communication both verbal and visual must be maintained at all times between the tool handler and remote control/pump operator. The tool must not be energized without notification from the tool handler.

1. Ensure that the hydraulic pump is full of hydraulic oil and if an air power pump is being used, that the air lubricator has sufficient oil in it. A sufficient gauge size extension cord should be used for electrical supply to the air power pump.

2. Make sure that all air and hydraulic couplings are clean and free from dirt.

3. Square drive tools only: Check that the correct size impact socket has been selected and that it has a retaining ring and pin.

4. Check that the square drive is in the correct position for tightening operations.

5. Attach the impact socket and secure it with the retaining 'O' ring and pin.

6. Position the reaction arm for the best angle and safe operation then engage the retaining device.

7. Hex drive cassettes only: Check that the correct size hex - drive cassette has been selected for the relevant power head and that it is fitted correctly.

8. With the tool removed from the flange and safely positioned on the ground, connect the hydraulic hoses to the tool and the power console 9. Connect the pump to an air supply with whip checks and pins at all connections. Switch on air supply and check system for leaks.

10. The torque wrench is operated via a remote control pendant, which is connected to the pump unit. To extend the actuator depress the actuator control button until the actuator makes a complete stroke then release to allow the actuator to return.

11. Ensure that the torque tool is removed from the flange! Then proceed to set the pump to the required pressure for tightening by turning the 'Torque Control Valve' clockwise to increase pressure or counter clockwise to decrease pressure while actuating the tool until the required pressure is displayed on the pump calibrated pressure gauge.

12. Fit the tool onto the bolt via the nut ensuring that correct and safe reaction is achieved.

Note: Pinch Points are present around all reaction areas and in tight spaces. Hands and fingers must be kept clear from pinch points at all times.
Extreme caution shall be exercised under abnormal condition and additional risk assessments completed to mitigate potential hazards caused by unsecured tools.

13. To start the tightening process the pump operator will state "CLEAR", and will await a response of "YES" from the tool handler, when this response has been made he will then say "START" or "HOT". Once the start command has been made there will be a 2 second pause prior to activation of the wrench.

14. To tighten the nut, depress the actuator control button until the actuator makes a complete stroke then release to allow the actuator to return. Continue to stroke the actuator for further strokes until the required torque load and pump pressure is achieved and the nut is tight.

15. **Note: If the back nut begins to move while tightening a backing spanner must be fitted to the nut reacting off the next adjacent nut to prevent turning. Backing spanners must be secured to prevent accidental release by being tied off or other methods. Backing spanners also introduce pinch points.**

16. Repeat steps 11 to 15 for all bolts/nut to be tightened.

11.0 SAFETY REQUIREMENTS

- Risk Assessments will be undertaken according to Company and Customer procedures. This may result in extra safety requirements. The following list gives minimum requirements.
- Eye protection must be worn to (29 CFR 1910.133) (ANSI Z87.1-1989).
- Gloves must be worn.
- Do not exceed maximum output/pressure for the tool.
- Wear Safety boots and FRC's when required.
- Observe site-specific safety and environmental requirements.
- Observe all safety instructions in the Operation and Maintenance Manual for the specified Torque Wrench.
- Remove all hand, neck and loose body jewelry
- When working at height safety harness must be worn!

12.0 TORQUE TIGHTENING DON'T'S

- Never torque damaged or corroded bolts.
- Do not draw the joint up tight on one or two bolts, as this will cause local gasket crushing or pinching of the gasket.
- Do not over tighten bolts; take particular care with small bolts, i.e. less than 1" diameter.
- Never pull the manual torque wrench any further once the click or linkage has activated.
- Use a wrench that has been dropped or knocked without checking the calibration.

13.0 MONITORING AND AUDIT REQUIREMENT

- This document will be reviewed for continuing suitability, accuracy, applicability and continual improvement:
    - at least every 3 years
    - following changes in organization, process, product legal or other requirements,
    - or as part of corrective or preventive action

Manual Section 7	Issue Date 03/17/16	Revision Date 01/15/26	Policy Number LLCP-113
	Torqueing		

Project	***Customer:***	***Site:***
	Contact Name:	***Contact Phone #:***
	Company Project ID:	***Customer Project Name:***
Joint Ref.	***Joint ID No.:***	***Tag No.:***
	Joint Location:	***ISO/P&ID Flange No.:***
	Vessel/Flange/Valve ID:	***Line No.:***
Joint Data	***Joint Type:***	***Joint Size/ID:***
	Joint Material:	***Joint Rating:***
	Bolt Dia./Nut AF:	***Bolt Material:***
	Bolt Qty.:	***Bolt Coating:***
	Gasket Type:	***Gasket Material:***
	Lubricant Type:	***Lubricant Coef:***
	Washer (Y/N):	
Values	***Value Source:***	***Yield Percentage:***
	Bolt Load: (lbf or kN)	***Residual Bolt Stress: (Lbf/in2 0r N/mm2)***
	Source of Calculation:	
Torque	***Final Torque Value:***	***Units:***
	Pump Pressure:	***Pump Serial Number:***
	Torque Tool Model:	***Torque Tool Serial No.:***
	1st Pass Torque Value:	***2nd Pass Torque Value:***
	3rd Pass Torque Value:	***4th Pass Torque Value:***
	5th Pass Torque Value (optional):	
Verification	***Flange Inspection by:***	***Date:***
	Flange Assembly by:	***Date:***
	Torque Tightened by:	***Date:***
	Customer Acceptance:	***Date:***
	PRINT ALL NAMES	

Notes: