JFE

OCTG
SERVICE HANDBOOK

MARCH 2025

UNCONTROLLED WHEN PRINTED

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1 Introduction to JFE Premium Connections

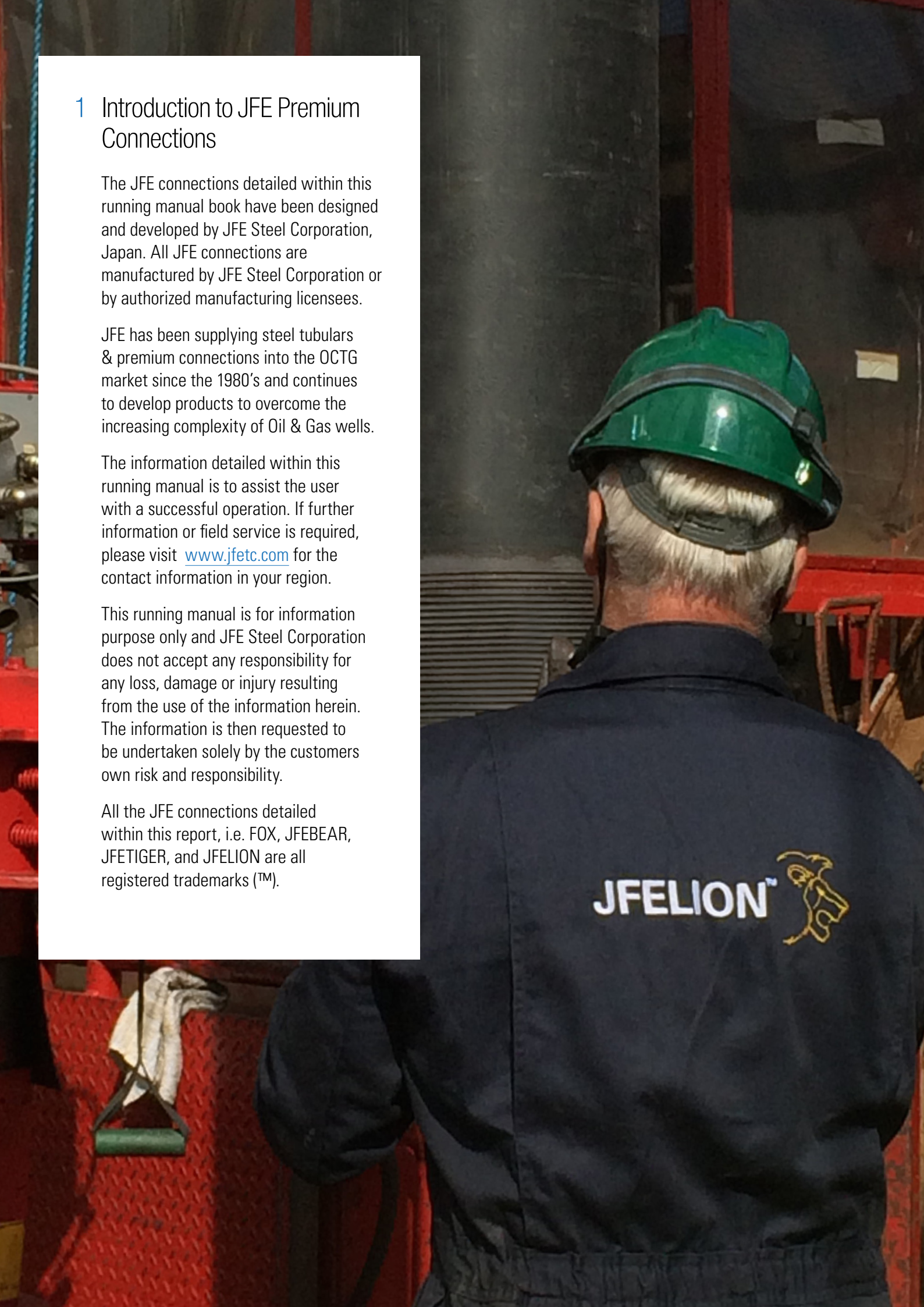
The JFE connections detailed within this running manual book have been designed and developed by JFE Steel Corporation, Japan. All JFE connections are manufactured by JFE Steel Corporation or by authorized manufacturing licensees.

JFE has been supplying steel tubulars & premium connections into the OCTG market since the 1980's and continues to develop products to overcome the increasing complexity of Oil & Gas wells.

The information detailed within this running manual is to assist the user with a successful operation. If further information or field service is required, please visit www.jfetc.com for the contact information in your region.

This running manual is for information purpose only and JFE Steel Corporation does not accept any responsibility for any loss, damage or injury resulting from the use of the information herein. The information is then requested to be undertaken solely by the customers own risk and responsibility.

All the JFE connections detailed within this report, i.e. FOX, JFEBEAR, JFETIGER, and JFELION are all registered trademarks (™).



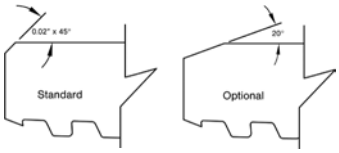
2 Alternative JFE Connection Options

2.1 100% & 101% Tensile Efficient (TE) Coupling

For various FOX & JFEBEAR sizes, the option of a 100% & 101% tensile efficient coupling OD exists. The standard coupling OD's were based on the original connection design, however with further connection design refinement, the 100% & 101% TE options provide a slimmer coupling OD while still maintaining the full connection performance properties.

2.2 45° Standard Chamfer & 20° Optional Bevel Options

For the FOX, JFEBEAR, JFETIGER & JFELION connections, to assist with smoother running operations and reduce couplings 'hanging up', a 20 degree optional bevel option is available. If the 20 degree optional bevel is selected, it should be noted that the coupling bearing face load rating is reduced. The maximum bearing face load ratings are shown on the CDS.

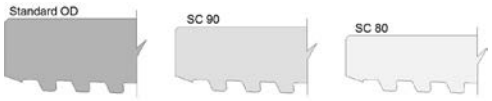


2.3 Special Clearance Options

Special clearance options are available for all JFE connections (see the specific connection special clearance OD section for further info). The special clearance options provide a further, slimmer connection OD, however this then impacts the connections yield strength and therefore the overall string tensile strength. If the coupling is special clearance, a black band will be painted adjacent to the material grade colour identification bands, plus the stencil description will include SC.

Stencil Example

JFEBEAR™ SC80 L80-13Cr 7" 29#, where the coupling OD tensile efficiency is 80%.



2.4 GRE Liner

Glass Reinforced (GRE) liner is available on various sizes of FOX, JFEBEAR & JFELION connections.

2.5 Internal Plastic Coating Guidelines

Internal plastic coatings can be applied to JFE premium connections, specifically FOX, JFEBEAR, JFETIGER & JFELION. If a plastic coating exists within the tubing ID, no coating shall be applied to the thread, seal, and torque shoulder areas. The figures below show the acceptable areas for plastic coating applications on JFE premium connections.

Acceptable coating area

Unacceptable coating area

2.6 Non-standard Products

The JFELION and JFEBEAR connections offer a number of non-standard products for various customer projects around the globe. These products will be identified as non-standard by the stencilling on the connection, e.g. JFEBEAR HT, and JFELION CBR, to list a few. For datasheets and more information with respect to these connections, please contact your local JFE-TC office.

2.7 Maximum Torque with Sealability

The Maximum Torque with Sealability (MTS) value is available for JFEBEAR and JFELION connections only. This torque value is the maximum figure the connection can be assembled to while maintaining sealability.

The torque can be applied during tong make-up on the rig floor, or alternatively, during rotation downhole. If applying on the rig floor, it is recommended that all mill end couplings are torqued to the MTS value during production at the steel mill or manufacturing licensee.

For smaller diameter connections, MTS is not available due to the low margin between the current maximum torque and structural yield torque.

All MTS values can be found on the specific connection data sheets available at www.jfetc.com.

2.8 Fatigue Life Performance

Connection fatigue information is typically required for drilling with casing or riser applications.

Various full scale fatigue testing has been performed on the connection product line offered by JFE Steel Corporation.

For more information on specific connection fatigue life, please contact your local JFE-TC office.

2.9 JFE Clear-Run Product Guide

JFE Clear-Run is an environmentally friendly running system which is available on JFEBEAR, JFETIGER and JFELION. Clear Glide is the primary component of the Clear-Run system which offers excellent long-term corrosion and galling resistance, therefore allowing products to arrive at the rig site in a ready to run condition. Clear Glide has a yellow OSPAR rating.

End finishing of pin and box connections for the JFE Clear Run system is critical where Clear-Plate (a proprietary electroplating technology) must be applied to chrome alloy boxes to ensure successful make-ups.

See the specific connection end finish requirement section for further info for the JFE Clear Run end finish requirements.

The following table describes where Clear-Glide can be purchased and Clear-Plate can be applied.

Clear-Glide Stockists	Licensed Clear-Plate Facilities
GB Premium Services (USA) Beattie (Canada) MITE (Europe)	MP Eastern Limited (UK) S&S Plating (USA) Guerrero Plating Technology (USA) Sobena Offshore Sdn Bhd KSB (Malaysia) Isiziz Plating Co. Ltd (Japan) Iwase Plating Co. Ltd (Japan)

3 Pipe Storage & Handling

3.1 General Storage in Yard

It is recommended that upon receipt of tubular goods, remove from the export packing and store in an indoor, dry atmosphere if possible. 13Cr tubulars should be inspected immediately after arrival to ensure no water contamination exists which can cause corrosion during storage. The following points should be adhered to for the storage of tubular goods:

1. Grades 13Cr or above are generally kept in wrap type systems
2. Store pipes at least 18inches above ground level to prevent contamination
3. Rest pipe on supports, adequately spaced to prevent bending of the pipe
4. Hardwood strips/dunnage to be present between layers of pipe so no weight is applied to couplings
5. It is recommended for chromium tubulars, especially 13Cr, that hardwood strips/dunnage be lined with plastic or rubber to avoid direct contact with the tubulars. This will prevent potential pitting
6. Bumper rings can also be utilised to avoid metal contact
7. Pipe should not be stacked higher than 10ft
8. Pipe & connections should be inspected periodically, i.e. every 1 to 3 months
9. During inspection the protectors are likely to be removed, therefore once inspection is completed ensure storage compound provides 100% coverage of connection prior to reinstallation of protector

3.2 General Storage at Rig Site

Before transferring the pipe to the pipe deck, it is recommended to inspect the area and ensure the correct materials i.e. dunnage is available before the operation begins. The following points are also recommended for storage at the rig site for all steel grades:

1. Hardwood should be placed on top of the deck beams before the first lot of pipe is laid down
2. Between each pipe layer, at least two rows of hard wooden spacers should exist, perpendicular to pipe length to avoid bending during storage, pipe OD contact, and ease of inspection
3. Keep protectors fitted during storage to avoid damage to the connections
4. Storage compound should be applied to the connection to avoid corrosion if pipe is not rig prepped

3.3 High Chrome/CRA Handling Guidelines

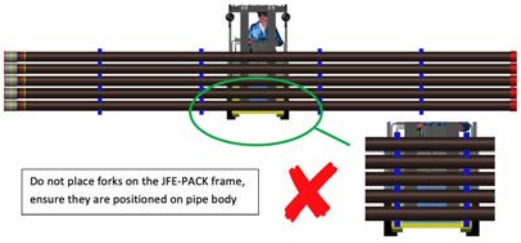
1. Handle joints individually using nylon slings (recommended). Do not use metal wire rope
2. Avoid rough handling i.e. colliding joints together, as this can result in localised work hardening
3. In the case of threading, padded pipe tables, padded forks and non-steel drifts should be utilised
4. If storing for long periods, indoor storage is recommended
5. Low stress/non marking dies should be utilised for tongs, slips & elevators when running high chrome tubulars

3.4 Storage & Handling of Tubulars in JFE-PACK

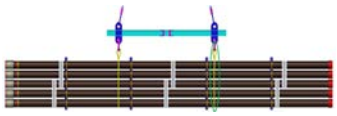
The following steps are recommended when handling pipe contained within the JFE-PACK system:

- Lift the JFE-PACK system by crane or forklift as shown in the following images

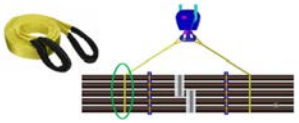
Correct Forklfit Handling Practice



Crane with beam hanger and nylon slings



Crane with nylon slings

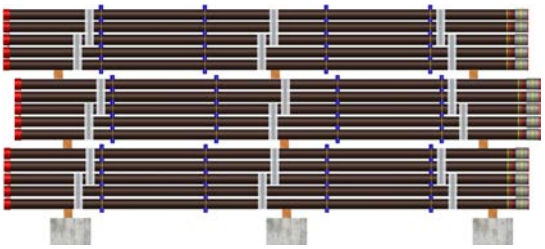


- Ensure slings are positioned on the pipe body, not the packaging
- Ensure JFE-PACK is lifted vertically to eliminate any possible damage due to impact

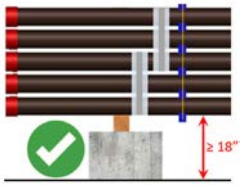
The following steps are recommended storing pipe contained within the JFE-PACK system:

- When stacking JFE-PACKS, place hardwood strips/dunnage with minimum size 105mm x 105mm x required length between each pack to ensure packs do not get damaged
- Maximum height should be no more than 10ft (2.1m) high, a maximum of 4 packs
- Storage racks should be high enough to avoid contact with the ground and have sufficient runners to prevent pipe from sagging (min. 3 runners for R3)
- Rack pipes at least 18" (457 mm) above ground. If the area where pipe is being stored is prone to flooding, then the height from ground should be increased accordingly. JFE do not recommend laying the JFE-PACK or pipe directly on the ground.

JFE-PACK with appropriate support and hardwood/dunnage



JFE-PACK stored at correct height above ground



3.5 JFE-PACK Assembly Procedure

This section details the equipment, tooling and assembly instructions for the JFE-PACK which is used to transport pipe from the JFE Steel mill to the customer's yard and/or rig site.

The JFE-PACK is a proprietary composite type packaging system offered by JFE Steel to avoid metal to metal pipe contact during transportation and storage.

For further information regarding the packing technology, please contact info@jfetc.com

All the preparation, packing and handling steps detailed within this document are to ensure optimum performance of the JFE-PACK. JFE Steel Corporation does not accept any responsibility for any loss, damage or injury resulting from the use of the information herein. The information is then requested to be undertaken solely by the customers own risk and responsibility.

3.5.1 Tooling and Equipment Required

Tooling	Equipment
• Torque wrench • Metal/steel banding tool	• Metal banding • Polypropylene sheet • JFE-PACK nut • JFE-PACK T-bolt/rod • Appropriate JFE-PACK spacer • JFE-PACK frame (bottom, middle and upper sections)

3.5.2 Packing Preparation

Prior to pipe packing, the bottom section of the JFE-PACK frame should be positioned appropriately so the pipe weight is supported equally.

The bottom section of the JFE-PACK is easily identifiable – it is the only section that has a 'hook type' fixture on each end. The hook should face down as shown in the image below.

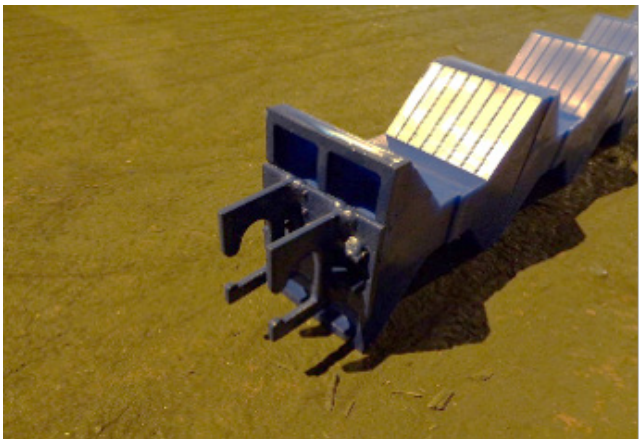


Image 1 – Bottom section of JFE-PACK with 'hook' – positioned downwards

3.5.2-1 JFE-PACK Bottom Section Positioning Criteria (R2)

For pipe lengths 25 to 34ft, the bottom section should be positioned as shown in figure 1. The pipes to be packed should be measured to acquire the overall length, and the centre determined. Once the centre is determined, the left and right hand side bottom sections can be positioned.

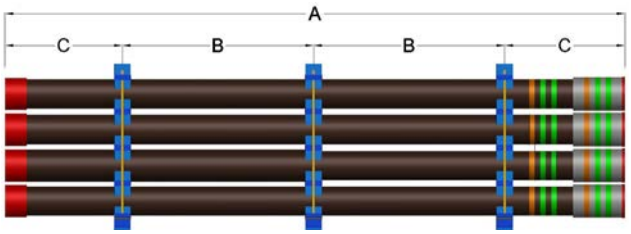


Figure 1 – JFE-PACK Positioning (Only applicable for R2 lengths)

Table 1 – Example of JFE-PACK Positioning lengths for R2 lengths

A	B	C
25ft	Max 10ft	Min 2.5ft
34ft	Max 11.25ft	Min 5.75ft

3.5.2-2 JFE-PACK Bottom Section Positioning Criteria (R3)

Pipe lengths 34.1 to 48ft, the bottom section should be positioned as shown in figure 2. The pipes to be packed should be measured to acquire the overall length, and the centre determined. Once the centre is determined, the left and right hand side bottom sections can be positioned.

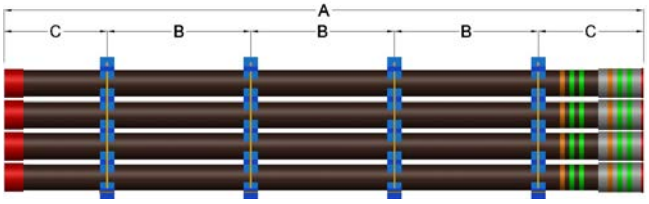


Figure 2 – JFE-PACK Positioning (Only applicable for R3 lengths)

Table 2 – Example of JFE-PACK Positioning lengths for R3 lengths

A	B	C
34.1ft	Max 9.5ft	Min 2.8ft
48ft	Max 11.25ft	Min 7.125ft

Lengths for B & C are adjustable, however adequate area should exist in order to assemble the polypropylene and metal banding as explained in section 5.2.

3.5.3 JFE-PACK Bottom Section Positioning Criteria (Pup Joints)

If pup joints are packed using the JFE-PACK system, only two frames shall be required. This is applicable to lengths from 2 to 10ft. The JFE-PACK sections shall be positioned at equal distances along the length of the pup joint. See the figure below for more information.

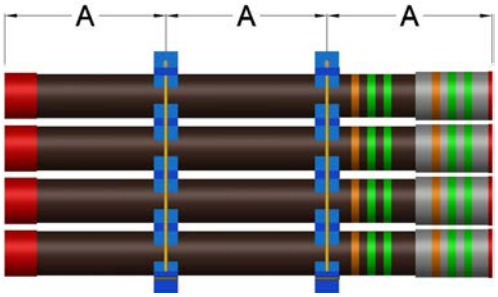


Figure 3 – JFE-PACK Positioning (Applicable for various pup joint lengths)

Table 3 – JFE-PACK Positioning lengths for pup joint lengths, 2 to 10ft

A
Equal lengths (min: 0.67ft / max: 3.33ft)

3.5.4 Packing and Stacking

1. Once the bottom sections of the JFE-PACK have been positioned accordingly on level ground, the pipes can be lowered onto the frame section.
2. Ensure that the mill ends are aligned before positioning the middle section of the JFE-PACK directly above the bottom frame section. The middle section of the JFE-PACK is shown below.

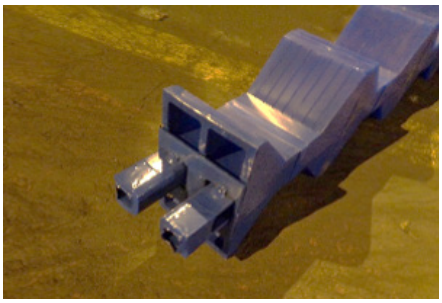


Image 2 – Middle section of JFE-PACK with two straight arms

Once the middle sections have been positioned, the next column of pipe can be lowered carefully onto the middle frame section.

3. Steps 2 and 3 can be repeated until the maximum number of columns has been achieved. The maximum numbers of columns are shown in table 4 on page 14.
4. Finally, once the stacking has been complete, the final top section should be placed directly above the uppermost middle section. The top section of the JFE-PACK is shown below.

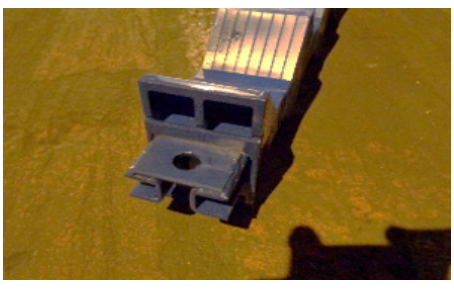


Image 3 – Top section of JFE-PACK with flat plate and hole – facing upwards

Important note: If insufficient pipes remain to completely fill the uppermost column of the JFE-PACK, the pipes shall be positioned using figures 4 & 5 as examples - do not stack to one side.

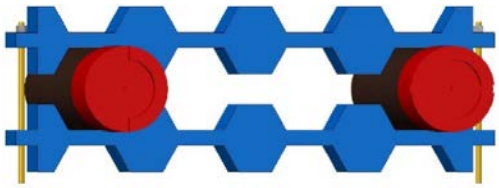


Figure 4 – two pipes remain for upper column

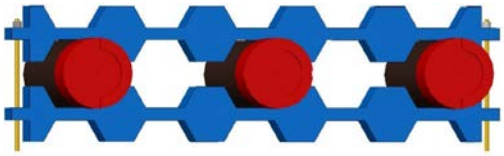


Figure 5 – three pipes remain for upper column

Table 4 – Maximum pipes per row (width) and column (height)

Outer Diameter (inch)	Nominal weight (lb./ft.)	Max pieces per row	Max pieces per column	Maximum pieces per JFE-PACK	
				R2	R3
				3 frames	4 frames
2 3/8	4.6	9	8	72	63
2 3/8	5.1	9	7	63	54
2 3/8	5.8	9	6	54	45
2 3/8	6.2	9	6	54	45
2 7/8	6.4	7	7	49	42
2 7/8	7.7	7	6	42	35
2 7/8	8.6	7	5	35	28
3 1/2	9.2	6	6	36	30
3 1/2	10.2	6	5	30	24
3 1/2	12.7	6	4	24	18
4	13.0	5	5	25	20
4	14.8	5	5	25	20
4	16.5	5	4	20	15
4 1/2	11.6	5	5	25	25
4 1/2	12.6	5	5	25	20
4 1/2	13.5	5	5	25	20
4 1/2	15.1	5	4	20	15
5	15.0	4	4	16	16
5	18.0	4	4	16	16
5 1/2	15.5	4	4	16	16
5 1/2	17.0	4	4	16	16
5 1/2	20.0	4	4	16	12
5 1/2	23.0	4	4	16	12
6	18.8	3	3	9	9
6 5/8	23.3	3	3	9	9
6 5/8	28.0	3	3	9	9
6 5/8	32.0	3	3	9	9
7	26.0	3	3	9	9
7	29.0	3	3	9	9
7	32.0	3	3	9	9
7	38.0	3	3	9	6
9 5/8	43.5	2	2	4	4
9 5/8	53.5	2	2	4	4

3.5.5 Securing the JFE-PACK

Insert bolts and secure

1 Once the frames are in the correct positions, following the instructions set out in section 4, the T-section bolt and nut (see image 4 below) should be assembled to secure the frames in place. See table 5 for required bolt lengths.

Image 4 – T-section bolt and nut

2 The T-section of the bolt should be positioned within the downward facing hook of the bottom JFE-PACK section and the threaded end passed through the hole of the upper JFE-PACK section.

3 The M16 lock nut should then be screwed onto the bolt and tightened using the torque wrench to a maximum torque of 177ft-lb. (240Nm). If this torque is exceeded, it may deform the JFE-PACK – see image below showing the T-section bolt and nut in torqued state.

Table 5 – Bolt length table for tubing and casing (inches)

OD (inch)	OD (mm)	Number of layers							
		1	2	3	4	5	6	7	8
2 ⅜	60.3	4.33	7.87	11.81	15.75	19.69	23.62	27.17	30.71
2 ⅞	73.0	4.92	9.25	13.19	17.52	21.85	26.38	30.71	-
3 ½	88.9	5.71	10.43	15.75	20.28	25.20	30.31	-	-
4	101.6	6.30	11.81	16.93	21.85	27.56	-	-	-
4 ½	114.3	6.69	12.20	18.31	24.21	30.31	-	-	-
5	127.0	7.87	13.98	19.69	26.38	-	-	-	-
5 ½	139.7	7.87	14.57	21.26	28.54	-	-	-	-
6	152.4	7.87	15.75	22.83	-	-	-	-	-
6 ⅝	168.3	9.06	16.93	25.20	-	-	-	-	-
7	177.8	9.25	17.72	25.98	-	-	-	-	-
7 ⅝	193.7	9.84	18.90	-	-	-	-	-	-
8	203.2	10.63	19.69	-	-	-	-	-	-
8 ½	215.9	10.63	20.28	-	-	-	-	-	-
8 ⅝	219.1	11.81	22.83	-	-	-	-	-	-
9 ⅝	244.5	11.81	22.83	-	-	-	-	-	-

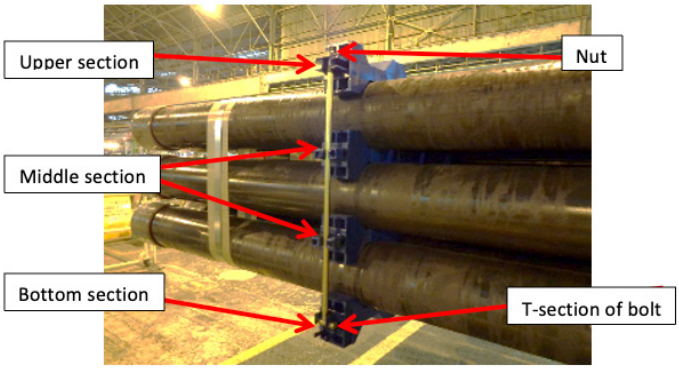


Image 5 – JFE-PACK with T-section bolt and nut in secure position

Steel Banding with Polypropylene Sheet

The final part of the packing process, to provide extra stiffness and secureness, is the assembly of polypropylene sheet and steel banding over the OD of the pipes.

A few important factors shall be followed when banding the pipe together:

1 The polypropylene sheet length should be at least 4 inch (102mm) longer than the length required to wrap around the pipe – see image 6 below

2 The polypropylene sheet width shall be a minimum of 4.5 inch (114mm) on either side of the metal band

3 Edge of the polypropylene sheet shall be 8" +/- 0.5" (203mm +/- 13mm) from edge of the JFE-PACK frame

4 Metal band width shall be minimum 1.25" (32mm)

5 The distance between metal bands positioned side by side shall be within 12" (305mm)

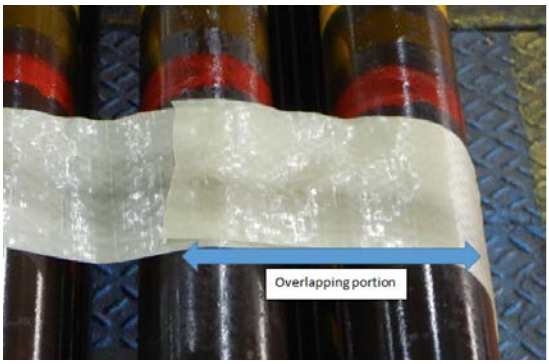


Image 6 – polypropylene overlapping technique

Image 7 – polypropylene overlapping technique

Steel Banding Positioning Guidelines

Depending on the length of pipe, i.e. R2 or R3 and pipe outer diameter, the number of bandings required shall change. See figures 6 to 9 for more details.

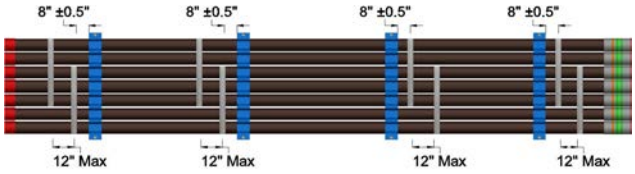


Figure 6 – Applicable to R3 joints where OD is ≤ 2 7/8" (Birdseye view)

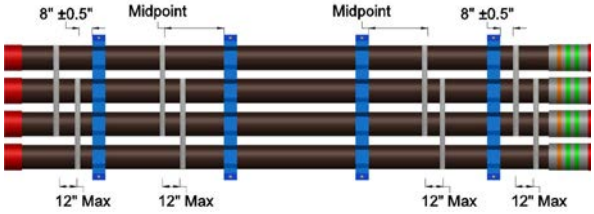


Figure 7 – Applicable to R3 joints where OD is > 2 7/8" (Birdseye view)

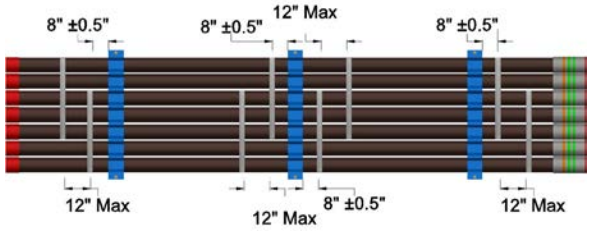


Figure 8 – Applicable to R2 joints where OD is ≤ 2 7/8" (Birdseye view)

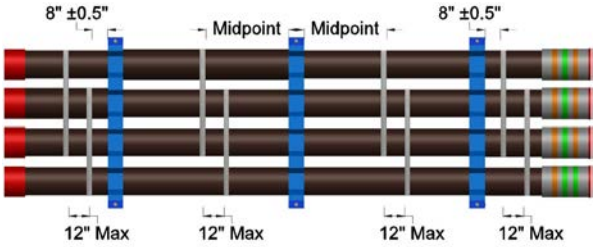


Figure 9 – Applicable to R2 joints where OD is > 2 7/8" (Birdseye view)

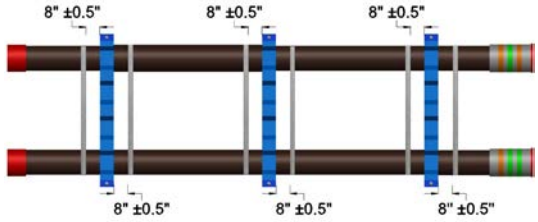


Figure 10 –
Applicable to R2 joints where the uppermost column of the JFE-PACK is not full
*Birdseye view of **top column only***

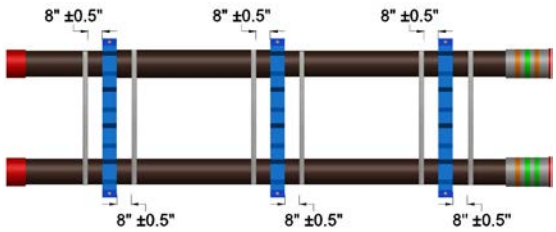


Figure 11 –
Applicable to R3 joints where the uppermost column of the JFE-PACK is not full
*Birdseye view of **top column only***

3.5.6 Safety Guidance for Unpacking or JFE-PACK

1. Do not stand directly in front of the metal band when cutting loose. Due to the tension in the metal band, it may spring suddenly which could cause injury if the person is hit by it.
2. Do not attempt to pull the remaining metal band from between the pipes once cut in order to avoid injury. Wait until pipes have been lifted by appropriate method and metal bands which have fallen to the floor can then be collected.
3. When loosening the bolts from the JFE-PACK, perform in stages, i.e. loosen slightly on one side, followed by loosening slightly on opposite side. By performing this in stages, the person will allow for the frame to relax equally.

3.5.7 Safety Guidance for Unpacking or JFE-PACK

The following points should be adhered to when handling loaded JFE-PACK's to avoid pipe or JFE-PACK frame damage:

1. Handle one JFE-PACK at a time
2. Use a spreader bar if lifting using a crane to distribute weight appropriately and ensure nylon slings are positioned around the pipe body, not the JFE-PACK
3. If using a forklift, ensure the folks are lined with nylon or wood and position the forks so contact is made to the pipe body only, not the JFE-PACK
4. When stacking JFE-PACK's, position at least two hardwood strips/dunnage (min size: 4" x 4") on the top of each JFE-PACK to avoid damage
5. It is recommended for chromium (≥13%Cr) tubulars, that hardwood strips/dunnage be lined with plastic or rubber to avoid direct contact with the tubulars. This will help to lessen the potential of pitting. See JFE's handling and storage guidelines for additional information
6. No more than 4 to 6 (depending on pipe size) JFE-PACK's should be stacked on top of each other at any one time to avoid exceeding a height of 10ft
7. If loading pipe onto a heavy goods vehicle, position hardwood strips/dunnage on the bed of the vehicle at suitable positions to avoid JFE-PACK contact with HGV bed. Ensure hardwood strips do not contact with the JFE-PACK

4 Approved thread compounds

This procedure recommends the thread compounds that can be used to make-up JFE connections.

JFE do not recommend the use of thread compounds containing PTFE (Teflon®) for premium connections.

List of Approved Thread Compounds include, but are not limited to:

Connection	Material Grade	API Modified [1]	Weatherford Lube Seal	Jet-Lube HPHT
FOX®	Carbon	✓	✓	✗
	9Cr to 17Cr	✓	✓	✗
	CRA	✓	✓	✗
JFEBEAR®	Carbon	✓	✓	✗
	9Cr to 17Cr	✓	✓	✗
	CRA	✓	✓	✗
JFETIGER®	Carbon	✓	✓	✗
	9Cr to 17Cr	✓	✓	✗
	CRA	✓	✓	✗
JFELION®	Carbon	✓	✓	✗
	9Cr to 17Cr	✓	✓	[8]
	CRA	✓	✓	[4]
JFERABBIT®	Carbon	✓	✗	✗

Connection	Material Grade	BOL 4010NM	TOPCO Green Seal II	Clear-Glide™ [2]	BOL 2000
FOX®	Carbon	✓	✗	✓	✗
	9Cr to 17Cr	≤5.5" [7]	✗	✓	✗
	CRA	≤5.5" [7]	✗	✓	✗
JFEBEAR®	Carbon	✓	✗	✓	✗
	9Cr to 17Cr	≤5.5" [7]	✗	✓	✗
	CRA	≤5.5" [7]	✗	✓	✗
JFETIGER®	Carbon	✓	✗	[4]	✗
	9Cr to 17Cr	[6]	✗	[4]	✗
	CRA	[6]	✗	[4]	✗
JFELION®	Carbon	≤5.5" [5][6]	[3]	[4]	✗
	9Cr to 17Cr	≤5.5" [7]	✗	[4]	✗
	CRA	≤5.5" [7]	✗	[4]	✗
JFERABBIT®	Carbon	✗	✗	✗	✓

[1] Thread compounds that are in compliance with API RP 5A3 Annex A can be used on JFE connections. Different names are given and are dependent on the thread compound manufacturer.

[2] Clear-Glide™ is to be used only with Clear-Run™ prepared tubulars, i.e. when the proper end finishing is applied.

[3] For use in geothermal well applications.

[4] Contact your local JFETC office for further information.

[5] Can be applied to sizes larger than 5.5" with as machined pins if Clear-Plate™ is applied to the coupling/box.

[6] Can be applied to sizes larger than 5.5" with Mn phosphate on the couplings, if the pin ends are abrasive blasted in accordance with JFE specifications.

[7] Can be applied to sizes larger than 5.5" if Clear-Plate™ is applied to the coupling/box.

[8] Can be applied to sizes ≤ 5.5" if Clear-Plate™ is applied to the coupling/box.

JFE continues to evaluate the use of thread compounds. It is recommended to contact your nearest JFE-TC office for further information if other compounds that are not listed are required. Please continuously refer to www.jfetc.com for the most updated list and technical data.

This table is for informational purpose only.

4.1 Application of thread compound

A thin, even coat of approved thread compound should be applied to the pin and box so the entire seal and thread areas are fully covered and the profiles are discernible.

Before application, ensure the connections are thoroughly cleaned and dried and the thread compound has been stirred to obtain a homogenous consistency.

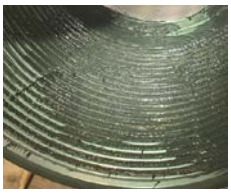
Application of the thread compound should be performed with a non-metallic soft bristle moustache brush as shown in Fig 6.1 or similar.

The pictures below show a few examples of poor and good doping practises.

✗ *Too little thread compound applied*

✗ *Excessive thread compound applied*

✗ *Too little thread compound applied*



✗ *Excessive thread compound applied*

✓ *Correct amount of thread compound applied*

✓ *Correct amount of thread compound applied*

4.2 Application of Clear-Glide (Clear-Run)

A thin, even coat of Clear Glide should be applied to the pin and box thread and seal areas to achieve a semi-transparent appearance where the profiles are discernible and inspection through the Clear Glide is possible.

Before application, ensure the connections are thoroughly cleaned and dried.

Application of the Clear Glide should be performed with a non-metallic moustache brush as shown in figure 6.1 or similar.

The pictures below show a few examples of poor and good Clear Glide applications.

✗ *Too little thread compound applied*

✗ *Excessive thread compound applied*

✗ *Too little thread compound applied*

✗ *Excessive thread compound applied*

✓ *Correct amount of thread compound applied*

✓ *Correct amount of thread compound applied*

5 Pre-Running

5.1 Horizontal Connection Make-up

A number of accessories will usually be assembled onshore in workshops prior to shipment to the rig site. The information detailed within this section is intended to assist the onshore make-up operations to ensure a smooth and successful operation. This is applicable to all JFE premium connections.

5.1.1 Equipment required

- Uncontaminated thread compound that has been thoroughly stirred prior to application (see section 4 or the relevant connection section for the list of approved thread compounds)
- Uncontaminated non-metallic, soft bristle brush or moustache brush as shown in figure 6.1 for compound application
- Appropriate sized horizontal power tong with suitable load cell, i.e. a 50kft-lb power tong is usually unsuitable for a make-up torque of 2,000ft-lb. The torque turn monitoring system should have the ability to record 1,000 data points per turn
- Ensure the horizontal power tong Tailstock/back-up and headstock/tong have the appropriate sizes dies to ensure an even gripping pressure around the circumference of the pin and box accessories
- The horizontal power tong should have sufficient torque capacity in the event a break-out is required. Typically, break-out is 20% greater than the make-up torque
- Obtain the correct mill end make-up torque from the relevant technical specification (JFE-TP-J-101) or www.jfetc.com
- The mill end optimum make-up torque is the average of the field optimum torque and maximum torque

5.1.2 Certification

Ensure the horizontal power tong is within calibration. Calibration intervals should be no greater than 6 months.

Power Tong Calibration Interval	
Assembly shops/JFE licensees: ≤ 12 months	Tubular running service company (offshore/onshore): ≤ 6 months

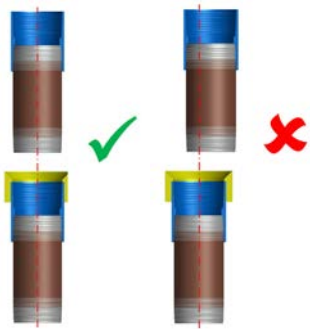
5.1.3 Procedure

- Ensure the pin and box connections are cleaned and dried thoroughly, followed by a visual inspection
- Check section 13.9 & 12.8 to determine whether Molybdenum Disulphide should be applied to the pin and box seal and shoulder areas. If yes, apply uniformly and ensure it dries before dope application
- Next, apply a thin even coat of the approved thread compound (see section 4.1 & 4.2) to both pin and box
- Screw on coupling/accessory to the pin or vice versa and tighten to the hand tight position. A strap wrench or chain tong can be used to assist with this operation
- Position the horizontal tailstock and headstock around the assembly and grip in appropriate areas. Note: An anti-deformation plug is recommended for the box field end if gripping over this area. Note 2: Recommend to use spirit level to ensure proper alignment is achieved.
- Make-up the connection using the appropriate torque figures (www.jfetc.com and section 10.7 / 11.7 / 12.7 / 13.7). Do not exceed 6RPM during the make-up
- Check the graph meets the acceptance criteria (detailed in the specific connection make-up acceptance criteria section)
- Finally, clean excess compound from ID and end drift as per API 5CT or customer requirements
- Apply a suitable or specific storage compound before applying the thread protector

5.2 Recommended Checks

Before running JFE connections, the following preliminary checks should be carried out:

- Ensure the rig alignment is correct as per the image below:



- Ensure the correct thread dope compound (see section 4 or the relevant connection section for the list of approved thread compounds for approved compounds) & sufficient amount exists to complete the entire job. Do not use if expiry date has passed and JFE recommends that a new pail of dope is used for each running job
- If pipe measuring is required on pipe deck, remove protectors and measure from pin face to box face. This is the total length and the effective length can be achieved using the following calculation:
  Effective length = total length – make-up loss
  (Make-up loss can be found on the connection data sheet)
- Check the equipment and surrounding areas are safe and free from any potential hazards
- Check the correct elevators and stabbing guides are compatible with the coupling and pipe diameters – slip type elevators should be used for special bevel and special clearance couplings
- Check the tong and torque turn equipment are calibrated and hold a valid calibration certificate
- Check the load cell is suitable for the upcoming running job, i.e. a 50kft-lb power tong is unsuitable for a make-up torque of 2,000ft-lb
- Ensure the torque turn equipment is computer controlled. Recommended resolution = 1000 DP/Turn
- Ensure the correct make-up torque values for the JFE connection are applied
- Check the tong dies, slips and slip type elevators are appropriate for the running job i.e. low stress/non-marking for high chrome/CRA/Sour Service material[1]. See section 6.4
- If drifting, precautions should be taken to ensure the nose/seal areas are not damaged. A Teflon or Nylon drift is recommended. If possible, install open ended thread protectors when carrying out this operation. Drift sizes are specified in section 5.3.
- If running chromium steel connections, nylon slings and strap wrenches should be available
- Ensure a sufficient quantity of spare thread protectors are available in the event the pipe is pulled
- Locate and inspect all required pipe and accessories to be installed and ensure the correct connection and material grade exists
- When cleaning the connections prior to running, remove the storage compound using high pressure hot water, cleaning solvent, i.e. soap, then ensure connections are completely dry. Do not use diesel or kerosene as this may leave a thin film on the threads and affect the friction during make-up
- Re-install clean thread protectors before lifting operations up to the vee door begin

The torque figures for all JFE connections can be found at www.jfetc.com.

All the major tong operators' offer dies for use with their tong equipment when running corrosion resistant alloy (CRA) tubulars. It is important when running CRA tubulars to minimise or prevent surface penetration as this can lead to stress raisers and assist with stress corrosion cracking (SCC) and/or sulphide stress cracking (SSC).

5.3 Drifting

- It is recommended to perform the drift operation from box to pin end to avoid dragging dirt and debris from the ID of the pipe into rig prepared box connections
- The drift may also be known as a 'rabbit' where the length is shorter than the required length as per API 5CT. The use of this is at the customers discretion.
- A Teflon or Nylon drift is recommended for all operations, however when drifting chromium or CRA steel grades a Teflon or Nylon drift mandrel must be used
- The drift mandrel should meet the API specifications (5CT E.28) as shown in the following table:

Standard drift sizes:

Size (inch)	Standard Length (inch)	Drift Diameter (inch)
Tubing		
≤ 2 7/8	42	d-(3/32)
> 2 7/8 to 8 5/8	42	d-(1/8)
> 8 5/8 to 10 3/4	42	d-(5/32)
Casing		
< 9 5/8	6	d-(1/8)
9 5/8 to 13 3/8	12	d-(5/32)
> 13 3/8	12	d-(3/16)

d = nominal pipe internal diameter

Alternative/special drift sizes:

Size (inch)	Weight (lb/ft)	Standard Length (inch)	Drift Diameter (inch)
7	23.00	6	6.250
7	29.00	6	6.125
7	32.00	6	6.000
7 3/4	46.10	6	6.500
8 5/8	32.00	6	7.875
8 5/8	40.00	6	7.625
9 5/8	40.00	12	8.750
9 5/8	53.50	12	8.500
9 5/8	58.40	12	8.375
9 7/8	66.90	12	8.500
10 3/4	45.50	12	9.875
10 3/4	55.50	12	9.625
11 3/4	42.00	12	11.000
11 3/4	60.00	12	10.625
11 3/4	65.00	12	10.625
13 3/8	72.00	12	12.250
14	114.00	12	12.250
14	115.00	12	12.250

6 Running Information

6.1 Guidelines

- During the pick-up operation where the pipe will travel up the vee door, the single joint elevator should fit neatly around the pipe behind the coupling
- If drifting from the top of vee door, precautions should be taken to ensure the nose/seal areas are not damaged. A Teflon or Nylon drift is recommended. If possible, install open ended thread protectors when carrying out this operation
- Inspect the box connection at this stage and ensure no damage exists
- To avoid a potential drop hazard downhole, it is recommended to apply the approved thread compound to the dry, clean box at this stage – excess dope compound should be removed. Application of the thread compound should be performed with a non-metallic soft bristle moustache brush as shown in Fig 6.1 or similar
- Throughout travel up the vee door, the pin protector should remain tightly assembled to prevent damage
- Alternatively, if pick-up and laydown equipment is used, these should be lined with plastic/rubber when handling chromium, CRA & sour service grades. Wood should not be used to line the bucket as wooden splinters can cause problems during make-up and running
- Do not remove the pin thread protector until the joint is hanging vertically in the derrick area – this will help to prevent damage from mishandling. Do not remove directly above the open coupling secured in the rotary table/slips to avoid contamination
- If 'quick type' protectors are utilised, the shipping protector should be removed immediately prior to lifting up the vee door and the quick type protector installed before travel – the 'quick type' protector should fit correctly and cover the entire connection
- Once the pin protector is removed, inspect to ensure no damage exists before applying the approved thread compound over the dry, clean connection – excess dope compound should be removed. Application of the thread compound should be performed with a non-metallic soft bristle moustache brush as shown in Fig 6.1 or similar

Fig 6.1 - Moustache Brush - Recommended application brush for thread compound

- In some cases, the connections may arrive at the rig in a 'ready to run' state, therefore no dope application will be required on the drill floor
- Install a clean, correctly sized stabbing guide to the coupling and securely fasten
- Once the pin is directly above the box immediately before the stabbing process, check the alignment once again
- The initial one or two turns during the stabbing process are critical to achieve correct thread engagement. For small diameters, a strap wrench or chain tong can be used to assist with this process, and for large diameters the tong in low speed can be utilised
- For chrome and CRA material, it is recommended to use a strap wrench to walk the connection in. This will reduce the chance of cross-threading and possible galling damage
- If the connection becomes locked during stabbing, rotate the pipe in the reverse direction until the connection drops, also known as 'bumps'
- Once the stabbing operation is completed, the final make-up operation can commence
- Position power tongs around the connection and ensure the tong grips pipe to pipe at the appropriate gripping pressure. See section 6.4 for jaw/die permissible depth mark information
- During the final make-up stage, the maximum rotational speed should not exceed 6 RPM
- If a tubing connection (≤ 4 ½") has three failed make-up attempts, lay down and select a new pin
- If a casing connection (≥ 5") has two failed make-up attempts, lay down and select a new pin

It is recommended to clean make-up dies, slip dies and elevator dies every 50 joints to avoid slippage and subsequent damage to the pipe/coupling body.

It is recommended to use slip type elevators for special clearance OD and 20° optional bevel couplings.

JFE Clear-Run Running Guide

- JFE Clear Run prepared pipe will likely be delivered to the rig site in a ready to run condition, therefore no cleaning is required. Clear Glide acts as a long-term storage and running compound
- A visual inspection can be performed through the Clear-Glide due the semi-transparent appearance
- Ensure contamination does not occur which may result in running issues, e.g., yielding
- Check www.jfetc.com for the latest torque figures as Clear Run make-up torques are different from the standard product

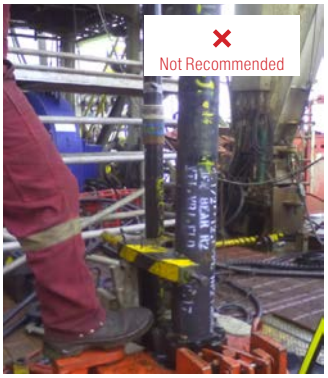
6.2 Running Dual Completions

When running dual completions, it is recommended to use a dual completion tong as shown below:

Using a dual completion tong eliminates the requirement for a spreader bar

A spreader bar will cause side loading on the connection as shown in the image to the right. This is not recommended.

For additional running information, follow the steps as detailed in running guidelines (Section 6.1)



Photos courtesy of Frank's International

6.3 Running Pipe in Stands

- Stands should be racked with pin protectors fitted & seated on a wooden board/non-metallic surface
- Ensure a weight compensator is being used when running stands. It is recommended the compensator be set at 50 to 100lbs more than the total stand weight.
- Once the connection has been stabbed correctly, rotate the pipe anti-clockwise to ensure correct thread engagement has been achieved. The tong can then be used to run in the casing to the hand tight position, not exceeding 6RPM
- For small diameter casing, care should be taken to prevent the stand from bowing during stabbing and make-up operations
- Follow the steps as detailed in the above running guidelines (Section 6.1)
- When racking back stands post break-out, protectors should be assembled tightly on the pin connections. There should also be a sufficiently sized hole within the protector to allow for drainage of rain water and fluids from the ID
- If a box protector is installed, a sufficient hole should exist to prevent pressure build up when lowering the stand
- Stands should be placed on wood or rubber mats during storage
- If stands are to be stored for prolonged periods, the pin and box connection should be cleaned and storage compound applied before assembly of the protector

For additional information, please refer to the full running manual (JFE-TP-M-001) which can be found at www.jfetc.com.

6.4 Jaw/Die Depth Mark Information

6.4.1 Low Alloy Criteria

OD Size (inch)	Coupling OD Max Grip Mark (inch) as per API 5CT E.36	Pipe OD Max Grip Mark as per API 5CT SR2 Requirement (JFE-TC Recommendation)
< 3 ½	0.025	5% of Nominal Wall Thickness
3 ½ to 6.068	0.030	
> 6 ⅝	0.040	

6.4.2 High Chrome and CRA Criteria

For material with chrome content from 9%Cr to 17%Cr, JFE recommend the use of low stress or non-marking jaws/dies.

For CRA materials, i.e. API 5CRA groups 2 to 4, non-marking jaws/dies are recommended however it is up to discretion of the end user.

For high chrome and CRA material, it is recommended that a maximum tong depth of 0.015" or 5% of nominal wall thickness (whichever is less), exists on both the pipe and coupling surface.

Note: To promote good industry practise, it is recommended to treat sour service grade steels in a similar fashion to CRA in order to avoid stress raisers in high concentration hydrogen (H2S) environments.

6.5 Orientating Well Features

JFE Steel offer an option where connections can be manufactured to assist with the alignment of well features to specific orientations, whether onshore or offshore. This feature is typically required for gauge mandrels, dual completions, etc.

It is strongly recommended that a trained JFE representative be present for any orientation process.

For more information, please contact your local JFE-TC office.

7 Break-out & Re-running Information

7.1 Break-out

In order to break-out the connection, the tong should be positioned so that the back-up jaws grip over the mill end coupling OD. Do not apply excessive jaw gripping pressure.

Photo courtesy of Weatherford International

- Ensure the back-up grips on the tong are the correct size for the coupling OD
- Apply tension to the joint or stand; the applied load should equal approx. the weight of the joint or stand. It is recommended to utilise a weight compensator
- Apply the break-out torque slowly and maintain a steady speed to avoid damage
- Never use a hammer or other hard object to assist with the break-out as this may cause damage
- The torque required to break-out the connection may be considerably more compared to make-up
- For chrome connections, once the torque is low enough, it is recommended to use a strap wrench to walk the connection out
- To avoid damage, ensure a stabbing guide of the correct size is assembled over the coupling before lifting the joint out of the corresponding box
- For whatever reason the connection is being broken out for, if not being immediately re-run, clean the connection before applying storage compound or Clear Glide and fitting the appropriate thread protector. Clear Glide in an approved storage compound for JFE connections.

7.2 Re-running

Prior to re-running, it is recommended that the connections are inspected by a qualified JFE field service representative to ensure they are acceptable to run in hole again.

- If a tubing connection (≤ 4 ½") has three failed make-up attempts, lay down and select a new pin
- If a casing connection (≥ 5") has two failed make-up attempts, lay down and select a new pin

8 Thread Locking Procedure

This guideline outlines the method for applying thread locking compound and the make-up acceptance criteria.

8.1 Locking Compound Information

The locking compound manufacturer's instructions should be followed to ensure the compound is used correctly. The locking compound should be mixed and applied at the last moment prior to make-up to prevent make-up issues, e.g., high shoulder torque. The compound begins to cure immediately once the catalyst is introduced causing the friction factor to increase over time.

8.2 Application Procedure

1 The thread locking compound should be applied to the pin thread run-out area as shown below in figure 8.2.1. Under no circumstances should the locking compound be applied to the seal and torque shoulder areas. Thread compound can be applied to the pin nose and torque shoulder areas.

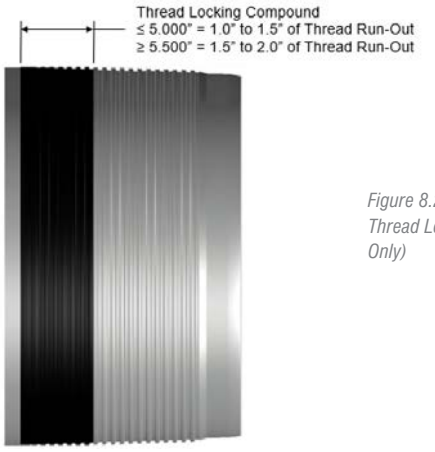


Figure 8.2.1 – Thread Lock Application (Pin Only)

2 Apply a thin, even coat of the approved thread compound to cover the thread, seal and torque shoulder area shown in figure 8.2.2 below. The compound should cover approximately 50% of the box connection where seal and thread forms should be discernible after application.

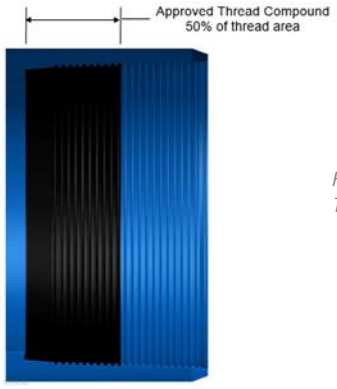


Figure 8.2.2 – Thread Compound Application (Box Only)

3 When making up the connection, standard torque values with a friction factor of 1.0 shall be used.

8.3 Torque Values

Depending on the type of locking compound and connection size, increasing the torque range may be required. The maximum torque with sealability (MTS) value can be used as a maximum torque value. When using the MTS, adjust the optimum torque to 95% of the MTS while maintaining the original minimum torque value. If an MTS value is not shown on the connection data sheet, please contact your local JFETC office for further assistance.

Torque setting example:

Torque	MTS	MTS value on CDS
	Optimum (Dump)	95% of MTS value
	Minimum	Minimum

Thread lock make-up graph examples are shown in figures below.

Figure 8.3.1 – Example where optimum torque has been set at 95% of the MTS value

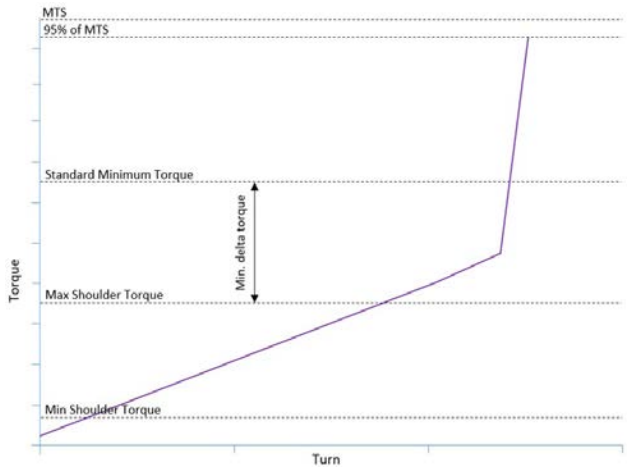
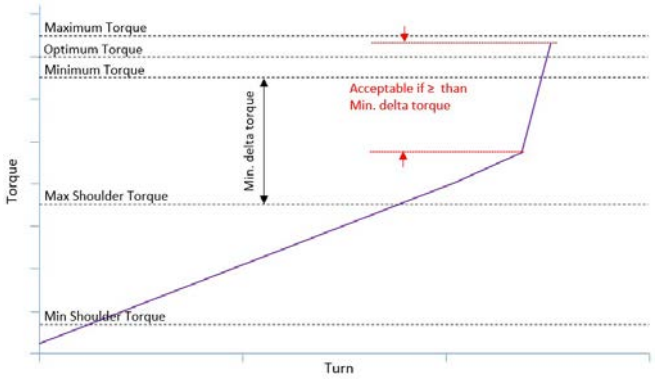
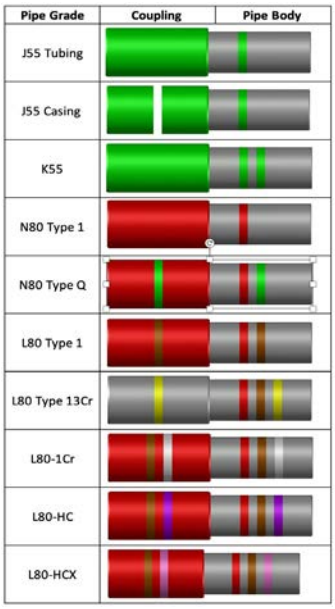


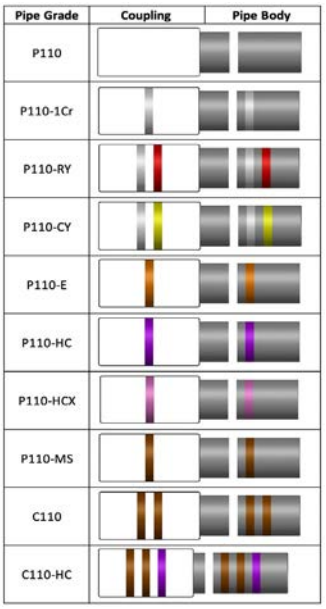
Figure 8.3.2 – The minimum delta torque is achieved after shouldering during make-up, the make-up is acceptable

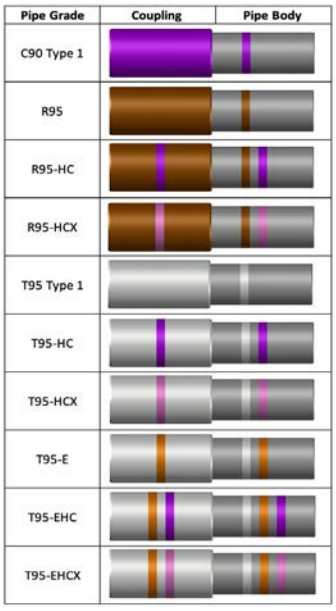


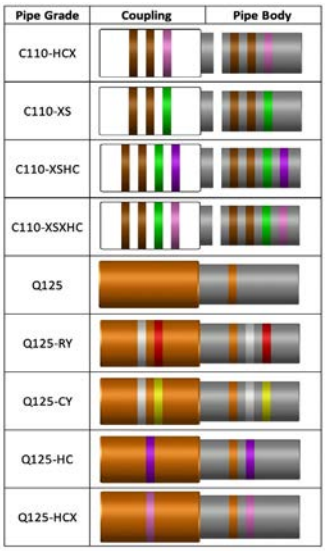
9 Pipe and Coupling Colour Code Information

9.1 API 5CT

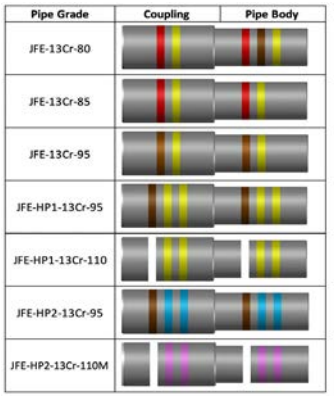


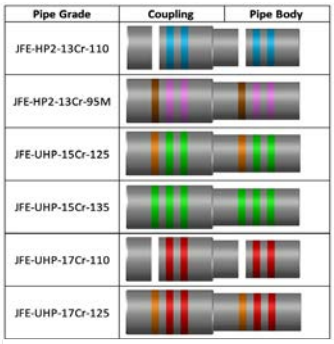




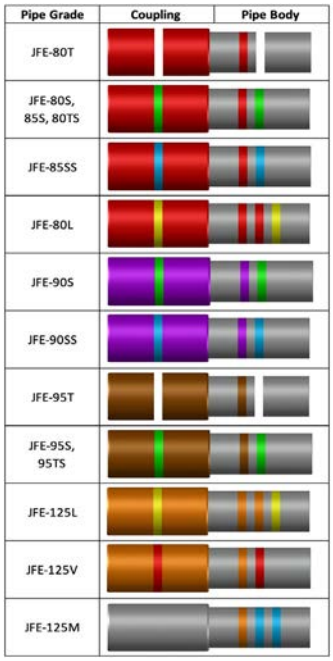


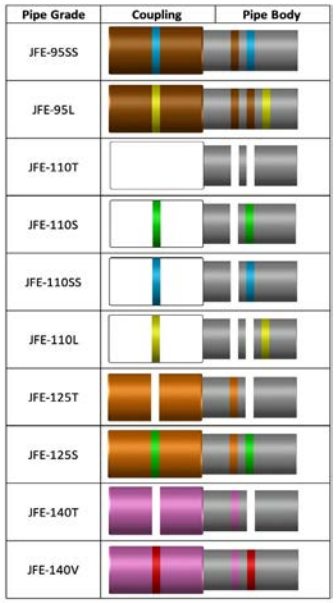
9.2 JFE Chrome



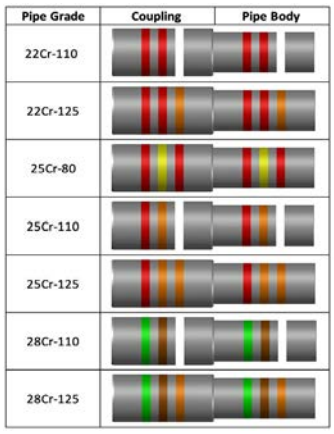


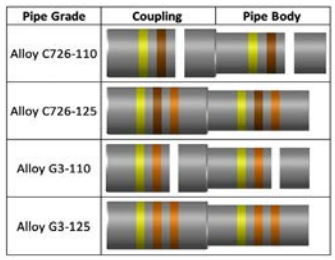
9.3 JFE Carbon





9.4 API 5CRA





10 FOX

10.1 Design Features

Figure 10.1.1 – Alloy Box Detail

Figure 10.1.2 – Carbon Box Detail

Figure 10.1.3 – Alloy & Carbon Pin Detail

OD (inch)	Threads per Inch (TPI)
2 ⅜ to 2 ⅞	8
3 ½ to 4	6
4 ½ to 13 ⅜	5

10.2 Interchangeability

FOX connections with differing weights are interchangeable within a given OD. Rules when mixing differing weights & grades:

- The lower make-up torque of the lighter weight/ lower grade connection should be used
- If pin weight is heavier, a step will extrude into pipe bore from pin
- If box weight is heavier, a step will extrude into pipe bore from box
- Couplings with differing weights may have differing OD's

The following tables provide examples of the rules when mixing various weights and grades for FOX.

Figure 10.2.1 – Differing Weights + Identical Grades (ID step = 0.031", Applied torque is the lesser torque value of the combined connections.)

3 ½" JFEBEAR	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	10.2	80	2.915	4040	4490	4940
Pin	12.7	80	2.853	4710	5230	5760
				Applicable Torque		
Step/side (inch)			0.031	4040	4490	4940

Figure 10.2.2 – Identical Weights + Differing Grades (No ID step, Applied torque is the lesser torque value of the combined connections.)

3 ½" JFEBEAR	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	10.2	80	2.915	4040	4490	4940
Pin	10.2	95	2.915	4690	5210	5730
				Applicable Torque		
Step/side (inch)			0	4040	4490	4940

Figure 10.2.3 – Differing Weights + Differing Grades (ID step = 0.042", Applied torque is the lesser torque value of the combined connections.)

4 ½" JFEBEAR	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	15.2	95	3.852	7110	7900	8690
Pin	12.6	80	3.936	4860	5400	5940
				Applicable Torque		
Step/side (inch)			0.042	4860	5400	5940

10.3 Field Inspection

Field Inspection Tools

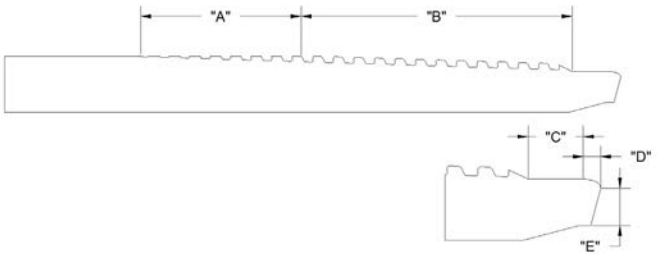
The following tools are commonly used but not limited to during field inspection & repair procedures:

- Depth Gauge
- Fine Tooth Triangle File
- Scotch Brite
- Emery Cloth
- Soft Stone
- Vernier Calipers
- Rotary Tools[1]

[1] Rotary tools can only be used by qualified JFE field service personnel.

A selection of field repair tools are shown in the image below.

10.3.1 FOX Pin Visual Inspection Criteria & Guidelines



Condition: Corrosion

Zone	Criteria	Action
A, B, C, E	All surfaces.Pitting less than 0.004" (0.1mm) deep or minor surface corrosion	Hand repair with soft bristle (no steel wire) brush or emery cloth
	Deeper than 0.004" (0.1mm)	Cut off & re-thread
D	No pitting acceptable	If present, cut off & re-thread
	Light surface corrosion (rust)	Hand repair with scotch brite or #400 emery cloth. Do not alter seal dimension. Repair should be made in a larger area than actual surface corrosion and should move around the circumference of the seal

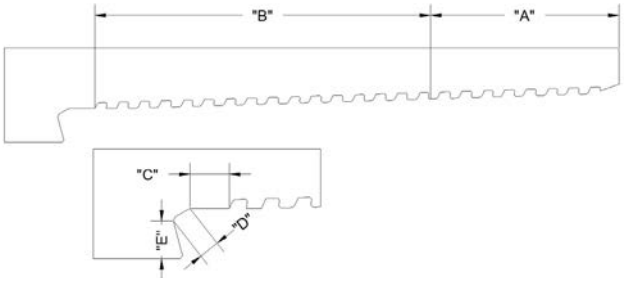
Condition: Burr, Tear, Ding, Mash, Scratch

Zone	Criteria	Action
A, B, C, E	All surfaces. Any condition which could cause galling, i.e. conditions described greater than 0.010" (0.3mm)	Hand repair with a fine triangle file; emery cloth or rotary tool[1]. Repair should be made in a larger area than actual effected area and should move around the helix of the thread. Otherwise - reject.
D	Not acceptable	If present, cut off & re-thread

Condition: Bead peening on carbon steel (≤ 4 1/2") and high chrome steel

Zone	Criteria	Action
A, B, C, D, E	Inspect for peened surface. If previously made-up, normal wear is expected and is acceptable	Bead peen if not present

10.3.2 FOX Box Visual Inspection Criteria & Guidelines



Condition: Corrosion

Zone	Criteria	Action
A, B, C, E	Slight imperfections and light surface corrosion, i.e. Less than 0.004" (0.1mm)	Hand repair with soft bristle (no steel wire) brush, emery cloth or scotch brite
	All other imperfections deeper than 0.004" (0.1mm)	Reject or re-thread
D	No pitting acceptable	Reject or re-thread
	Light surface corrosion (rust)	Hand repair with scotch brite or #400 emery cloth. Do not alter seal dimension. Repair should be made in a larger area than actual surface corrosion and should move around the circumference of the seal
Coupling OD, ID Bore & Bearing Face	Pitting or corrosion less than 0.020" (0.5mm) deep	Grind to the bottom of the pit & smooth edges. Keep within product tolerances.
	Deeper than 0.020" (0.5mm)	Reject or re-thread

Condition: Burr, Tear, Ding, Mash, Scratch

Zone	Criteria	Action
A, B, C, E	All surfaces. Any condition which could cause galling, ie. conditions described greater than 0.010" (0.3mm)	Hand repair with a fine triangle file or emery cloth. Repair should be made in a larger area than actual effected area and should move around the helix of the thread. Otherwise - reject.
D	Not acceptable	If present, cut off & re-thread

Condition: Manganese phosphate

Zone	Criteria	Action
A, B, C, D, E	Must be present. Inspect for medium grey surface colour. If previously made-up, normal wear is expected and is acceptable	Manganese phosphate if not present, reject, or re phosphate

Condition: Copper-plate and Clear-Plate™

Zone	Criteria	Action
A, B, C, D, E	Inspect the electroplated surface. Oxidation or discolouration of the plated surface is acceptable. If previously made-up, normal wear is expected and acceptable. Any delamination of plating is cause for reject	If holiday/ delamination exists, reject or re-plate

10.4 Approved Thread Compounds

This procedure recommends the thread compounds that can be used to make-up JFE connections.

JFE do not recommend the use of thread compounds containing PTFE (Teflon®) for premium connections.

List of Approved Thread Compounds include, but are not limited to:

FOX Approved Thread Compounds

Connection	Material Grade	API Modified [1]	Weatherford Lube Seal	Jet-Lube HPHT
FOX®	Carbon	✓	✓	✗
	9Cr to 17Cr	✓	✓	✗
	CRA	✓	✓	✗

Connection	Material Grade	BOL 4010NM	TOPCO Green Seal II	Clear-Glide™ [2]	BOL 2000
FOX®	Carbon	✓	✗	✓	✗
	9Cr to 17Cr	≤5.5" [3]	✗	✓	✗
	CRA	≤5.5" [3]	✗	✓	✗

[1] Thread compounds that are in compliance with API RP 5A3 Annex A can be used on JFE connections. Different names are given and are dependent on the thread compound manufacturer.

[2] Clear-Glide™ is to be used only with Clear-Run™ prepared tubulars, i.e. when the proper end finishing is applied.

[3] Can be applied to sizes larger than 5.5" if Clear-Plate™ is applied to the coupling/box.

JFE continues to evaluate the use of thread compounds. It is recommended to contact your nearest JFE-TC office for further information if other compounds that are not listed are required. Please continuously refer to www.jfetc.com for the most updated list and technical data.

This table is for informational purpose only.

10.5 Lifting Plugs

Figure 10.5.1 – Example of main body for lift plug (seal removed)

The following points shall be adhered to for FOX lift plugs:

- The lift plug shall be manufactured from low alloy steel with a specified minimum yield stress (SMYS) of 110ksi, and a maximum yield stress of 140ksi.
- The lift plug shall be bead peened, phosphated or copper-plated as per the relevant procedures. Once machining has been completed, weld on handles can be installed to assist with handling and assembling operations. If handles are installed, they shall be of appropriate size and orientated 0° and 180°.
- The lift plug is low torque and therefore a power tong is not required. Final positioning before lifting operation can be achieved using the handles or strap wrench/chain tong

The following information shall be low stress stamped on the lift plug where drifting operations are not required:

Size, All weights, grade and FOX Lift Plug
Licensee code plus manufacturing date
For lifting a maximum of three joints only

Stencil Example
9 5/8" All weights AISI 4145 110ksi FOX Lift Plug
SI-081; 22nd April 2021
For lifting a maximum of three joints only

The following information shall be low stress stamped on the lift plug where drifting through the plug is required:

Size, weight, grade and FOX
Bore ID = XXXX
Licensee code plus manufacturing date
For lifting a maximum of three joints only

Example
2 7/8" 6.4# AISI 110ksi FOX Lift Plug
Bore ID = 2.441"
SI-081; 22nd April 2021
For lifting a maximum of three joints only

10.6 Make-Up Acceptance Criteria

Figure 10.6.1 – Example of an acceptable, typical FOX make up graph

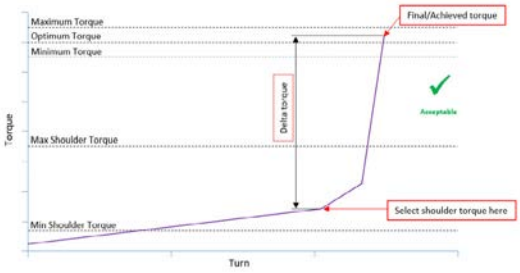


Figure 10.6.2 – Example of an acceptable FOX make-up graph (Shoulder point is below maximum shoulder)

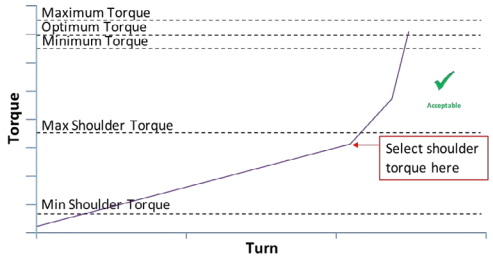


Figure 10.6.3 – Example of an acceptable FOX make up graph (Minor slippage during thread engagement)

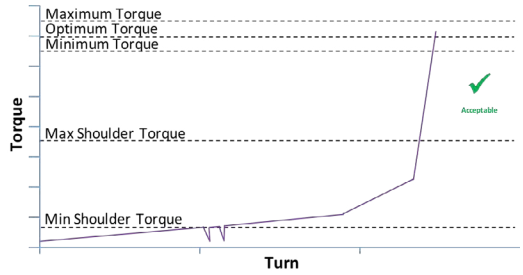
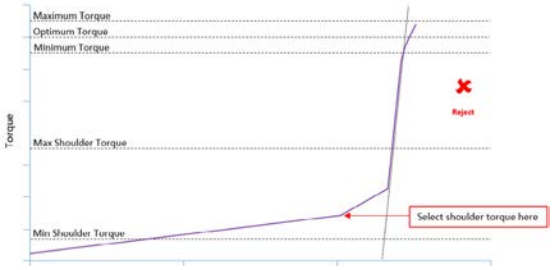


Figure 10.6.4 – Example of an unacceptable FOX make-up graph (loss of linearity is not acceptable). If in doubt, please contact your local JFE Technical Center



Possible causes of the unacceptable graph profile but not limited to, are as follows:

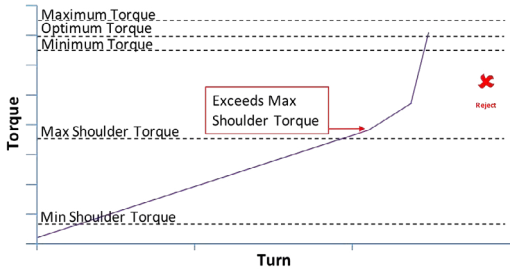
- Shoulder torque has not been selected correctly
- Dope is contaminated
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range
- Friction factor of dope is too low
- Load cell error

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

It should be noted that if the delta turns are greater than 0.1, however no loss of linearity exists, the graph can be accepted.

Figure 10.6.5 – Example of an unacceptable FOX make up graph (Exceeds Max Shoulder Torque)



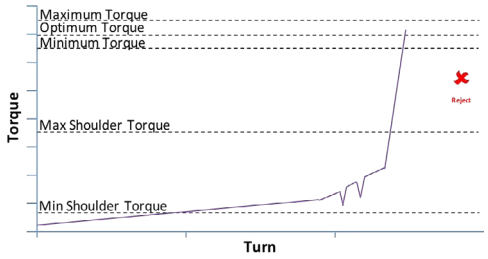
Possible causes of the unacceptable graph profile but not limited to, are as follows:

- Friction factor of dope is too high
- Dope is contaminated
- Pipe may not be straight
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 10.6.6 – Example of an unacceptable FOX make up graph (Slipping during seal engagement)



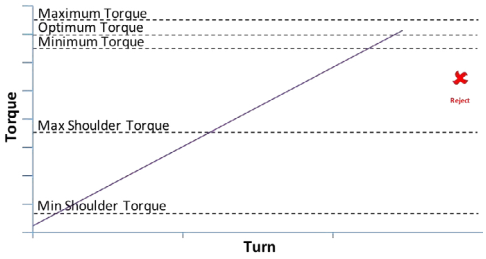
Possible causes of the unacceptable graph profile but not limited to, are as follows:

- Pipe may not be straight
- Jaw of power tong is worn out or dirty

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 10.6.7 – Example of an unacceptable FOX make up graph (No clear shoulder torque)



Possible causes of the unacceptable graph profile but not limited to, are as follows:

- Friction factor of dope is too high
- Dope is contaminated
- Pipe may not be straight
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

10.7 FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
2 ⅜	4.60	0.190	Chrome ≥ 9%CR	80ksi	930	1,000	1,070	460
				85ksi	970	1,040	1,120	470
				95ksi	1,040	1,120	1,200	480
				110ksi	1,160	1,250	1,330	510
				125ksi	1,270	1,370	1,460	530
			Carbon	55ksi	860	920	990	550
				80ksi	1,050	1,130	1,210	590
				85ksi	1,090	1,170	1,250	600
				90ksi	1,120	1,200	1,290	590
				95ksi	1,160	1,250	1,330	610
				110ksi	1,270	1,370	1,460	630
				125ksi	1,390	1,490	1,600	650
				140ksi	1,500	1,610	1,730	670
2 ⅜	5.80	0.254	Chrome ≥ 9%CR	80ksi	1,280	1,380	1,470	600
				85ksi	1,340	1,440	1,540	610
				95ksi	1,450	1,560	1,670	640
				110ksi	1,610	1,730	1,850	660
				125ksi	1,770	1,900	2,040	690
			Carbon	v	1,160	1,250	1,330	720
				80ksi	1,430	1,540	1,640	760
				85ksi	1,490	1,600	1,710	770
				90ksi	1,540	1,660	1,770	790
				95ksi	1,600	1,720	1,840	800
				110ksi	1,760	1,890	2,020	820
				125ksi	1,920	2,060	2,210	850
				140ksi	2,080	2,240	2,390	880
2 ⅞	6.40	0.217	Chrome ≥ 9%CR	80ksi	1,470	1,580	1,690	770
				85ksi	1,530	1,640	1,760	780
				95ksi	1,640	1,760	1,890	800
				110ksi	1,810	1,950	2,080	840
				125ksi	1,980	2,130	2,280	860
			Carbon	55ksi	1,420	1,530	1,630	970
				80ksi	1,700	1,830	1,960	1,020
				85ksi	1,760	1,890	2,020	1,030
				90ksi	1,810	1,950	2,080	1,040
				95ksi	1,870	2,010	2,150	1,050
				110ksi	2,040	2,190	2,350	1,080
				125ksi	2,210	2,380	2,540	1,110
				140ksi	2,380	2,560	2,740	1,140
2 ⅞	7.80	0.276	Chrome ≥ 9%CR	80ksi	1,960	2,110	2,250	940
				85ksi	2,040	2,190	2,350	950
				95ksi	2,200	2,370	2,530	980
				110ksi	2,450	2,630	2,820	1,020
				125ksi	2,690	2,890	3,090	1,060
			Carbon	55ksi	1,820	1,960	2,090	1,150
				80ksi	2,220	2,390	2,550	1,220
				85ksi	2,310	2,480	2,660	1,240
				90ksi	2,390	2,570	2,750	1,250
				95ksi	2,470	2,660	2,840	1,270
				110ksi	2,710	2,910	3,120	1,300
				125ksi	2,960	3,180	3,400	1,350
				140ksi	3,200	3,440	3,680	1,390
2 ⅞	8.60	0.308	Chrome ≥ 9%CR	80ksi	2,240	2,410	2,580	1,090
				85ksi	2,330	2,500	2,680	1,100
				95ksi	2,510	2,700	2,890	1,140
				110ksi	2,790	3,000	3,210	1,190
				125ksi	3,060	3,290	3,520	1,240
			Carbon	55ksi	2,100	2,260	2,420	1,360
				80ksi	2,550	2,740	2,930	1,420
				85ksi	2,640	2,840	3,040	1,440
				90ksi	2,740	2,950	3,150	1,470
				95ksi	2,830	3,040	3,250	1,480
				110ksi	3,100	3,330	3,570	1,520
				125ksi	3,370	3,620	3,880	1,570
				140ksi	3,650	3,920	4,200	1,620

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
3 ½	7.70	0.216	Chrome ≥ 9%CR	80ksi	1,940	2,090	2,230	920
				85ksi	2,020	2,170	2,320	930
				95ksi	2,180	2,340	2,510	950
				110ksi	2,430	2,610	2,790	1,000
				125ksi	2,670	2,870	3,070	1,040
			Carbon	55ksi	1,800	1,940	2,070	1,140
				80ksi	2,200	2,370	2,530	1,200
				85ksi	2,280	2,450	2,620	1,210
				90ksi	2,360	2,540	2,710	1,230
				95ksi	2,440	2,620	2,810	1,230
				110ksi	2,690	2,890	3,090	1,280
				125ksi	2,930	3,150	3,370	1,320
				140ksi	3,170	3,410	3,650	1,370
3 ½	9.20	0.254	Chrome ≥ 9%CR	80ksi	2,380	2,560	2,740	1,060
				85ksi	2,490	2,680	2,860	1,080
				95ksi	2,700	2,900	3,110	1,120
				110ksi	3,010	3,240	3,460	1,170
				125ksi	3,320	3,570	3,820	1,220
			Carbon	55ksi	2,150	2,310	2,470	1,280
				80ksi	2,670	2,870	3,070	1,370
				85ksi	2,780	2,990	3,200	1,390
				90ksi	2,880	3,100	3,310	1,410
				95ksi	2,980	3,200	3,430	1,420
				110ksi	3,300	3,550	3,800	1,480
				125ksi	3,610	3,880	4,150	1,530
				140ksi	3,920	4,210	4,510	1,580
3 ½	10.20	0.289	Chrome ≥ 9%CR	80ksi	2,630	2,830	3,020	1,270
				85ksi	2,740	2,950	3,150	1,290
				95ksi	2,960	3,180	3,400	1,330
				110ksi	3,280	3,530	3,770	1,390
				125ksi	3,610	3,880	4,150	1,440
			Carbon	55ksi	2,460	2,640	2,830	1,570
				80ksi	3,000	3,230	3,450	1,670
				85ksi	3,110	3,340	3,580	1,680
				90ksi	3,220	3,460	3,700	1,710
				95ksi	3,320	3,570	3,820	1,720
				110ksi	3,650	3,920	4,200	1,780
				125ksi	3,970	4,270	4,570	1,830
				140ksi	4,300	4,620	4,950	1,890
3 ½	12.70	0.375	Chrome ≥ 9%CR	80ksi	3,920	4,210	4,510	1,630
				85ksi	4,100	4,410	4,720	1,660
				95ksi	4,460	4,790	5,130	1,720
				110ksi	5,000	5,380	5,750	1,830
				125ksi	5,540	5,950	6,370	1,910
			Carbon	55ksi	3,450	3,710	3,970	1,930
				80ksi	4,350	4,680	5,000	2,100
				85ksi	4,530	4,870	5,210	2,120
				90ksi	4,710	5,060	5,420	2,150
				95ksi	4,890	5,260	5,620	2,190
				110ksi	5,420	5,830	6,230	2,280
				125ksi	5,960	6,410	6,850	2,370
				140ksi	6,500	6,990	7,480	2,470
3 ½	15.50	0.476	Chrome ≥ 9%CR	80ksi	5,180	5,570	5,960	2,170
				85ksi	5,420	5,830	6,230	2,220
				95ksi	5,890	6,330	6,770	2,290
				110ksi	6,600	7,100	7,590	2,430
				125ksi	7,300	7,850	8,400	2,540
			Carbon	55ksi	4,570	4,910	5,260	2,570
				80ksi	5,750	6,180	6,610	2,780
				85ksi	5,990	6,440	6,890	2,830
				90ksi	6,220	6,690	7,150	2,870
				95ksi	6,460	6,940	7,430	2,900
				110ksi	7,170	7,710	8,250	3,040
				125ksi	7,870	8,460	9,050	3,150
				140ksi	8,580	9,220	9,870	3,270

FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
3 ½	15.50	0.476	Chrome ≥ 9%CR	80ksi	5,180	5,570	5,960	2,170
				85ksi	5,420	5,830	6,230	2,220
				95ksi	5,890	6,330	6,770	2,290
				110ksi	6,600	7,100	7,590	2,430
				125ksi	7,300	7,850	8,400	2,540
			Carbon	55ksi	4,570	4,910	5,260	2,570
				80ksi	5,750	6,180	6,610	2,780
				85ksi	5,990	6,440	6,890	2,830
				90ksi	6,220	6,690	7,150	2,870
				95ksi	6,460	6,940	7,430	2,900
				110ksi	7,170	7,710	8,250	3,040
				125ksi	7,870	8,460	9,050	3,150
				140ksi	8,580	9,220	9,870	3,270
4	9.50	0.226	Chrome ≥ 9%CR	80ksi	2,430	2,610	2,790	1,090
				85ksi	2,530	2,720	2,910	1,100
				95ksi	2,740	2,950	3,150	1,140
				110ksi	3,060	3,290	3,520	1,200
				125ksi	3,380	3,630	3,890	1,250
			Carbon	55ksi	2,200	2,370	2,530	1,320
				80ksi	2,720	2,920	3,130	1,400
				85ksi	2,830	3,040	3,250	1,420
				90ksi	2,940	3,160	3,380	1,450
				95ksi	3,040	3,270	3,500	1,460
				110ksi	3,360	3,610	3,860	1,520
				125ksi	3,680	3,960	4,230	1,580
				140ksi	3,990	4,290	4,590	1,620
4	10.70	0.262	Chrome ≥ 9%CR	80ksi	2,950	3,170	3,390	1,240
				85ksi	3,080	3,310	3,540	1,260
				95ksi	3,350	3,600	3,850	1,310
				110ksi	3,750	4,030	4,310	1,380
				125ksi	4,150	4,460	4,770	1,450
			Carbon	55ksi	2,610	2,810	3,000	1,490
				80ksi	3,280	3,530	3,770	1,600
				85ksi	3,410	3,670	3,920	1,620
				90ksi	3,540	3,810	4,070	1,640
				95ksi	3,680	3,960	4,230	1,670
				110ksi	4,080	4,390	4,690	1,740
				125ksi	4,480	4,820	5,150	1,810
				140ksi	4,880	5,250	5,610	1,880
4	13.20	0.330	Chrome ≥ 9%CR	80ksi	3,840	4,130	4,420	1,660
				85ksi	4,010	4,310	4,610	1,690
				95ksi	4,350	4,680	5,000	1,750
				110ksi	4,870	5,240	5,600	1,850
				125ksi	5,380	5,780	6,190	1,920
			Carbon	55ksi	3,420	3,680	3,930	1,980
				80ksi	4,280	4,600	4,920	2,130
				85ksi	4,450	4,780	5,120	2,160
				90ksi	4,620	4,970	5,310	2,190
				95ksi	4,790	5,150	5,510	2,220
				110ksi	5,310	5,710	6,110	2,320
				125ksi	5,820	6,260	6,690	2,400
				140ksi	6,340	6,820	7,290	2,500
4 ½	10.50	0.224	Chrome ≥ 9%CR and Carbon	55ksi	2,470	2,660	2,840	1,630
				80ksi	2,990	3,210	3,440	1,710
				85ksi	3,090	3,320	3,550	1,730
				90ksi	3,200	3,440	3,680	1,750
				95ksi	3,300	3,550	3,800	1,770
				110ksi	3,610	3,880	4,150	1,820
				125ksi	3,920	4,210	4,510	1,860
				140ksi	4,240	4,560	4,880	1,930

FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
4 ½	11.60	0.250	Chrome ≥ 9%CR and Carbon	55ksi	2,820	3,030	3,240	1,790
				80ksi	3,450	3,710	3,970	1,900
				85ksi	3,580	3,850	4,120	1,930
				90ksi	3,700	3,980	4,260	1,950
				95ksi	3,830	4,120	4,400	1,970
				110ksi	4,200	4,520	4,830	2,030
				125ksi	4,580	4,920	5,270	2,090
				140ksi	4,960	5,330	5,700	2,170
4 ½	12.60	0.271	Chrome ≥ 9%CR and Carbon	55ksi	3,120	3,350	3,590	1,930
				80ksi	3,840	4,130	4,420	2,060
				85ksi	3,980	4,280	4,580	2,080
				90ksi	4,120	4,430	4,740	2,100
				95ksi	4,270	4,590	4,910	2,130
				110ksi	4,700	5,050	5,410	2,200
				125ksi	5,130	5,510	5,900	2,270
				140ksi	5,560	5,980	6,390	2,350
4 ½	13.50	0.290	Chrome ≥ 9%CR and Carbon	55ksi	3,380	3,630	3,890	2,030
				80ksi	4,190	4,500	4,820	2,180
				85ksi	4,350	4,680	5,000	2,210
				90ksi	4,510	4,850	5,190	2,240
				95ksi	4,670	5,020	5,370	2,260
				110ksi	5,160	5,550	5,930	2,360
				125ksi	5,640	6,060	6,490	2,430
				140ksi	6,120	6,580	7,040	2,520
4 ½	15.10 / 15.20	0.337	Chrome ≥ 9%CR and Carbon	55ksi	4,110	4,420	4,730	2,320
				80ksi	5,170	5,560	5,950	2,500
				85ksi	5,390	5,790	6,200	2,540
				90ksi	5,600	6,020	6,440	2,580
				95ksi	5,810	6,250	6,680	2,620
				110ksi	6,450	6,930	7,420	2,720
				125ksi	7,090	7,620	8,150	2,840
				140ksi	7,720	8,300	8,880	2,950
4 ½	18.90	0.430	Chrome ≥ 9%CR and Carbon	55ksi	5,270	5,670	6,060	2,760
				80ksi	6,740	7,250	7,750	3,010
				85ksi	7,040	7,570	8,100	3,070
				90ksi	7,330	7,880	8,430	3,110
				95ksi	7,620	8,190	8,760	3,160
				110ksi	8,510	9,150	9,790	3,330
				125ksi	9,390	10,090	10,800	3,470
				140ksi	10,270	11,040	11,810	3,630
4 ½	21.50	0.500	Chrome ≥ 9%CR and Carbon	55ksi	6,080	6,540	6,990	3,030
				80ksi	7,860	8,450	9,040	3,350
				85ksi	8,210	8,830	9,440	3,410
				90ksi	8,560	9,200	9,840	3,460
				95ksi	8,920	9,590	10,260	3,530
				110ksi	9,980	10,730	11,480	3,720
				125ksi	11,040	11,870	12,700	3,900
				140ksi	12,110	13,020	13,930	4,090
4 ½	23.70	0.560	Chrome ≥ 9%CR and Carbon	55ksi	6,760	7,270	7,770	3,250
				80ksi	8,790	9,450	10,110	3,610
				85ksi	9,190	9,880	10,570	3,670
				90ksi	9,600	10,320	11,040	3,750
				95ksi	10,010	10,760	11,510	3,820
				110ksi	11,220	12,060	12,900	4,020
				125ksi	12,440	13,370	14,310	4,240
				140ksi	13,660	14,680	15,710	4,450

FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
5	13.00	0.253	Chrome ≥ 9%CR and Carbon	55ksi	3,170	3,410	3,650	1,980
				80ksi	3,890	4,180	4,470	2,100
				85ksi	4,030	4,330	4,630	2,120
				90ksi	4,180	4,490	4,810	2,150
				95ksi	4,320	4,640	4,970	2,170
				110ksi	4,750	5,110	5,460	2,260
				125ksi	5,190	5,580	5,970	2,340
				140ksi	5,620	6,040	6,460	2,410
5	15.00	0.296	Chrome ≥ 9%CR and Carbon	55ksi	3,860	4,150	4,440	2,280
				80ksi	4,800	5,160	5,520	2,450
				85ksi	4,990	5,360	5,740	2,480
				90ksi	5,180	5,570	5,960	2,520
				95ksi	5,370	5,770	6,180	2,550
				110ksi	5,930	6,370	6,820	2,640
				125ksi	6,500	6,990	7,480	2,750
				140ksi	7,070	7,600	8,130	2,850
5	18.00	0.362	Chrome ≥ 9%CR and Carbon	55ksi	5,090	5,470	5,850	2,730
				80ksi	6,480	6,970	7,450	2,980
				85ksi	6,750	7,260	7,760	3,030
				90ksi	7,030	7,560	8,080	3,080
				95ksi	7,310	7,860	8,410	3,130
				110ksi	8,140	8,750	9,360	3,270
				125ksi	8,970	9,640	10,320	3,410
				140ksi	9,800	10,540	11,270	3,570
5	21.40	0.437	Chrome ≥ 9%CR and Carbon	55ksi	6,320	6,790	7,270	3,160
				80ksi	8,150	8,760	9,370	3,480
				85ksi	8,510	9,150	9,790	3,540
				90ksi	8,880	9,550	10,210	3,610
				95ksi	9,250	9,940	10,640	3,670
				110ksi	10,350	11,130	11,900	3,880
				125ksi	11,440	12,300	13,160	4,060
				140ksi	12,540	13,480	14,420	4,250
5	23.20	0.478	Chrome ≥ 9%CR and Carbon	55ksi	6,900	7,420	7,940	3,360
				80ksi	8,950	9,620	10,290	3,720
				85ksi	9,360	10,060	10,760	3,790
				90ksi	9,770	10,500	11,240	3,860
				95ksi	10,180	10,940	11,710	3,930
				110ksi	11,410	12,270	13,120	4,160
				125ksi	12,640	13,590	14,540	4,370
				140ksi	13,870	14,910	15,950	4,580
5	24.10	0.500	Chrome ≥ 9%CR and Carbon	55ksi	7,210	7,750	8,290	3,460
				80ksi	9,380	10,080	10,790	3,850
				85ksi	9,810	10,550	11,280	3,930
				90ksi	10,240	11,010	11,780	4,000
				95ksi	10,670	11,470	12,270	4,070
				110ksi	11,970	12,870	13,770	4,300
				125ksi	13,270	14,270	15,260	4,530
				140ksi	14,570	15,660	16,760	4,750
5 ½	15.50	0.275	Chrome ≥ 9%CR and Carbon	55ksi	3,890	4,180	4,470	2,190
				80ksi	4,890	5,260	5,620	2,370
				85ksi	5,090	5,470	5,850	2,400
				90ksi	5,290	5,690	6,080	2,440
				95ksi	5,490	5,900	6,310	2,470
				110ksi	6,100	6,560	7,020	2,580
				125ksi	6,700	7,200	7,710	2,680
				140ksi	7,300	7,850	8,400	2,790

FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
5 ½	17.00	0.304	Chrome ≥ 9%CR and Carbon	55ksi	4,430	4,760	5,090	2,400
				80ksi	5,620	6,040	6,460	2,610
				85ksi	5,850	6,290	6,730	2,650
				90ksi	6,090	6,550	7,000	2,690
				95ksi	6,330	6,800	7,280	2,730
				110ksi	7,040	7,570	8,100	2,860
				125ksi	7,760	8,340	8,920	2,980
				140ksi	8,470	9,110	9,740	3,110
5 ½	20.00	0.361	Chrome ≥ 9%CR and Carbon	55ksi	5,660	6,080	6,510	2,810
				80ksi	7,310	7,860	8,410	3,100
				85ksi	7,640	8,210	8,790	3,150
				90ksi	7,970	8,570	9,170	3,220
				95ksi	8,310	8,930	9,560	3,280
				110ksi	9,300	10,000	10,700	3,460
				125ksi	10,290	11,060	11,830	3,630
				140ksi	11,280	12,130	12,970	3,800
5 ½	23.00	0.415	Chrome ≥ 9%CR and Carbon	55ksi	6,620	7,120	7,610	3,150
				80ksi	8,620	9,270	9,910	3,490
				85ksi	9,020	9,700	10,370	3,560
				90ksi	9,430	10,140	10,840	3,640
				95ksi	9,830	10,570	11,300	3,710
				110ksi	11,030	11,860	12,680	3,910
				125ksi	12,240	13,160	14,080	4,130
				140ksi	13,440	14,450	15,460	4,330
5 ½	26.80	0.500	Chrome ≥ 9%CR and Carbon	55ksi	7,900	8,490	9,090	3,560
				80ksi	10,380	11,160	11,940	4,000
				85ksi	10,880	11,700	12,510	4,090
				90ksi	11,380	12,230	13,090	4,170
				95ksi	11,880	12,770	13,660	4,260
				110ksi	13,370	14,370	15,380	4,520
				125ksi	14,860	15,970	17,090	4,780
				140ksi	16,350	17,580	18,800	5,040
6 ⅝	20.00	0.288	Chrome ≥ 9%CR and Carbon	55ksi	4,820	5,180	5,540	2,670
				80ksi	6,090	6,550	7,000	2,890
				85ksi	6,340	6,820	7,290	2,930
				90ksi	6,600	7,100	7,590	2,990
				95ksi	6,850	7,360	7,880	3,020
				110ksi	7,610	8,180	8,750	3,150
				125ksi	8,380	9,010	9,640	3,300
				140ksi	9,140	9,830	10,510	3,430
6 ⅝	24.00	0.352	Chrome ≥ 9%CR and Carbon	55ksi	6,340	6,820	7,290	3,250
				80ksi	8,140	8,750	9,360	3,560
				85ksi	8,500	9,140	9,780	3,620
				90ksi	8,860	9,520	10,190	3,680
				95ksi	9,220	9,910	10,600	3,740
				110ksi	10,300	11,070	11,850	3,930
				125ksi	11,380	12,230	13,090	4,120
				140ksi	12,460	13,390	14,330	4,300
6 ⅝	28.00	0.417	Chrome ≥ 9%CR and Carbon	55ksi	8,470	9,110	9,740	3,890
				80ksi	11,100	11,930	12,770	4,330
				85ksi	11,630	12,500	13,370	4,430
				90ksi	12,160	13,070	13,980	4,520
				95ksi	12,690	13,640	14,590	4,620
				110ksi	14,270	15,340	16,410	4,890
				125ksi	15,850	17,040	18,230	5,170
				140ksi	17,440	18,750	20,060	5,450

FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
6 5/8	32.00	0.475	Chrome ≥ 9%CR and Carbon	55ksi	10,420	11,200	11,980	4,410
				80ksi	13,850	14,890	15,930	5,020
				85ksi	14,540	15,630	16,720	5,140
				90ksi	15,220	16,360	17,500	5,260
				95ksi	15,910	17,100	18,300	5,380
				110ksi	17,960	19,310	20,650	5,740
				125ksi	20,020	21,520	23,020	6,100
				140ksi	22,080	23,740	25,390	6,470
7	20.00	0.272	Chrome ≥ 9%CR and Carbon	55ksi	4,870	5,240	5,600	2,580
				80ksi	6,210	6,680	7,140	2,810
				85ksi	6,480	6,970	7,450	2,860
				90ksi	6,740	7,250	7,750	2,900
				95ksi	7,010	7,540	8,060	2,950
				110ksi	7,820	8,410	8,990	3,090
				125ksi	8,620	9,270	9,920	3,230
				140ksi	9,430	10,140	10,840	3,380
7	23.00	0.317	Chrome ≥ 9%CR and Carbon	55ksi	6,030	6,480	6,930	3,000
				80ksi	7,780	8,360	8,950	3,300
				85ksi	8,130	8,740	9,350	3,370
				90ksi	8,490	9,130	9,760	3,440
				95ksi	8,840	9,500	10,170	3,500
				110ksi	9,890	10,630	11,370	3,680
				125ksi	10,940	11,760	12,580	3,860
				140ksi	12,000	12,900	13,800	4,050
7	26.00	0.362	Chrome ≥ 9%CR and Carbon	55ksi	7,290	7,840	8,380	3,420
				80ksi	9,520	10,230	10,950	3,810
				85ksi	9,970	10,720	11,470	3,890
				90ksi	10,410	11,190	11,970	3,960
				95ksi	10,860	11,670	12,490	4,040
				110ksi	12,200	13,120	14,030	4,290
				125ksi	13,540	14,560	15,570	4,520
				140ksi	14,880	16,000	17,110	4,760
7	29.00	0.408	Chrome ≥ 9%CR and Carbon	55ksi	8,970	9,640	10,320	3,890
				80ksi	11,880	12,770	13,660	4,400
				85ksi	12,460	13,390	14,330	4,500
				90ksi	13,040	14,020	15,000	4,600
				95ksi	13,620	14,640	15,660	4,700
				110ksi	15,370	16,520	17,680	5,010
				125ksi	17,110	18,390	19,680	5,310
				140ksi	18,860	20,270	21,690	5,620
7	32.00	0.453	Chrome ≥ 9%CR and Carbon	55ksi	10,440	11,220	12,010	4,300
				80ksi	13,940	14,990	16,030	4,920
				85ksi	14,640	15,740	16,840	5,040
				90ksi	15,340	16,490	17,640	5,160
				95ksi	16,040	17,240	18,450	5,280
				110ksi	18,130	19,490	20,850	5,640
				125ksi	20,230	21,750	23,260	6,010
				140ksi	22,330	24,000	25,680	6,380
7	35.00	0.498	Chrome ≥ 9%CR and Carbon	55ksi	11,560	12,430	13,290	4,640
				80ksi	15,490	16,650	17,810	5,320
				85ksi	16,280	17,500	18,720	5,460
				90ksi	17,070	18,350	19,630	5,600
				95ksi	17,850	19,190	20,530	5,730
				110ksi	20,210	21,730	23,240	6,150
				125ksi	22,570	24,260	25,960	6,550
				140ksi	24,940	26,810	28,680	6,980

FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
7	38.00	0.540	Chrome ≥ 9%CR and Carbon	55ksi	12,560	13,500	14,440	4,920
				80ksi	16,900	18,170	19,440	5,680
				85ksi	17,770	19,100	20,440	5,830
				90ksi	18,630	20,030	21,420	5,980
				95ksi	19,500	20,960	22,430	6,130
				110ksi	22,100	23,760	25,420	6,590
				125ksi	24,700	26,550	28,410	7,040
				140ksi	27,300	29,350	31,400	7,500
7 5/8	26.40	0.328	Chrome ≥ 9%CR and Carbon	55ksi	6,190	6,650	7,120	3,370
				80ksi	7,850	8,440	9,030	3,670
				85ksi	8,180	8,790	9,410	3,720
				90ksi	8,510	9,150	9,790	3,780
				95ksi	8,840	9,500	10,170	3,830
				110ksi	9,840	10,580	11,320	4,020
				125ksi	10,830	11,640	12,450	4,180
				140ksi	11,830	12,720	13,600	4,370
7 5/8	29.70	0.375	Chrome ≥ 9%CR and Carbon	55ksi	7,520	8,080	8,650	3,850
				80ksi	9,660	10,380	11,110	4,230
				85ksi	10,090	10,850	11,600	4,310
				90ksi	10,510	11,300	12,090	4,380
				95ksi	10,940	11,760	12,580	4,460
				110ksi	12,220	13,140	14,050	4,680
				125ksi	13,500	14,510	15,530	4,900
				140ksi	14,790	15,900	17,010	5,140
7 5/8	33.70	0.430	Chrome ≥ 9%CR and Carbon	55ksi	9,540	10,260	10,970	4,480
				80ksi	12,460	13,390	14,330	4,980
				85ksi	13,040	14,020	15,000	5,090
				90ksi	13,630	14,650	15,670	5,190
				95ksi	14,210	15,280	16,340	5,300
				110ksi	15,960	17,160	18,350	5,600
				125ksi	17,710	19,040	20,370	5,900
				140ksi	19,470	20,930	22,390	6,220
7 5/8	39.00	0.500	Chrome ≥ 9%CR and Carbon	55ksi	12,230	13,150	14,060	5,230
				80ksi	16,230	17,450	18,660	5,940
				85ksi	17,030	18,310	19,580	6,080
				90ksi	17,830	19,170	20,500	6,220
				95ksi	18,630	20,030	21,420	6,360
				110ksi	21,030	22,610	24,180	6,780
				125ksi	23,430	25,180	26,940	7,190
				140ksi	25,830	27,770	29,700	7,620
7 5/8	42.80	0.562	Chrome ≥ 9%CR and Carbon	55ksi	14,240	15,310	16,380	5,820
				80ksi	19,030	20,460	21,880	6,650
				85ksi	19,990	21,490	22,990	6,820
				90ksi	20,950	22,520	24,090	6,980
				95ksi	21,910	23,550	25,200	7,150
				110ksi	24,780	26,640	28,500	7,650
				125ksi	27,660	29,730	31,810	8,150
				140ksi	30,540	32,830	35,120	8,660
7 5/8	45.30	0.595	Chrome ≥ 9%CR and Carbon	55ksi	15,090	16,220	17,350	6,070
				80ksi	20,210	21,730	23,240	6,960
				85ksi	21,240	22,830	24,430	7,140
				90ksi	22,260	23,930	25,600	7,320
				95ksi	23,290	25,040	26,780	7,500
				110ksi	26,370	28,350	30,330	8,040
				125ksi	29,440	31,650	33,860	8,580
				140ksi	32,520	34,960	37,400	9,120
8 5/8	32.00	0.352	Chrome ≥ 9%CR and Carbon	55ksi	6,580	7,070	7,570	3,680
				80ksi	8,290	8,910	9,530	3,980
				85ksi	8,630	9,280	9,920	4,040
				90ksi	8,980	9,650	10,330	4,100
				95ksi	9,320	10,020	10,720	4,160
				110ksi	10,350	11,130	11,900	4,350
				125ksi	11,380	12,230	13,090	4,520
				140ksi	12,400	13,330	14,260	4,690

FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
8 5/8	36.00	0.400	Chrome ≥ 9%CR and Carbon	55ksi	8,060	8,660	9,270	4,200
				80ksi	10,310	11,080	11,860	4,600
				85ksi	10,760	11,570	12,370	4,680
				90ksi	11,210	12,050	12,890	4,760
				95ksi	11,660	12,530	13,410	4,830
				110ksi	13,010	13,990	14,960	5,080
				125ksi	14,360	15,440	16,510	5,310
				140ksi	15,710	16,890	18,070	5,550
8 5/8	40.00	0.450	Chrome ≥ 9%CR and Carbon	55ksi	9,840	10,580	11,320	4,770
				80ksi	12,770	13,730	14,690	5,280
				85ksi	13,360	14,360	15,360	5,380
				90ksi	13,950	15,000	16,040	5,490
				95ksi	14,540	15,630	16,720	5,590
				110ksi	16,300	17,520	18,750	5,900
				125ksi	18,060	19,410	20,770	6,200
				140ksi	19,820	21,310	22,790	6,520
8 5/8	44.00	0.500	Chrome ≥ 9%CR and Carbon	55ksi	11,690	12,570	13,440	5,310
				80ksi	15,360	16,510	17,660	5,960
				85ksi	16,090	17,300	18,500	6,090
				90ksi	16,820	18,080	19,340	6,210
				95ksi	17,560	18,880	20,190	6,350
				110ksi	19,750	21,230	22,710	6,720
				125ksi	21,950	23,600	25,240	7,110
				140ksi	24,150	25,960	27,770	7,490
8 5/8	49.00	0.557	Chrome ≥ 9%CR and Carbon	55ksi	13,880	14,920	15,960	5,930
				80ksi	18,420	19,800	21,180	6,720
				85ksi	19,330	20,780	22,230	6,880
				90ksi	20,240	21,760	23,280	7,040
				95ksi	21,150	22,740	24,320	7,200
				110ksi	23,870	25,660	27,450	7,670
				125ksi	26,600	28,600	30,590	8,160
				140ksi	29,320	31,520	33,720	8,630
9 5/8	36.00	0.352	Chrome ≥ 9%CR and Carbon	55ksi	6,780	7,290	7,800	3,710
				80ksi	8,590	9,230	9,880	4,030
				85ksi	8,950	9,620	10,290	4,090
				90ksi	9,310	10,010	10,710	4,160
				95ksi	9,670	10,400	11,120	4,220
				110ksi	10,760	11,570	12,370	4,420
				125ksi	11,840	12,730	13,620	4,600
				140ksi	12,920	13,890	14,860	4,790
9 5/8	40.00	0.395	Chrome ≥ 9%CR and Carbon	55ksi	7,960	8,560	9,150	4,160
				80ksi	10,180	10,940	11,710	4,550
				85ksi	10,630	11,430	12,220	4,640
				90ksi	11,070	11,900	12,730	4,710
				95ksi	11,510	12,370	13,240	4,780
				110ksi	12,850	13,810	14,780	5,020
				125ksi	14,180	15,240	16,310	5,250
				140ksi	15,510	16,670	17,840	5,480
9 5/8	43.50	0.435	Chrome ≥ 9%CR and Carbon	55ksi	9,100	9,780	10,470	4,560
				80ksi	11,740	12,620	13,500	5,030
				85ksi	12,260	13,180	14,100	5,120
				90ksi	12,790	13,750	14,710	5,210
				95ksi	13,320	14,320	15,320	5,310
				110ksi	14,900	16,020	17,140	5,590
				125ksi	16,480	17,720	18,950	5,860
				140ksi	18,060	19,410	20,770	6,130

FOX Torque Information

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
9 5/8	47.00	0.472	Chrome ≥ 9%CR and Carbon	55ksi	10,990	11,810	12,640	5,070
				80ksi	14,390	15,470	16,550	5,670
				85ksi	15,070	16,200	17,330	5,780
				90ksi	15,750	16,930	18,110	5,900
				95ksi	16,430	17,660	18,890	6,020
				110ksi	18,480	19,870	21,250	6,390
				125ksi	20,520	22,060	23,600	6,740
				140ksi	22,560	24,250	25,940	7,090
9 5/8	53.50	0.545	Chrome ≥ 9%CR and Carbon	55ksi	13,290	14,290	15,280	5,790
				80ksi	17,580	18,900	20,220	6,530
				85ksi	18,440	19,820	21,210	6,680
				90ksi	19,300	20,750	22,200	6,830
				95ksi	20,160	21,670	23,180	6,980
				110ksi	22,730	24,430	26,140	7,420
				125ksi	25,310	27,210	29,110	7,880
				140ksi	27,890	29,980	32,070	8,330
9 5/8	58.40	0.595	Chrome ≥ 9%CR and Carbon	55ksi	14,930	16,050	17,170	6,260
				80ksi	19,870	21,360	22,850	7,120
				85ksi	20,860	22,420	23,990	7,290
				90ksi	21,850	23,490	25,130	7,470
				95ksi	22,840	24,550	26,270	7,630
				110ksi	25,810	27,750	29,680	8,160
				125ksi	28,770	30,930	33,090	8,670
				140ksi	31,740	34,120	36,500	9,190
10 3/4	40.50	0.350	Chrome ≥ 9%CR and Carbon	55ksi	6,430	6,910	7,390	3,640
				80ksi	8,090	8,700	9,300	3,940
				85ksi	8,420	9,050	9,680	3,990
				90ksi	8,750	9,410	10,060	4,050
				95ksi	9,080	9,760	10,440	4,110
				110ksi	10,070	10,830	11,580	4,280
				125ksi	11,060	11,890	12,720	4,450
				140ksi	12,050	12,950	13,860	4,620
10 3/4	45.50	0.400	Chrome ≥ 9%CR and Carbon	55ksi	7,840	8,430	9,020	4,170
				80ksi	9,990	10,740	11,490	4,550
				85ksi	10,420	11,200	11,980	4,620
				90ksi	10,850	11,660	12,480	4,700
				95ksi	11,280	12,130	12,970	4,780
				110ksi	12,570	13,510	14,460	5,000
				125ksi	13,860	14,900	15,940	5,230
				140ksi	15,140	16,280	17,410	5,450
10 3/4	51.00	0.450	Chrome ≥ 9%CR and Carbon	55ksi	9,190	9,880	10,570	4,650
				80ksi	11,830	12,720	13,600	5,120
				85ksi	12,360	13,290	14,210	5,210
				90ksi	12,890	13,860	14,820	5,310
				95ksi	13,420	14,430	15,430	5,400
				110ksi	15,000	16,130	17,250	5,680
				125ksi	16,580	17,820	19,070	5,940
				140ksi	18,170	19,530	20,900	6,230
10 3/4	55.50	0.495	Chrome ≥ 9%CR and Carbon	55ksi	10,460	11,240	12,030	5,080
				80ksi	13,570	14,590	15,610	5,630
				85ksi	14,190	15,250	16,320	5,730
				90ksi	14,810	15,920	17,030	5,840
				95ksi	15,440	16,600	17,760	5,960
				110ksi	17,300	18,600	19,900	6,280
				125ksi	19,170	20,610	22,050	6,610
				140ksi	21,040	22,620	24,200	6,940
10 3/4	60.70	0.545	Chrome ≥ 9%CR and Carbon	55ksi	13,080	14,060	15,040	5,740
				80ksi	17,280	18,580	19,870	6,480
				85ksi	18,120	19,480	20,840	6,630
				90ksi	18,960	20,380	21,800	6,770
				95ksi	19,800	21,290	22,770	6,920
				110ksi	22,320	23,990	25,670	7,360
				125ksi	24,840	26,700	28,570	7,800
				140ksi	27,360	29,410	31,460	8,240

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
10 ¾	65.70	0.595	Chrome ≥ 9%CR and Carbon	55ksi	14,630	15,730	16,820	6,210
				80ksi	19,440	20,900	22,360	7,050
				85ksi	20,400	21,930	23,460	7,210
				90ksi	21,360	22,960	24,560	7,370
				95ksi	22,330	24,000	25,680	7,550
				110ksi	25,210	27,100	28,990	8,050
				125ksi	28,100	30,210	32,320	8,560
				140ksi	30,990	33,310	35,640	9,070
10 ¾	73.20	0.672	Chrome ≥ 9%CR and Carbon	55ksi	16,520	17,760	19,000	6,790
				80ksi	22,060	23,710	25,370	7,760
				85ksi	23,160	24,900	26,630	7,950
				90ksi	24,270	26,090	27,910	8,140
				95ksi	25,380	27,280	29,190	8,340
				110ksi	28,700	30,850	33,010	8,910
				125ksi	32,030	34,430	36,830	9,500
				140ksi	35,350	38,000	40,650	10,080
11 ¾	47.00	0.375	Chrome ≥ 9%CR and Carbon	55ksi	7,290	7,840	8,380	3,940
				80ksi	9,260	9,950	10,650	4,280
				85ksi	9,650	10,370	11,100	4,340
				90ksi	10,050	10,800	11,560	4,420
				95ksi	10,440	11,220	12,010	4,490
				110ksi	11,620	12,490	13,360	4,690
				125ksi	12,800	13,760	14,720	4,900
				140ksi	13,990	15,040	16,090	5,120
11 ¾	54.00	0.435	Chrome ≥ 9%CR and Carbon	55ksi	8,940	9,610	10,280	4,540
				80ksi	11,510	12,370	13,240	4,990
				85ksi	12,020	12,920	13,820	5,080
				90ksi	12,530	13,470	14,410	5,170
				95ksi	13,050	14,030	15,010	5,270
				110ksi	14,580	15,670	16,770	5,520
				125ksi	16,120	17,330	18,540	5,800
				140ksi	17,660	18,980	20,310	6,060
11 ¾	60.00	0.489	Chrome ≥ 9%CR and Carbon	55ksi	11,340	12,190	13,040	5,210
				80ksi	14,860	15,970	17,090	5,820
				85ksi	15,560	16,730	17,890	5,950
				90ksi	16,270	17,490	18,710	6,080
				95ksi	16,970	18,240	19,520	6,190
				110ksi	19,090	20,520	21,950	6,570
				125ksi	21,200	22,790	24,380	6,940
				140ksi	23,310	25,060	26,810	7,300
11 ¾	65.00	0.534	Chrome ≥ 9%CR and Carbon	55ksi	12,720	13,670	14,630	5,630
				80ksi	16,780	18,040	19,300	6,350
				85ksi	17,590	18,910	20,230	6,490
				90ksi	18,400	19,780	21,160	6,630
				95ksi	19,220	20,660	22,100	6,780
				110ksi	21,650	23,270	24,900	7,200
				125ksi	24,090	25,900	27,700	7,640
				140ksi	26,520	28,510	30,500	8,050
13 ⅜	54.50	0.380	Chrome ≥ 9%CR and Carbon	55ksi	7,250	7,790	8,340	3,960
				80ksi	9,190	9,880	10,570	4,300
				85ksi	9,570	10,290	11,010	4,360
				90ksi	9,960	10,710	11,450	4,440
				95ksi	10,350	11,130	11,900	4,510
				110ksi	11,510	12,370	13,240	4,700
				125ksi	12,670	13,620	14,570	4,910
				140ksi	13,830	14,870	15,900	5,110

Size (inch)	Weight (ppf)	Pipe Body Wall (inch)	Material	Grade	Field Torque (ft-lb) / APImod (FF=1.0)			
					Minimum Torque	Optimum Torque	Maximum Torque	Maximum Shoulder
13 ⅜	61.00	0.430	Chrome ≥ 9%CR and Carbon	55ksi	8,820	9,480	10,140	4,500
				80ksi	11,330	12,180	13,030	4,930
				85ksi	11,830	12,720	13,600	5,020
				90ksi	12,340	13,270	14,190	5,120
				95ksi	12,840	13,800	14,770	5,200
				110ksi	14,350	15,430	16,500	5,470
				125ksi	15,860	17,050	18,240	5,730
				140ksi	17,370	18,670	19,980	5,990
13 ⅜	68.00	0.480	Chrome ≥ 9%CR and Carbon	55ksi	10,220	10,990	11,750	4,980
				80ksi	13,250	14,240	15,240	5,500
				85ksi	13,860	14,900	15,940	5,610
				90ksi	14,470	15,560	16,640	5,730
				95ksi	15,070	16,200	17,330	5,820
				110ksi	16,890	18,160	19,420	6,140
				125ksi	18,710	20,110	21,520	6,460
				140ksi	20,530	22,070	23,610	6,780
13 ⅜	72.00	0.514	Chrome ≥ 9%CR and Carbon	55ksi	11,200	12,040	12,880	5,290
				80ksi	14,610	15,710	16,800	5,900
				85ksi	15,290	16,440	17,580	6,010
				90ksi	15,970	17,170	18,370	6,130
				95ksi	16,650	17,900	19,150	6,250
				110ksi	18,700	20,100	21,510	6,610
				125ksi	20,740	22,300	23,850	6,970
				140ksi	22,790	24,500	26,210	7,330

10.8 End Finishing Requirements

0.03 in	High Chrome[1] Steel Pin End Finish	High Chrome[1] Steel Box End Finish	Carbon Steel Pin End Finish	Carbon Steel Box End Finish
All	Bare (Mill end) and Bead Blast (Field end) or Bead Blast both Mill and Field End	Copper-plate or Clear-Plate™	Bare as Minimum Requirement or Phosphate or Bead Blast	Manganese Phosphate as Minimum or Copper-plate

Note[1] - Definition of high chrome steel: Containing ≥ 9%Cr

10.9 Special Clearance OD Dimensions

FOX Special Clearance Coupling OD's		
Size (inch)	Coupling OD (inch)	Tolerance (inch)
4 ½	4.882	+ 0.020 / - 0
5	5.391	
5 ½	5.891	
6 ⅝	7.000	
7	7.380	
7 ⅝	8.000	
8 ⅝	9.120	
9 ⅝	10.100	
10 ¾	11.266	
11 ¾	12.268	

11 JFEBEAR

11.1 Design Features

Figure 11.1.1 – Box Detail

Figure 11.1.2 – Pin Detail

OD (inch)	Threads per Inch (TPI)
2 ⅜ to 2 ⅞	8
3 ½ to 4	6
4 ½ to 9 ⅝	5

11.2 Interchangeability

JFEBEAR connections with differing weights are interchangeable within a given OD. Rules when mixing differing weights & grades:

- The lower make-up torque of the lighter weight/ lower grade connection should be used
- If pin weight is heavier, a step will extrude into pipe bore from pin
- If box weight is heavier, a step will extrude into pipe bore from box
- Couplings with differing weights may have differing OD's
- JFEBEAR & JFEBEAR HT are interchangeable

The following tables provide examples of the rules when mixing various weights and grades for JFEBEAR.

Figure 11.2.1 – Differing Weights + Identical Grades (ID step = 0.031", Applied torque is the lesser torque value of the combined connections.)

3 ½" JFEBEAR	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	10.2	80	2.915	4040	4490	4940
Pin	12.7	80	2.853	4710	5230	5760
				Applicable Torque		
Step/side (inch)			0.031	4040	4490	4940

Figure 11.2.2 – Identical Weights + Differing Grades (No ID step, Applied torque is the lesser torque value of the combined connections.)

3 ½" JFEBEAR	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	10.2	80	2.915	4040	4490	4940
Pin	10.2	95	2.915	4690	5210	5730
				Applicable Torque		
Step/side (inch)			0	4040	4490	4940

Figure 11.2.3 – Differing Weights + Differing Grades (ID step = 0.042", Applied torque is the lesser torque value of the combined connections.)

4 ½" JFEBEAR	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	15.2	95	3.852	7110	7900	8690
Pin	12.6	80	3.936	4860	5400	5940
				Applicable Torque		
Step/side (inch)			0.042	4860	5400	5940

11.3 Field Inspection

Field Inspection Tools

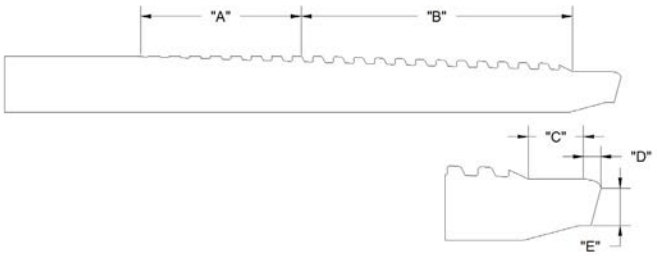
The following tools are commonly used but not limited to during field inspection & repair procedures:

- Depth Gauge
- Fine Tooth Triangle File
- Scotch Brite
- Emery Cloth
- Soft Stone
- Vernier Calipers
- Rotary Tools[1]

[1] Rotary tools can only be used by qualified JFE field service personnel.

A selection of field repair tools are shown in the image below.

11.3.1 JFEBEAR Pin Visual Inspection Criteria & Guidelines



Condition: Corrosion

Zone	Criteria	Action
A, B, C, E	All surfaces.Pitting less than 0.004" (0.1mm) deep or minor surface corrosion	Hand repair with soft bristle (no steel wire) brush or emery cloth
	Deeper than 0.004" (0.1mm)	Cut off & re-thread
D	No pitting acceptable	If present, cut off & re-thread
	Light surface corrosion (rust)	Hand repair with scotch brite or #400 emery cloth. Do not alter seal dimension. Repair should be made in a larger area than actual surface corrosion and should move around the circumference of the seal

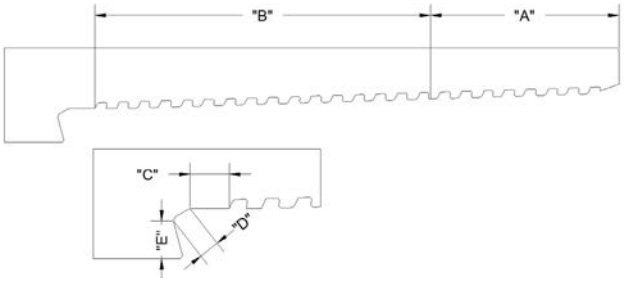
Condition: Burr, Tear, Ding, Mash, Scratch

Zone	Criteria	Action
A, B, C, E	All surfaces. Any condition which could cause galling, i.e. conditions described greater than 0.010" (0.3mm)	Hand repair with a fine triangle file; emery cloth or rotary tool[1]. Repair should be made in a larger area than actual effected area and should move around the helix of the thread. Otherwise - reject.
D	Not acceptable	If present, cut off & re-thread

Condition: Bead peening on carbon steel (≤ 4 1/2") and high chrome steel

Zone	Criteria	Action
A, B, C, D, E	Inspect for peened surface. If previously made-up, normal wear is expected and is acceptable	Bead peen if not present

11.3.2 JFEBEAR Box Visual Inspection Criteria & Guidelines



Condition: Corrosion

Zone	Criteria	Action
A, B, C, E	Slight imperfections and light surface corrosion, i.e. Less than 0.004" (0.1mm)	Hand repair with soft bristle (no steel wire) brush, emery cloth or scotch brite
	All other imperfections deeper than 0.004" (0.1mm)	Reject or re-thread
D	No pitting acceptable	Reject or re-thread
	Light surface corrosion (rust)	Hand repair with scotch brite or #400 emery cloth. Do not alter seal dimension. Repair should be made in a larger area than actual surface corrosion and should move around the circumference of the seal
Coupling OD, ID Bore & Bearing Face	Pitting or corrosion less than 0.020" (0.5mm) deep	Grind to the bottom of the pit & smooth edges. Keep within product tolerances.
	Deeper than 0.020" (0.5mm)	Reject or re-thread

Condition: Burr, Tear, Ding, Mash, Scratch

Zone	Criteria	Action
A, B, C, E	All surfaces. Any condition which could cause galling, ie. conditions described greater than 0.010" (0.3mm)	Hand repair with a fine triangle file or emery cloth. Repair should be made in a larger area than actual effected area and should move around the helix of the thread. Otherwise - reject.
D	Not acceptable	If present, cut off & re-thread

Condition: Manganese phosphate

Zone	Criteria	Action
A, B, C, D, E	Must be present. Inspect for medium grey surface colour. If previously made-up, normal wear is expected and is acceptable	Manganese phosphate if not present, reject, or re phosphate

Condition: Copper-plate and Clear-Plate™

Zone	Criteria	Action
A, B, C, D, E	Inspect the electroplated surface. Oxidation or discolouration of the plated surface is acceptable. If previously made-up, normal wear is expected and acceptable. Any delamination of plating is cause for reject	If holiday/ delamination exists, reject or re-plate

11.4 Approved Thread Compounds

This procedure recommends the thread compounds that can be used to make-up JFE connections.

JFE do not recommend the use of thread compounds containing PTFE (Teflon®) for premium connections.

List of Approved Thread Compounds include, but are not limited to:

JFEBEAR Approved Thread Compounds

Connection	Material Grade	API Modified [1]	Weatherford Lube Seal	Jet-Lube HPHT
JFEBEAR®	Carbon	✓	✓	✗
	9Cr to 17Cr	✓	✓	✗
	CRA	✓	✓	✗

Connection	Material Grade	BOL 4010NM	TOPCO Green Seal II	Clear-Glide™ [2]	BOL 2000
JFEBEAR®	Carbon	✓	✗	✓	✗
	9Cr to 17Cr	≤5.5" [3]	✗	✓	✗
	CRA	≤5.5" [3]	✗	✓	✗

[1] Thread compounds that are in compliance with API RP 5A3 Annex A can be used on JFE connections. Different names are given and are dependent on the thread compound manufacturer.

[2] Clear-Glide™ is to be used only with Clear-Run™ prepared tubulars, i.e. when the proper end finishing is applied.

[3] Can be applied to sizes larger than 5.5" if Clear-Plate™ is applied to the coupling/box.

JFE continues to evaluate the use of thread compounds. It is recommended to contact your nearest JFE-TC office for further information if other compounds that are not listed are required. Please continuously refer to www.jfetc.com for the most updated list and technical data.

This table is for informational purpose only.

11.5 Lifting Plugs

Figure 11.5.1 – Example of main body for lift plug (seal removed)

The following points shall be adhered to for JFEBEAR lift plugs:

- The lift plug shall be manufactured from low alloy steel with a specified minimum yield stress (SMYS) of 110ksi, and a maximum yield stress of 140ksi.
- The lift plug shall be bead peened, phosphated or copper-plated as per the relevant procedures. Once machining has been completed, weld on handles can be installed to assist with handling and assembling operations. If handles are installed, they shall be of appropriate size and orientated 0° and 180°.
- The lift plug is low torque and therefore a power tong is not required. Final positioning before lifting operation can be achieved using the handles or strap wrench/chain tong

The following information shall be low stress stamped on the lift plug where drifting operations are not required:

Size, All weights, grade and JFEBEAR Lift Plug
Licensee code plus manufacturing date
For lifting a maximum of three joints only

Stencil Example
9 ⅝" All weights AISI 4145 110ksi JFEBEAR Lift Plug
SI-081; 22nd April 2021
For lifting a maximum of three joints only

The following information shall be low stress stamped on the lift plug where drifting through the plug is required:

Size, weight, grade and JFEBEAR Lift Plug
Bore ID = XXXX
Licensee code plus manufacturing date
For lifting a maximum of three joints only

Example
4.5" 12.6# AISI 110ksi JFEBEAR Lift Plug
Bore ID = 3.958"
SI-081; 22nd April 2021
For lifting a maximum of three joints only

11.6 Make-Up Acceptance Criteria

Figure 11.6.1 – Example of an acceptable, typical JFEBEAR make up graph

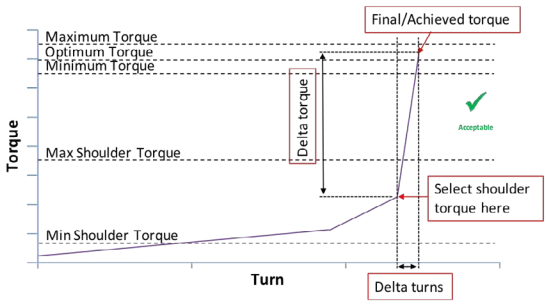


Figure 11.6.2 – Example of an acceptable JFEBEAR make-up graph (minor loss of linearity within 0.1 delta turns). If delta turns are higher than 0.1, however the graph remains linear, the graph is acceptable.

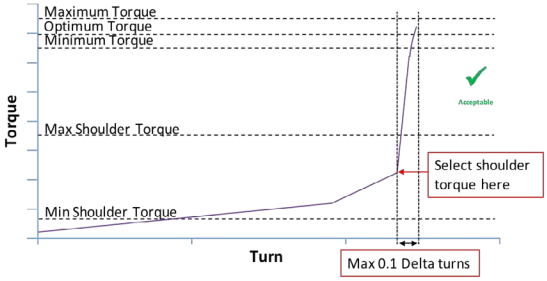


Figure 11.6.3 – Example of an acceptable JFEBEAR make up graph (Minor slippage during thread engagement)

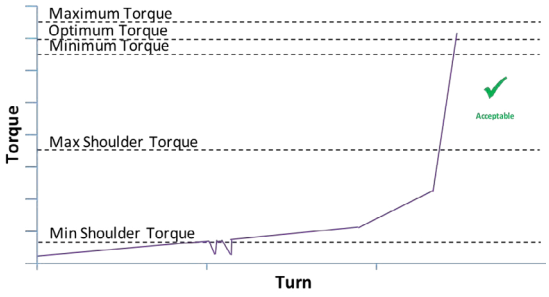
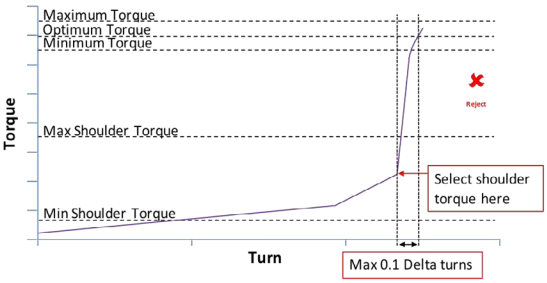


Figure 11.6.4 – Example of an unacceptable JFEBEAR make-up graph (loss of linearity falls out of the 0.1 delta turns criteria). If in doubt, please contact your local JFE Technical Center



Possible causes of the unacceptable graph profile but not limited to, are as follows:

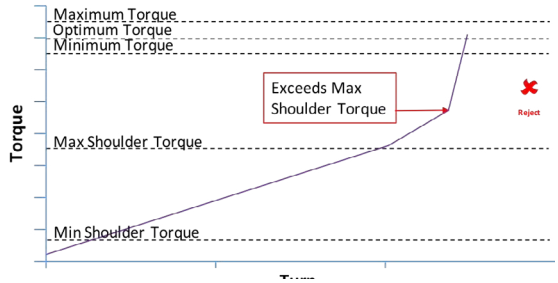
- Shoulder torque has not been selected correctly
- Dope is contaminated
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range
- Friction factor of dope is too low
- Load cell error

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

It should be noted that if the delta turns are greater than 0.1, however no loss of linearity exists, the graph can be accepted.

Figure 11.6.5 – Example of an unacceptable JFEBEAR make up graph (Exceeds Max Shoulder Torque)



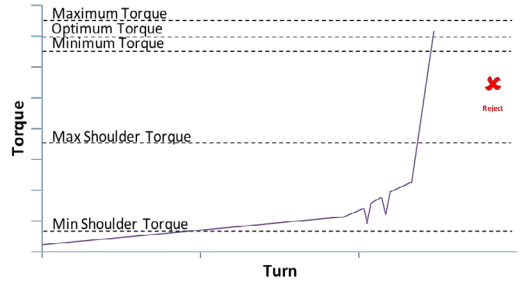
Possible causes of the unacceptable graph profile but not limited to, are as follows:

- Friction factor of dope is too high
- Dope is contaminated
- Pipe may not be straight
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 11.6.6 – Example of an unacceptable JFEBEAR make up graph (Slipping during seal engagement portion)



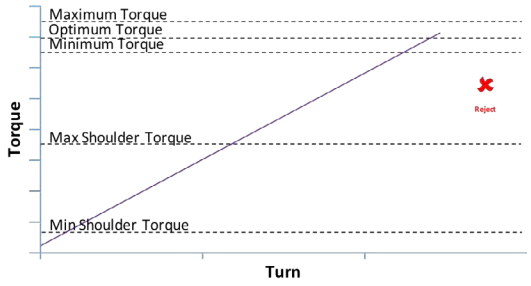
Possible causes of the unacceptable graph profile but not limited to, are as follows:

- Pipe may not be straight
- Jaw of power tong is worn out or dirty

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 11.6.7 – Example of an unacceptable JFEBEAR make up graph (No clear shoulder torque)



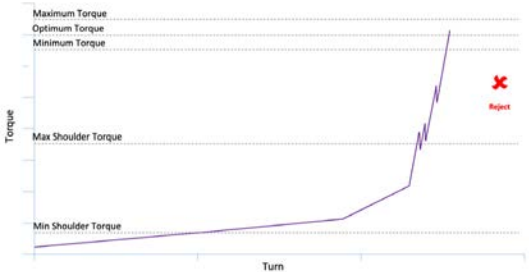
Possible causes of the unacceptable graph profile but not limited to, are as follows:

- Friction factor of dope is too high
- Dope is contaminated
- Pipe may not be straight
- Pin or box dimensions are out with the tolerance range

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 11.6.8 – Example of an unacceptable make up graph (Slipping after shouldering)



Possible causes of the unacceptable graph profile but not limited to, are as follows:

- Jaw of power tong is worn
- Contamination on pipe/coupling or dies/jaw
- Gripping pressure too low

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Determine the root cause of slippage
- Re-make up if no galling exists

Figure 11.6.9 – Example of an acceptable JFEBEAR make-up graph (the maximum torque value of the dope hump exceeds the maximum shoulder torque, however linearity is re-established prior to shouldering at a value below maximum shoulder torque)

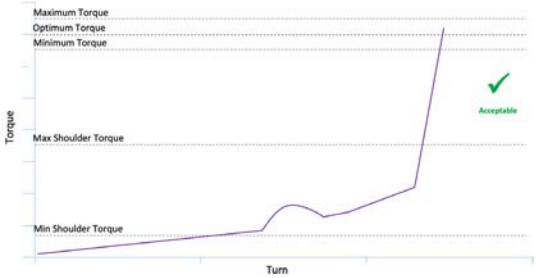


Figure 11.6.10 – Example of an acceptable JFEBEAR make-up graph (shoulder torque and maximum torque value of the dope hump are below maximum shoulder torque where dope hump extends into shoulder torque gradient)

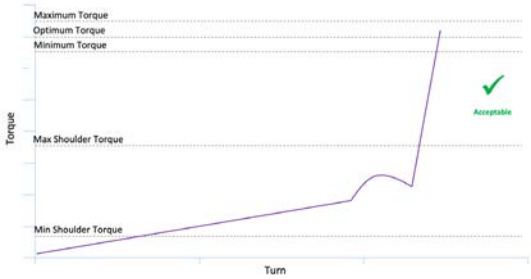


Figure 11.6.11 – Example of an unacceptable JFEBEAR make-up graph (the maximum torque value of the dope hump exceeds the maximum shoulder torque, however linearity is re-established prior to shouldering at a value below maximum shoulder torque)

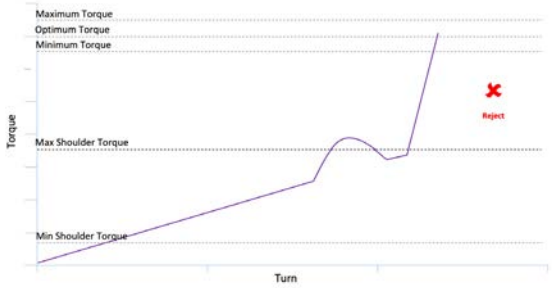
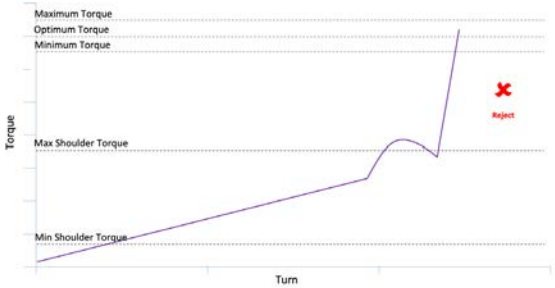


Figure 11.6.12 – Example of an unacceptable JFEBEAR make-up graph (the peak torque value of the dope hump is above the maximum shoulder torque value and the selected position is within the dope hump area)



Possible causes of the unacceptable graph profile but not limited to, are as follows:

- Dope is contaminated
- Excessive dope application

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

11.7 Torque Information

JFEBEAR

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	55 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	990	1,100	1,210	75	880
	5.80	0.254	1,350	1,500	1,650	75	1,200
	6.60	0.295	1,620	1,800	1,980	90	1,440
	7.35	0.336	1,890	2,100	2,310	105	1,680
2 7/8	6.40	0.217	1,620	1,800	1,980	90	1,440
	7.80	0.276	1,980	2,200	2,420	110	1,760
	8.60	0.308	2,520	2,800	3,080	140	2,240
	9.35	0.340	2,790	3,100	3,410	155	2,480
	10.50	0.392	3,240	3,600	3,960	180	2,880
	11.50	0.440	3,420	3,800	4,180	190	3,040
3 1/2	7.70	0.216	2,250	2,500	2,750	250	2,000
	9.20	0.254	2,610	2,900	3,190	290	2,320
	10.20	0.289	3,060	3,400	3,740	340	2,720
	12.70	0.375	4,230	4,700	5,170	470	3,760
	14.30	0.430	4,770	5,300	5,830	530	4,240
	15.50	0.476	5,310	5,900	6,490	590	4,720
	17.00	0.530	5,670	6,300	6,930	630	5,040
4	9.50	0.226	2,700	3,000	3,300	300	2,400
	10.70	0.262	3,240	3,600	3,960	360	2,880
	11.60	0.286	-	-	-	-	-
	13.20	0.330	4,230	4,700	5,170	470	3,760
	14.80	0.380	-	-	-	-	-
	16.10	0.415	5,400	6,000	6,600	600	4,800
4 1/2	11.60	0.250	3,600	4,000	4,400	400	3,200
	12.60	0.271	3,960	4,400	4,840	440	3,520
	13.50	0.290	4,320	4,800	5,280	480	3,840
	15.20	0.337	5,220	5,800	6,380	580	4,640
	17.00	0.380	5,940	6,600	7,260	660	5,280
	18.90	0.430	6,660	7,400	8,140	740	5,920
	21.50	0.500	7,740	8,600	9,460	860	6,880
	23.70	0.560	8,640	9,600	10,560	960	7,680
5	13.00	0.253	3,690	4,100	4,510	410	3,075
	15.00	0.296	4,950	5,500	6,050	550	4,125
	18.00	0.362	6,480	7,200	7,920	720	5,400
	21.40	0.437	8,100	9,000	9,900	900	6,750
	23.20	0.478	8,730	9,700	10,670	970	7,275
	24.10	0.500	9,180	10,200	11,220	1,020	7,650
5 1/2	15.50	0.275	4,590	5,100	5,610	510	3,825
	17.00	0.304	5,220	5,800	6,380	580	4,350
	20.00	0.361	6,660	7,400	8,140	740	5,550
	23.00	0.415	7,830	8,700	9,570	870	6,525
	26.00	0.476	8,820	9,800	10,780	980	7,350
	26.80	0.500	9,270	10,300	11,330	1,030	7,725
6	24.10	0.400	-	-	-	-	-
6 5/8	20.00	0.288	5,220	5,800	6,380	406	3,770
	24.00	0.352	6,840	7,600	8,360	532	4,940
	28.00	0.417	9,090	10,100	11,110	707	6,565
	32.00	0.475	11,070	12,300	13,530	861	7,995
7	23.00	0.317	6,210	6,900	7,590	483	4,485
	26.00	0.362	7,470	8,300	9,130	581	5,395
	29.00	0.408	9,180	10,200	11,220	714	6,630
	32.00	0.453	10,710	11,900	13,090	833	7,735
	35.00	0.498	11,880	13,200	14,520	924	8,580
	38.00	0.540	12,510	13,900	15,290	973	9,035
	42.70	0.625	13,140	14,600	16,060	1,022	9,490
	46.40	0.687	14,220	15,800	17,380	1,106	10,270
7 5/8	29.70	0.375	7,740	8,600	9,460	602	5,590
	33.70	0.430	8,370	9,300	10,230	651	6,045
	39.00	0.500	11,250	12,500	13,750	875	8,125
	42.80	0.562	13,140	14,600	16,060	1,022	9,490
	45.30	0.595	13,950	15,500	17,050	1,085	10,075
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	6,030	6,700	7,370	335	4,355
	36.00	0.400	7,380	8,200	9,020	410	5,330
	40.00	0.450	8,190	9,100	10,010	455	5,915
	44.00	0.500	9,450	10,500	11,550	525	6,825
	49.00	0.557	12,060	13,400	14,740	670	8,710
9 5/8	36.00	0.352	6,570	7,300	8,030	365	4,745
	40.00	0.395	7,290	8,100	8,910	405	5,265
	43.50	0.435	7,920	8,800	9,680	440	5,720
	47.00	0.472	9,630	10,700	11,770	535	6,955
	53.50	0.545	10,890	12,100	13,310	605	7,865
	58.40	0.595	12,240	13,600	14,960	680	8,840
	59.40	0.609	13,590	15,100	16,610	755	9,815

JFEBEAR JFEBEAR API

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80, 85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,200	1,300	1,400	75	1,040
	5.80	0.254	1,620	1,750	1,880	88	1,400
	6.60	0.295	1,810	1,960	2,110	98	1,568
	7.35	0.336	2,120	2,295	2,470	115	1,836
2 7/8	6.40	0.217	1,890	2,040	2,190	102	1,632
	7.80	0.276	2,350	2,540	2,730	127	2,032
	8.60	0.308	2,630	2,840	3,050	142	2,272
	9.35	0.340	3,000	3,245	3,490	162	2,596
	10.50	0.392	3,400	3,675	3,950	184	2,940
	11.50	0.440	3,700	4,000	4,300	200	3,200
3 1/2	7.70	0.216	2,570	2,850	3,140	285	2,280
	9.20	0.254	3,500	3,870	4,240	387	3,096
	10.20	0.289	4,040	4,490	4,940	449	3,592
	12.70	0.375	4,710	5,230	5,760	523	4,184
	14.30	0.430	5,470	6,080	6,690	608	4,864
	15.50	0.476	6,390	7,100	7,810	710	5,680
	17.00	0.530	6,840	7,600	8,360	760	6,080
4	9.50	0.226	3,465	3,745	4,025	375	2,996
	10.70	0.262	3,960	4,400	4,850	440	3,520
	11.60	0.286	4,390	4,880	5,370	488	3,904
	13.20	0.330	5,000	5,550	6,110	555	4,440
	14.80	0.380	5,850	6,500	7,150	650	5,200
	16.10	0.415	6,550	7,270	8,000	727	5,816
4 1/2	11.60	0.250	4,410	4,900	5,390	490	3,920
	12.60	0.271	4,860	5,400	5,940	540	4,320
	13.50	0.290	5,400	6,000	6,600	600	4,800
	15.20	0.337	6,570	7,300	8,030	730	5,840
	17.00	0.380	7,470	8,300	9,130	830	6,640
	18.90	0.430	8,640	9,600	10,560	960	7,680
	21.50	0.500	10,080	11,200	12,320	1,120	8,960
	23.70	0.560	11,250	12,500	13,750	1,250	10,000
5	13.00	0.253	4,950	5,500	6,050	550	4,125
	15.00	0.296	6,120	6,800	7,480	680	5,100
	18.00	0.362	7,840	8,710	9,580	871	6,533
	21.40	0.437	9,800	10,900	12,000	1,090	8,175
	23.20	0.478	11,430	12,700	13,970	1,270	9,525
	24.10	0.500	11,970	13,300	14,630	1,330	9,975
5 1/2	15.50	0.275	5,760	6,400	7,040	640	4,800
	17.00	0.304	6,660	7,400	8,140	740	5,550
	20.00	0.361	8,640	9,600	10,560	960	7,200
	23.00	0.415	10,170	11,300	12,430	1,130	8,475
	26.00	0.476	11,610	12,900	14,190	1,290	9,675
	26.80	0.500	12,240	13,600	14,960	1,360	10,200
6	24.10	0.400	11,900	13,220	14,540	1,322	9,915
6 5/8	20.00	0.288	6,570	7,300	8,030	511	4,745
	24.00	0.352	14,040	15,600	17,160	871	10,140
	28.00	0.417	14,260	15,840	17,430	1,109	10,296
	32.00	0.475	14,940	16,600	18,260	1,162	10,790
7	23.00	0.317	10,350	11,500	12,650	805	7,475
	26.00	0.362	11,800	13,110	14,420	918	8,522
	29.00	0.408	16,110	17,320	18,530	1,212	11,258
	32.00	0.453	22,440	24,260	26,080	1,698	15,769
	35.00	0.498	22,440	24,930	27,430	1,745	16,205
	38.00	0.540	22,500	25,000	27,500	1,750	16,250
	42.70	0.625	25,200	28,000	30,800	1,960	18,200
	46.40	0.687	26,100	29,000	31,900	2,030	18,850
7 5/8	29.70	0.375	9,900	11,000	12,100	770	7,150
	33.70	0.430	10,890	12,100	13,310	847	7,865
	39.00	0.500	14,940	16,600	18,260	1,162	10,790
	42.80	0.562	17,550	19,500	21,450	1,365	12,675
	45.30	0.595	18,630	20,700	22,770	1,449	13,455
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	7,650	8,500	9,350	425	5,525
	36.00	0.400	9,540	10,600	11,660	530	6,890
	40.00	0.450	18,000	20,000	22,000	1,000	13,000
	44.00	0.500	22,680	25,200	27,720	1,260	16,380
	49.00	0.557	23,220	25,800	28,380	1,290	16,770
9 5/8	36.00	0.352	8,190	9,100	10,010	455	5,915
	40.00	0.395	20,360	22,620	24,880	1,131	14,703
	43.50	0.435	23,220	25,800	28,380	1,290	16,770
	47.00	0.472	23,220	25,800	28,380	1,290	16,770
	53.50	0.545	23,220	25,800	28,380	1,290	16,770
	58.40	0.595	23,220	25,800	28,380	1,290	16,770
	59.40	0.609	23,220	25,800	28,380	1,290	16,770

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90, 95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,380	1,490	1,600	75	1,192
	5.80	0.254	1,800	1,945	2,090	97	1,556
	6.60	0.295	1,980	2,130	2,280	107	1,704
	7.35	0.336	2,340	2,530	2,720	127	2,024
2 7/8	6.40	0.217	1,980	2,140	2,300	107	1,712
	7.80	0.276	2,490	2,690	2,890	135	2,152
	8.60	0.308	2,940	3,170	3,400	159	2,536
	9.35	0.340	3,400	3,675	3,950	184	2,940
	10.50	0.392	3,960	4,280	4,600	214	3,424
	11.50	0.440	4,200	4,540	4,880	227	3,632
3 1/2	7.70	0.216	3,150	3,500	3,850	350	2,800
	9.20	0.254	3,640	4,040	4,450	404	3,232
	10.20	0.289	4,690	5,210	5,730	521	4,168
	12.70	0.375	5,720	6,360	7,000	636	5,088
	14.30	0.430	6,840	7,600	8,360	760	6,080
	15.50	0.476	6,930	7,700	8,470	770	6,160
	17.00	0.530	7,290	8,100	8,910	810	6,480
4	9.50	0.226	3,990	4,430	4,870	443	3,544
	10.70	0.262	4,920	5,470	6,020	547	4,376
	11.60	0.286	5,370	5,970	6,570	597	4,776
	13.20	0.330	6,080	6,760	7,430	676	5,408
	14.80	0.380	6,750	7,500	8,250	750	6,000
	16.10	0.415	7,810	8,440	9,080	844	6,752
4 1/2	11.60	0.250	4,770	5,300	5,830	530	4,240
	12.60	0.271	5,310	5,900	6,490	590	4,720
	13.50	0.290	5,920	6,580	7,240	658	5,264
	15.20	0.337	7,110	7,900	8,690	790	6,320
	17.00	0.380	8,140	9,050	9,990	905	7,240
	18.90	0.430	9,180	10,200	11,220	1,020	8,160
	21.50	0.500	10,800	12,000	13,200	1,200	9,600
	23.70	0.560	11,790	13,100	14,410	1,310	10,480
5	13.00	0.253	5,310	5,900	6,490	590	4,425
	15.00	0.296	6,390	7,100	7,810	710	5,325
	18.00	0.362	8,170	9,080	9,990	908	6,810
	21.40	0.437	10,400	11,560	12,720	1,156	8,670
	23.20	0.478	11,970	13,300	14,630	1,330	9,975
	24.10	0.500	12,510	13,900	15,290	1,390	10,425
5 1/2	15.50	0.275	6,210	6,900	7,590	690	5,175
	17.00	0.304	7,200	8,000	8,800	800	6,000
	20.00	0.361	9,450	10,500	11,550	1,050	7,875
	23.00	0.415	11,160	12,400	13,640	1,240	9,300
	26.00	0.476	12,690	14,100	15,510	1,410	10,575
	26.80	0.500	13,410	14,900	16,390	1,490	11,175
6	24.10	0.400	13,370	14,850	16,340	1,485	11,138
6 5/8	20.00	0.288	7,110	7,900	8,690	553	5,135
	24.00	0.352	16,250	18,050	19,850	1,011	11,733
	28.00	0.417	16,410	18,230	20,050	1,276	11,850
	32.00	0.475	16,410	18,230	20,050	1,276	11,850
7	23.00	0.317	12,470	13,480	14,490	944	8,762
	26.00	0.362	13,510	14,600	15,700	1,022	9,490
	29.00	0.408	19,720	21,320	22,920	1,492	13,858
	32.00	0.453	26,000	28,100	30,200	1,967	18,265
	35.00	0.498	26,610	28,770	30,930	2,014	18,701
	38.00	0.540	27,210	29,420	31,630	2,059	19,123
	42.70	0.625	27,210	29,420	31,630	2,059	19,123
	46.40	0.687	27,210	29,420	31,630	2,059	19,123
7 5/8	29.70	0.375	10,800	12,000	13,200	840	7,800
	33.70	0.430	17,820	19,800	21,780	1,386	12,870
	39.00	0.500	16,380	18,200	20,020	1,274	11,830
	42.80	0.562	18,900	21,000	23,100	1,470	13,650
	45.30	0.595	19,800	22,000	24,200	1,540	14,300
	47.10	0.625	23,220	25,800	28,380	1,290	16,770
7 3/4	46.10	0.595	34,020	37,800	41,580	1,890	24,570
8 5/8	32.00	0.352	8,100	9,000	9,900	450	5,850
	36.00	0.400	9,990	11,100	12,210	555	7,215
	40.00	0.450	19,350	21,500	23,650	1,075	13,975
	44.00	0.500	23,220	25,800	28,380	1,290	16,770
	49.00	0.557	23,220	25,800	28,380	1,290	16,770
9 5/8	36.00	0.352	9,000	10,000	11,000	500	6,500
	40.00	0.395	20,360	22,620	24,880	1,131	14,703
	43.50	0.435	23,220	25,800	28,380	1,290	16,770
	47.00	0.472	23,220	25,800	28,380	1,290	16,770
	53.50	0.545	23,220	25,800	28,380	1,290	16,770
	58.40	0.595	23,220	25,800	28,380	1,290	16,770
	59.40	0.609	23,220	25,800	28,380	1,290	16,770

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	105, 110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,400	1,510	1,620	76	1,208
	5.80	0.254	1,810	1,960	2,110	98	1,568
	6.60	0.295	2,150	2,325	2,500	116	1,860
	7.35	0.336	2,450	2,650	2,850	133	2,120
2 7/8	6.40	0.217	2,090	2,320	2,550	116	1,856
	7.80	0.276	2,630	2,920	3,210	146	2,336
	8.60	0.308	3,150	3,405	3,660	170	2,724
	9.35	0.340	3,700	4,000	4,300	200	3,200
	10.50	0.392	4,200	4,540	4,880	227	3,632
	11.50	0.440	4,500	4,865	5,230	243	3,892
3 1/2	7.70	0.216	3,285	3,650	4,015	365	2,920
	9.20	0.254	3,780	4,200	4,620	420	3,360
	10.20	0.289	4,740	5,270	5,800	527	4,216
	12.70	0.375	6,210	6,900	7,590	690	5,520
	14.30	0.430	6,930	7,700	8,470	770	6,160
	15.50	0.476	7,500	8,330	9,160	833	6,664
	17.00	0.530	8,000	8,890	9,780	889	7,112
4	9.50	0.226	4,410	4,900	5,390	490	3,920
	10.70	0.262	5,094	5,660	6,230	566	4,528
	11.60	0.286	5,480	6,090	6,700	609	4,872
	13.20	0.330	6,150	6,830	7,510	683	5,464
	14.80	0.380	7,200	8,000	8,800	800	6,400
	16.10	0.415	8,050	8,950	9,840	895	7,160
4 1/2	11.60	0.250	5,220	5,800	6,380	580	4,640
	12.60	0.271	5,850	6,500	7,150	650	5,200
	13.50	0.290	6,390	7,100	7,810	710	5,680
	15.20	0.337	8,010	8,900	9,790	890	7,120
	17.00	0.380	9,270	10,300	11,330	1,030	8,240
	18.90	0.430	10,260	11,400	12,540	1,140	9,120
	21.50	0.500	12,060	13,400	14,740	1,340	10,720
	23.70	0.560	13,320	14,800	16,280	1,480	11,840
5	13.00	0.253	5,940	6,600	7,260	660	4,950
	15.00	0.296	7,380	8,200	9,020	820	6,150
	18.00	0.362	10,080	11,200	12,320	1,120	8,400
	21.40	0.437	12,780	14,200	15,620	1,420	10,650
	23.20	0.478	13,500	15,000	16,500	1,500	11,250
	24.10	0.500	14,490	16,100	17,710	1,610	12,075
5 1/2	15.50	0.275	6,930	7,700	8,470	770	5,775
	17.00	0.304	8,010	8,900	9,790	890	6,675
	20.00	0.361	10,530	11,700	12,870	1,170	8,775
	23.00	0.415	15,010	16,680	18,350	1,668	12,510
	26.00	0.476	15,010	16,680	18,350	1,668	12,510
	26.80	0.500	15,010	16,680	18,350	1,668	12,510
6	24.10	0.400	15,480	17,200	18,920	1,720	12,900
6 5/8	20.00	0.288	7,560	8,400	9,240	588	5,460
	24.00	0.352	16,250	18,050	19,850	1,011	11,733
	28.00	0.417	16,410	18,230	20,050	1,276	11,850
	32.00	0.475	17,000	18,890	20,780	1,322	12,279
7	23.00	0.317	12,470	13,480	14,490	944	8,762
	26.00	0.362	13,510	14,600	15,700	1,022	9,490
	29.00	0.408	19,720	21,320	22,920	1,492	13,858
	32.00	0.453	26,000	28,100	30,200	1,967	18,265
	35.00	0.498	26,610	28,770	30,930	2,014	18,701
	38.00	0.540	27,210	29,420	31,630	2,059	19,123
	42.70	0.625	27,210	29,420	31,630	2,059	19,123
	46.40	0.687	27,210	29,420	31,630	2,059	19,123
7 5/8	29.70	0.375	11,520	12,800	14,080	896	8,320
	33.70	0.430	12,780	14,200	15,620	994	9,230
	39.00	0.500	17,730	19,700	21,670	1,379	12,805
	42.80	0.562	20,880	23,200	25,520	1,624	15,080
	45.30	0.595	22,230	24,700	27,170	1,729	16,055
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	35,010	38,900	42,790	1,945	25,285
8 5/8	32.00	0.352	8,460	9,400	10,340	470	6,110
	36.00	0.400	10,980	12,200	13,420	610	7,930
	40.00	0.450	20,700	23,000	25,300	1,150	14,950
	44.00	0.500	23,220	25,800	28,380	1,290	16,770
	49.00	0.557	23,220	25,800	28,380	1,290	16,770
9 5/8	36.00	0.352	9,540	10,600	11,660	530	6,890
	40.00	0.395	20,360	22,620	24,880	1,131	14,703
	43.50	0.435	23,220	25,800	28,380	1,290	16,770
	47.00	0.472	23,220	25,800	28,380	1,290	16,770
	53.50	0.545	23,220	25,800	28,380	1,290	16,770
	58.40	0.595	23,220	25,800	28,380	1,290	16,770
	59.40	0.609	23,220	25,800	28,380	1,290	16,770

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	125 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,530	1,655	1,780	83	1,324
	5.80	0.254	2,000	2,165	2,330	108	1,732
	6.60	0.295	2,345	2,535	2,725	127	2,028
	7.35	0.336	2,750	2,970	3,190	149	2,376
2 7/8	6.40	0.217	2,340	2,530	2,720	127	2,024
	7.80	0.276	2,800	3,030	3,260	152	2,424
	8.60	0.308	3,430	3,710	3,990	186	2,968
	9.35	0.340	3,950	4,270	4,590	214	3,416
	10.50	0.392	4,390	4,750	5,110	238	3,800
	11.50	0.440	4,700	5,080	5,460	254	4,064
3 1/2	7.70	0.216	3,465	3,850	4,235	385	3,080
	9.20	0.254	3,925	4,360	4,795	436	3,488
	10.20	0.289	5,070	5,630	6,190	563	4,504
	12.70	0.375	6,500	7,220	7,940	722	5,776
	14.30	0.430	7,200	8,000	8,800	800	6,400
	15.50	0.476	8,000	8,890	9,780	889	7,112
	17.00	0.530	8,500	9,445	10,390	945	7,556
4	9.50	0.226	4,820	5,360	5,900	536	4,288
	10.70	0.262	5,490	6,100	6,710	610	4,880
	11.60	0.286	5,840	6,490	7,140	649	5,192
	13.20	0.330	6,570	7,300	8,030	730	5,840
	14.80	0.380	-	-	-	-	-
	16.10	0.415	8,590	9,545	10,500	955	7,636
4 1/2	11.60	0.250	5,580	6,200	6,820	620	4,960
	12.60	0.271	6,300	7,000	7,700	700	5,600
	13.50	0.290	6,930	7,700	8,470	770	6,160
	15.20	0.337	8,775	9,750	10,725	975	7,800
	17.00	0.380	10,215	11,350	12,485	1,135	9,080
	18.90	0.430	11,250	12,500	13,750	1,250	10,000
	21.50	0.500	12,780	14,200	15,620	1,420	11,360
	23.70	0.560	14,380	15,980	17,580	1,598	12,784
5	13.00	0.253	6,480	7,200	7,920	720	5,400
	15.00	0.296	8,100	9,000	9,900	900	6,750
	18.00	0.362	10,710	11,900	13,090	1,190	8,925
	21.40	0.437	14,040	15,600	17,160	1,560	11,700
	23.20	0.478	14,580	16,200	17,820	1,620	12,150
	24.10	0.500	15,750	17,500	19,250	1,750	13,125
5 1/2	15.50	0.275	7,110	7,900	8,690	790	5,925
	17.00	0.304	8,550	9,500	10,450	950	7,125
	20.00	0.361	10,980	12,200	13,420	1,220	9,150
	23.00	0.415	15,010	16,680	18,350	1,668	12,510
	26.00	0.476	15,010	16,680	18,350	1,668	12,510
	26.80	0.500	15,010	16,680	18,350	1,668	12,510
6	24.10	0.400	16,670	18,520	20,370	1,852	13,890
6 5/8	20.00	0.288	8,190	9,100	10,010	637	5,915
	24.00	0.352	16,250	18,050	19,850	1,011	11,733
	28.00	0.417	16,410	18,230	20,050	1,276	11,850
	32.00	0.475	17,000	18,890	20,780	1,322	12,279
7	23.00	0.317	12,470	13,480	14,490	944	8,762
	26.00	0.362	13,510	14,600	15,700	1,022	9,490
	29.00	0.408	19,720	21,320	22,920	1,492	13,858
	32.00	0.453	26,000	28,100	30,200	1,967	18,265
	35.00	0.498	26,610	28,770	30,930	2,014	18,701
	38.00	0.540	27,210	29,420	31,630	2,059	19,123
	42.70	0.625	27,210	29,420	31,630	2,059	19,123
	46.40	0.687	27,210	29,420	31,630	2,059	19,123
7 5/8	29.70	0.375	12,150	13,500	14,850	945	8,775
	33.70	0.430	13,230	14,700	16,170	1,029	9,555
	39.00	0.500	18,450	20,500	22,550	1,435	13,325
	42.80	0.562	22,500	25,000	27,500	1,750	16,250
	45.30	0.595	24,030	26,700	29,370	1,869	17,355
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	9,360	10,400	11,440	520	6,760
	36.00	0.400	11,520	12,800	14,080	640	8,320
	40.00	0.450	22,050	24,500	26,950	1,225	15,925
	44.00	0.500	23,220	25,800	28,380	1,290	16,770
	49.00	0.557	23,220	25,800	28,380	1,290	16,770
9 5/8	36.00	0.352	10,170	11,300	12,430	565	7,345
	40.00	0.395	20,360	22,620	24,880	1,131	14,703
	43.50	0.435	23,220	25,800	28,380	1,290	16,770
	47.00	0.472	23,220	25,800	28,380	1,290	16,770
	53.50	0.545	23,220	25,800	28,380	1,290	16,770
	58.40	0.595	23,220	25,800	28,380	1,290	16,770
	59.40	0.609	23,400	26,000	28,600	1,300	16,900

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Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	140 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,620	1,800	1,980	90	1,440
	5.80	0.254	2,250	2,500	2,750	125	2,000
	6.60	0.295	2,520	2,800	3,080	140	2,240
	7.35	0.336	3,150	3,500	3,850	175	2,800
2 7/8	6.40	0.217	2,520	2,800	3,080	140	2,240
	7.80	0.276	3,600	4,000	4,400	200	3,200
	8.60	0.308	4,050	4,500	4,950	225	3,600
	9.35	0.340	4,950	5,500	6,050	275	4,400
	10.50	0.392	5,400	6,000	6,600	300	4,800
	11.50	0.440	6,120	6,800	7,480	340	5,440
3 1/2	7.70	0.216	3,465	3,850	4,235	385	3,080
	9.20	0.254	4,320	4,800	5,280	480	3,840
	10.20	0.289	6,300	7,000	7,700	700	5,600
	12.70	0.375	7,380	8,200	9,020	820	6,560
	14.30	0.430	8,190	9,100	10,010	910	7,280
	15.50	0.476	8,820	9,800	10,780	980	7,840
	17.00	0.530	9,630	10,700	11,770	1,070	8,560
4	9.50	0.226	5,040	5,600	6,160	560	4,480
	10.70	0.262	6,030	6,700	7,370	670	5,360
	11.60	0.286	-	-	-	-	-
	13.20	0.330	6,930	7,700	8,470	770	6,160
	14.80	0.380	-	-	-	-	-
	16.10	0.415	9,630	10,700	11,770	1,070	8,560
4 1/2	11.60	0.250	6,030	6,700	7,370	670	5,360
	12.60	0.271	6,930	7,700	8,470	770	6,160
	13.50	0.290	7,740	8,600	9,460	860	6,880
	15.20	0.337	9,810	10,900	11,990	1,090	8,720
	17.00	0.380	11,430	12,700	13,970	1,270	10,160
	18.90	0.430	12,780	14,200	15,620	1,420	11,360
	21.50	0.500	14,580	16,200	17,820	1,620	12,960
	23.70	0.560	16,290	18,100	19,910	1,810	14,480
5	13.00	0.253	7,020	7,800	8,580	780	5,850
	15.00	0.296	8,820	9,800	10,780	980	7,350
	18.00	0.362	12,060	13,400	14,740	1,340	10,050
	21.40	0.437	16,020	17,800	19,580	1,780	13,350
	23.20	0.478	17,730	19,700	21,670	1,970	14,775
	24.10	0.500	18,540	20,600	22,660	2,060	15,450
5 1/2	15.50	0.275	8,100	9,000	9,900	900	6,750
	17.00	0.304	9,900	11,000	12,100	1,100	8,250
	20.00	0.361	13,500	15,000	16,500	1,500	11,250
	23.00	0.415	16,200	18,000	19,800	1,800	13,500
	26.00	0.476	17,100	19,000	20,900	1,900	14,250
	26.80	0.500	18,000	20,000	22,000	2,000	15,000
6	24.10	0.400	-	-	-	-	-
6 5/8	20.00	0.288	9,090	10,100	11,110	707	6,565
	24.00	0.352	16,250	18,050	19,850	1,011	11,733
	28.00	0.417	17,370	19,300	21,230	1,351	12,545
	32.00	0.475	21,960	24,400	26,840	1,708	15,860
7	23.00	0.317	12,470	13,480	14,490	944	8,762
	26.00	0.362	14,130	15,700	21,450	1,099	10,205
	29.00	0.408	19,720	21,320	22,920	1,492	13,858
	32.00	0.453	26,000	28,100	30,200	1,967	18,265
	35.00	0.498	26,610	28,770	30,930	2,014	18,701
	38.00	0.540	27,210	29,420	31,630	2,059	19,123
	42.70	0.625	27,210	29,420	31,630	2,059	19,123
	46.40	0.687	27,210	29,420	31,630	2,059	19,123
7 5/8	29.70	0.375	13,680	15,200	16,720	1,064	9,880
	33.70	0.430	15,210	16,900	18,590	1,183	10,985
	39.00	0.500	21,420	23,800	26,180	1,666	15,470
	42.80	0.562	25,380	28,200	31,020	1,974	18,330
	45.30	0.595	27,000	30,000	33,000	2,100	19,500
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	10,440	11,600	12,760	580	7,540
	36.00	0.400	13,050	14,500	15,950	725	9,425
	40.00	0.450	22,050	24,500	26,950	1,225	15,925
	44.00	0.500	23,220	25,800	28,380	1,290	16,770
	49.00	0.557	23,220	25,800	28,380	1,290	16,770
9 5/8	36.00	0.352	11,160	12,400	13,640	620	8,060
	40.00	0.395	20,360	22,620	24,880	1,131	14,703
	43.50	0.435	23,220	25,800	28,380	1,290	16,770
	47.00	0.472	23,220	25,800	28,380	1,290	16,770
	53.50	0.545	23,220	25,800	28,380	1,290	16,770
	58.40	0.595	23,400	26,000	28,600	1,300	16,900
	59.40	0.609	26,370	29,300	32,230	1,465	19,045

Clear-Run for Chrome Grades ≥ 9%Cr

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80, 85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,440	1,560	1,680	80	1,330
	5.80	0.254	1,940	2,100	2,260	110	1,790
	6.60	0.295	2,170	2,350	2,530	120	2,000
	7.35	0.336	2,540	2,750	2,960	140	2,340
2 7/8	6.40	0.217	3,210	3,470	3,720	170	2,770
	7.80	0.276	4,000	4,320	4,640	220	3,450
	8.60	0.308	4,470	4,830	5,190	240	3,860
	9.35	0.340	5,100	5,520	5,930	280	4,410
	10.50	0.392	5,780	6,250	6,720	310	5,000
	11.50	0.440	6,290	6,800	7,310	340	5,440
3 1/2	7.70	0.216	3,860	4,280	4,710	430	3,420
	9.20	0.254	5,250	5,810	6,360	580	4,640
	10.20	0.289	6,060	6,740	7,410	670	5,390
	12.70	0.375	7,070	7,850	8,640	780	6,280
	14.30	0.430	8,210	9,120	10,040	910	7,300
	15.50	0.476	9,590	10,650	11,720	1,070	8,520
	17.00	0.530	10,260	11,400	12,540	1,140	9,120
4	9.50	0.226	5,200	5,620	6,040	560	4,490
	10.70	0.262	5,940	6,600	7,280	660	5,280
	11.60	0.286	6,590	7,320	8,060	730	5,860
	13.20	0.330	7,500	8,330	9,170	830	6,660
	14.80	0.380	8,780	9,750	10,730	980	7,800
	16.10	0.415	9,830	10,910	12,000	1,090	8,720
4 1/2	11.60	0.250	5,510	6,130	6,740	610	4,900
	12.60	0.271	6,080	6,750	7,430	680	5,400
	13.50	0.290	6,750	7,500	8,250	750	6,000
	15.20	0.337	8,210	9,130	10,040	910	7,300
	17.00	0.380	9,340	10,380	11,410	1,040	8,300
	18.90	0.430	10,800	12,000	13,200	1,200	9,600
	21.50	0.500	12,600	14,000	15,400	1,400	11,200
	23.70	0.560	14,060	15,630	17,190	1,560	12,500
5	13.00	0.253	6,440	7,150	7,870	720	5,360
	15.00	0.296	7,960	8,840	9,720	880	6,630
	18.00	0.362	10,190	11,320	12,450	1,130	8,490
	21.40	0.437	12,740	14,170	15,600	1,420	10,630
	23.20	0.478	14,860	16,510	18,160	1,650	12,380
	24.10	0.500	15,560	17,290	19,020	1,730	12,970
5 1/2	15.50	0.275	7,490	8,320	9,150	830	6,240
	17.00	0.304	8,660	9,620	10,580	960	7,220
	20.00	0.361	11,230	12,480	13,730	1,250	9,360
	23.00	0.415	13,220	14,690	16,160	1,470	11,020
	26.00	0.476	15,090	16,770	18,450	1,680	12,580
	26.80	0.500	15,910	17,680	19,450	1,770	13,260
6	24.10	0.400	15,470	17,190	18,900	1,720	12,890
6 5/8	20.00	0.288	8,540	9,490	10,440	660	6,170
	24.00	0.352	14,560	16,170	17,800	1,130	10,510
	28.00	0.417	18,540	20,590	22,660	1,440	13,380
	32.00	0.475	19,420	21,580	23,740	1,510	14,030
7	23.00	0.317	13,460	14,950	16,450	1,050	9,720
	26.00	0.362	15,340	17,040	18,750	1,190	11,080
	29.00	0.408	20,940	22,520	24,090	1,580	14,640
	32.00	0.453	29,170	31,540	33,900	2,210	20,500
	35.00	0.498	29,170	32,410	35,660	2,270	21,070
	38.00	0.540	29,250	32,500	35,750	2,280	21,130
	42.70	0.625	32,760	36,400	40,040	2,550	23,660
	46.40	0.687	33,930	37,700	41,470	2,640	24,510
7 5/8	29.70	0.375	12,870	14,300	15,730	1,000	9,300
	33.70	0.430	14,160	15,730	17,300	1,100	10,220
	39.00	0.500	19,420	21,580	23,740	1,510	14,030
	42.80	0.562	22,820	25,350	27,890	1,770	16,480
	45.30	0.595	24,220	26,910	29,600	1,880	17,490
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	9,950	11,050	12,160	550	7,180
	36.00	0.400	12,400	13,780	15,160	690	8,960
	40.00	0.450	23,400	26,000	28,600	1,300	16,900
	44.00	0.500	29,480	32,760	36,040	1,640	21,290
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	10,650	11,830	13,010	590	7,690
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,190	33,540	36,890	1,680	21,800
	59.40	0.609	30,190	33,540	36,890	1,680	21,800

JFEBEAR CLEAR-RUN Advanced Tubular System

Clear-Run for Chrome Grades ≥ 9%Cr

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90, 95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,660	1,790	1,920	90	1,520
	5.80	0.254	2,160	2,330	2,510	120	1,980
	6.60	0.295	2,380	2,560	2,740	130	2,180
	7.35	0.336	2,810	3,040	3,260	150	2,580
2 7/8	6.40	0.217	3,370	3,640	3,910	180	2,910
	7.80	0.276	4,230	4,570	4,910	230	3,660
	8.60	0.308	5,000	5,390	5,780	270	4,310
	9.35	0.340	5,780	6,250	6,720	310	5,000
	10.50	0.392	6,730	7,280	7,820	360	5,820
	11.50	0.440	7,140	7,720	8,300	390	6,170
3 1/2	7.70	0.216	4,730	5,250	5,780	530	4,200
	9.20	0.254	5,460	6,060	6,680	610	4,850
	10.20	0.289	7,040	7,820	8,600	780	6,250
	12.70	0.375	8,580	9,540	10,500	950	7,630
	14.30	0.430	10,260	11,400	12,540	1,140	9,120
	15.50	0.476	10,400	11,550	12,710	1,160	9,240
	17.00	0.530	10,940	12,150	13,370	1,220	9,720
4	9.50	0.226	5,990	6,650	7,310	660	5,320
	10.70	0.262	7,380	8,210	9,030	820	6,560
	11.60	0.286	8,060	8,960	9,860	900	7,160
	13.20	0.330	9,120	10,140	11,150	1,010	8,110
	14.80	0.380	10,130	11,250	12,380	1,130	9,000
	16.10	0.415	11,720	12,660	13,620	1,270	10,130
4 1/2	11.60	0.250	5,960	6,630	7,290	660	5,300
	12.60	0.271	6,640	7,380	8,110	740	5,900
	13.50	0.290	7,400	8,230	9,050	820	6,580
	15.20	0.337	8,890	9,880	10,860	990	7,900
	17.00	0.380	10,180	11,310	12,490	1,130	9,050
	18.90	0.430	11,480	12,750	14,030	1,280	10,200
	21.50	0.500	13,500	15,000	16,500	1,500	12,000
	23.70	0.560	14,740	16,380	18,010	1,640	13,100
5	13.00	0.253	6,900	7,670	8,440	770	5,750
	15.00	0.296	8,310	9,230	10,150	920	6,920
	18.00	0.362	10,620	11,800	12,990	1,180	8,850
	21.40	0.437	13,520	15,030	16,540	1,500	11,270
	23.20	0.478	15,560	17,290	19,020	1,730	12,970
	24.10	0.500	16,260	18,070	19,880	1,810	13,550
5 1/2	15.50	0.275	8,070	8,970	9,870	900	6,730
	17.00	0.304	9,360	10,400	11,440	1,040	7,800
	20.00	0.361	12,290	13,650	15,020	1,370	10,240
	23.00	0.415	14,510	16,120	17,730	1,610	12,090
	26.00	0.476	16,500	18,330	20,160	1,830	13,750
	26.80	0.500	17,430	19,370	21,310	1,940	14,530
6	24.10	0.400	17,380	19,310	21,240	1,930	14,480
6 5/8	20.00	0.288	9,240	10,270	11,300	720	6,680
	24.00	0.352	16,900	18,770	20,640	1,310	12,200
	28.00	0.417	21,330	23,700	26,070	1,660	15,400
	32.00	0.475	21,330	23,700	26,070	1,660	15,400
7	23.00	0.317	16,210	17,520	18,840	1,230	11,390
	26.00	0.362	17,560	18,980	20,410	1,330	12,340
	29.00	0.408	25,640	27,720	29,800	1,940	18,020
	32.00	0.453	33,800	36,530	39,260	2,560	23,740
	35.00	0.498	34,590	37,400	40,210	2,620	24,310
	38.00	0.540	35,370	38,250	41,120	2,680	24,860
	42.70	0.625	35,370	38,250	41,120	2,680	24,860
	46.40	0.687	35,370	38,250	41,120	2,680	24,860
7 5/8	29.70	0.375	14,040	15,600	17,160	1,090	10,140
	33.70	0.430	23,170	25,740	28,310	1,800	16,730
	39.00	0.500	21,290	23,660	26,030	1,660	15,380
	42.80	0.562	24,570	27,300	30,030	1,910	17,750
	45.30	0.595	25,740	28,600	31,460	2,000	18,590
	47.10	0.625	30,190	33,540	36,890	2,348	21,800
7 3/4	46.10	0.595	44,230	49,140	54,050	2,460	31,940
8 5/8	32.00	0.352	10,530	11,700	12,870	590	7,610
	36.00	0.400	12,990	14,430	15,870	720	9,380
	40.00	0.450	25,160	27,950	30,750	1,400	18,170
	44.00	0.500	30,190	33,540	36,890	1,680	21,800
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	11,700	13,000	14,300	650	8,450
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,190	33,540	36,890	1,680	21,800
	59.40	0.609	30,190	33,540	36,890	1,680	21,800

JFEBEAR CLEAR-RUN Advanced Tubular System — Clear-Run for Chrome Grades ≥ 9%Cr

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	105, 110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,680	1,810	1,940	90	1,540
	5.80	0.254	2,170	2,350	2,530	120	2,000
	6.60	0.295	2,580	2,790	3,000	140	2,370
	7.35	0.336	2,940	3,180	3,420	160	2,700
2 7/8	6.40	0.217	3,550	3,940	4,340	200	3,160
	7.80	0.276	4,470	4,960	5,460	250	3,970
	8.60	0.308	5,360	5,790	6,220	290	4,630
	9.35	0.340	6,290	6,800	7,310	340	5,440
	10.50	0.392	7,140	7,720	8,300	390	6,170
	11.50	0.440	7,650	8,270	8,890	410	6,620
3 1/2	7.70	0.216	4,930	5,480	6,020	550	4,380
	9.20	0.254	5,670	6,300	6,930	630	5,040
	10.20	0.289	7,110	7,910	8,700	790	6,320
	12.70	0.375	9,320	10,350	11,390	1,040	8,280
	14.30	0.430	10,400	11,550	12,710	1,160	9,240
	15.50	0.476	11,250	12,500	13,740	1,250	10,000
	17.00	0.530	12,000	13,340	14,670	1,330	10,670
4	9.50	0.226	6,620	7,350	8,090	740	5,880
	10.70	0.262	7,640	8,490	9,350	850	6,790
	11.60	0.286	8,220	9,140	10,050	910	7,310
	13.20	0.330	9,230	10,250	11,270	1,020	8,200
	14.80	0.380	10,800	12,000	13,200	1,200	9,600
	16.10	0.415	12,080	13,430	14,760	1,340	10,740
4 1/2	11.60	0.250	6,530	7,250	7,980	730	5,800
	12.60	0.271	7,310	8,130	8,940	810	6,500
	13.50	0.290	7,990	8,880	9,760	890	7,100
	15.20	0.337	10,010	11,130	12,240	1,110	8,900
	17.00	0.380	11,590	12,880	14,160	1,290	10,300
	18.90	0.430	12,830	14,250	15,680	1,430	11,400
	21.50	0.500	15,080	16,750	18,430	1,680	13,400
	23.70	0.560	16,650	18,500	20,350	1,850	14,800
5	13.00	0.253	7,720	8,580	9,440	860	6,440
	15.00	0.296	9,590	10,660	11,730	1,070	8,000
	18.00	0.362	13,100	14,560	16,020	1,460	10,920
	21.40	0.437	16,610	18,460	20,310	1,850	13,850
	23.20	0.478	17,550	19,500	21,450	1,950	14,630
	24.10	0.500	18,840	20,930	23,020	2,090	15,700
5 1/2	15.50	0.275	9,010	10,010	11,010	1,000	7,510
	17.00	0.304	10,410	11,570	12,730	1,160	8,680
	20.00	0.361	13,690	15,210	16,730	1,520	11,410
	23.00	0.415	19,510	21,680	23,860	2,170	16,260
	26.00	0.476	19,510	21,680	23,860	2,170	16,260
	26.80	0.500	19,510	21,680	23,860	2,170	16,260
6	24.10	0.400	20,120	22,360	24,600	2,240	16,770
6 5/8	20.00	0.288	9,830	10,920	12,010	760	7,100
	24.00	0.352	16,900	18,770	20,640	1,310	12,200
	28.00	0.417	21,330	23,700	26,070	1,660	15,400
	32.00	0.475	22,100	24,560	27,010	1,720	15,960
7	23.00	0.317	16,210	17,520	18,840	1,230	11,390
	26.00	0.362	17,560	18,980	20,410	1,330	12,340
	29.00	0.408	25,640	27,720	29,800	1,940	18,020
	32.00	0.453	33,800	36,530	39,260	2,560	23,740
	35.00	0.498	34,590	37,400	40,210	2,620	24,310
	38.00	0.540	35,370	38,250	41,120	2,680	24,860
	42.70	0.625	35,370	38,250	41,120	2,680	24,860
	46.40	0.687	35,370	38,250	41,120	2,680	24,860
7 5/8	29.70	0.375	14,980	16,640	18,300	1,160	10,820
	33.70	0.430	16,610	18,460	20,310	1,290	12,000
	39.00	0.500	23,050	25,610	28,170	1,790	16,650
	42.80	0.562	27,140	30,160	33,180	2,110	19,600
	45.30	0.595	28,900	32,110	35,320	2,250	20,870
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	45,510	50,570	55,630	2,530	32,870
8 5/8	32.00	0.352	11,000	12,220	13,440	610	7,940
	36.00	0.400	14,270	15,860	17,450	790	10,310
	40.00	0.450	26,910	29,900	32,890	1,500	19,440
	44.00	0.500	30,190	33,540	36,890	1,680	21,800
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	12,400	13,780	15,160	690	8,960
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,190	33,540	36,890	1,680	21,800
	59.40	0.609	30,190	33,540	36,890	1,680	21,800

JFEBEAR CLEAR-RUN Advanced Tubular System — Clear-Run for Chrome Grades ≥ 9%Cr

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	125 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,840	1,990	2,140	100	1,690
	5.80	0.254	2,400	2,600	2,800	130	2,210
	6.60	0.295	2,810	3,040	3,270	150	2,580
	7.35	0.336	3,300	3,560	3,830	180	3,030
2 7/8	6.40	0.217	3,980	4,300	4,620	220	3,440
	7.80	0.276	4,760	5,150	5,540	260	4,120
	8.60	0.308	5,830	6,310	6,780	320	5,050
	9.35	0.340	6,720	7,260	7,800	360	5,810
	10.50	0.392	7,460	8,080	8,690	400	6,460
	11.50	0.440	7,990	8,640	9,280	430	6,910
3 1/2	7.70	0.216	5,200	5,780	6,350	580	4,620
	9.20	0.254	5,890	6,540	7,190	650	5,230
	10.20	0.289	7,610	8,450	9,290	840	6,760
	12.70	0.375	9,750	10,830	11,910	1,080	8,660
	14.30	0.430	10,800	12,000	13,200	1,200	9,600
	15.50	0.476	12,000	13,340	14,670	1,330	10,670
	17.00	0.530	12,750	14,170	15,580	1,420	11,330
4	9.50	0.226	7,230	8,040	8,850	800	6,430
	10.70	0.262	8,240	9,150	10,070	920	7,320
	11.60	0.286	8,760	9,740	10,710	970	7,790
	13.20	0.330	9,860	10,950	12,050	1,100	8,760
	14.80	0.380	-	-	-	-	-
	16.10	0.415	12,890	14,320	15,750	1,430	11,450
4 1/2	11.60	0.250	6,980	7,750	8,530	780	6,200
	12.60	0.271	7,880	8,750	9,630	880	7,000
	13.50	0.290	8,660	9,630	10,590	960	7,700
	15.20	0.337	10,970	12,190	13,410	1,220	9,750
	17.00	0.380	12,770	14,190	15,610	1,420	11,350
	18.90	0.430	14,060	15,630	17,190	1,560	12,500
	21.50	0.500	15,980	17,750	19,530	1,780	14,200
	23.70	0.560	17,980	19,980	21,980	2,000	15,980
5	13.00	0.253	8,420	9,360	10,300	940	7,020
	15.00	0.296	10,530	11,700	12,870	1,170	8,780
	18.00	0.362	13,920	15,470	17,020	1,550	11,600
	21.40	0.437	18,250	20,280	22,310	2,030	15,210
	23.20	0.478	18,950	21,060	23,170	2,110	15,800
	24.10	0.500	20,100	22,300	24,500	2,230	16,700
5 1/2	15.50	0.275	9,240	10,270	11,300	1,030	7,700
	17.00	0.304	11,120	12,350	13,590	1,240	9,260
	20.00	0.361	14,270	15,860	17,450	1,590	11,900
	23.00	0.415	19,510	21,680	23,860	2,170	16,260
	26.00	0.476	19,510	21,680	23,860	2,170	16,260
	26.80	0.500	19,510	21,680	23,860	2,170	16,260
6	24.10	0.400	21,670	24,080	26,480	2,410	18,060
6 5/8	20.00	0.288	10,650	11,830	13,010	830	7,690
	24.00	0.352	16,900	18,770	20,640	1,310	12,200
	28.00	0.417	21,330	23,700	26,070	1,660	15,400
	32.00	0.475	22,100	24,560	27,010	1,720	15,960
7	23.00	0.317	16,210	17,520	18,840	1,230	11,390
	26.00	0.362	17,560	18,980	20,410	1,330	12,340
	29.00	0.408	25,640	27,720	29,800	1,940	18,020
	32.00	0.453	33,800	36,530	39,260	2,560	23,740
	35.00	0.498	34,590	37,400	40,210	2,620	24,310
	38.00	0.540	35,370	38,250	41,120	2,680	24,860
	42.70	0.625	35,370	38,250	41,120	2,680	24,860
	46.40	0.687	35,370	38,250	41,120	2,680	24,860
7 5/8	29.70	0.375	15,800	17,550	19,310	1,230	11,410
	33.70	0.430	17,200	19,110	21,020	1,340	12,420
	39.00	0.500	23,990	26,650	29,320	1,870	17,320
	42.80	0.562	29,250	32,500	35,750	2,280	21,130
	45.30	0.595	31,240	34,710	38,180	2,430	22,560
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	12,170	13,520	14,870	680	8,790
	36.00	0.400	14,980	16,640	18,300	830	10,820
	40.00	0.450	28,670	31,850	35,040	1,590	20,700
	44.00	0.500	30,190	33,540	36,890	1,680	21,800
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	13,220	14,690	16,160	730	9,550
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,190	33,540	36,890	1,680	21,800
	59.40	0.609	30,420	33,800	37,180	1,690	21,970

Clear-Run for Chrome Grades ≥ 9%Cr

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	140 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,940	2,160	2,380	110	1,840
	5.80	0.254	2,700	3,000	3,300	150	2,550
	6.60	0.295	3,020	3,360	3,700	170	2,860
	7.35	0.336	3,780	4,200	4,620	210	3,570
2 7/8	6.40	0.217	4,280	4,760	5,240	240	3,810
	7.80	0.276	6,120	6,800	7,480	340	5,440
	8.60	0.308	6,890	7,650	8,420	380	6,120
	9.35	0.340	8,420	9,350	10,290	470	7,480
	10.50	0.392	9,180	10,200	11,220	510	8,160
	11.50	0.440	10,400	11,560	12,720	580	9,250
3 1/2	7.70	0.216	5,200	5,780	6,350	580	4,620
	9.20	0.254	6,480	7,200	7,920	720	5,760
	10.20	0.289	9,450	10,500	11,550	1,050	8,400
	12.70	0.375	11,070	12,300	13,530	1,230	9,840
	14.30	0.430	12,290	13,650	15,020	1,370	10,920
	15.50	0.476	13,230	14,700	16,170	1,470	11,760
	17.00	0.530	14,450	16,050	17,660	1,610	12,840
4	9.50	0.226	7,560	8,400	9,240	840	6,720
	10.70	0.262	9,050	10,050	11,060	1,010	8,040
	11.60	0.286	-	-	-	-	-
	13.20	0.330	10,400	11,550	12,710	1,160	9,240
	14.80	0.380	-	-	-	-	-
	16.10	0.415	14,450	16,050	17,660	1,610	12,840
4 1/2	11.60	0.250	7,540	8,380	9,210	840	6,700
	12.60	0.271	8,660	9,630	10,590	960	7,700
	13.50	0.290	9,680	10,750	11,830	1,080	8,600
	15.20	0.337	12,260	13,630	14,990	1,360	10,900
	17.00	0.380	14,290	15,880	17,460	1,590	12,700
	18.90	0.430	15,980	17,750	19,530	1,780	14,200
	21.50	0.500	18,230	20,250	22,280	2,030	16,200
	23.70	0.560	20,360	22,630	24,890	2,260	18,100
5	13.00	0.253	9,130	10,140	11,150	1,010	7,610
	15.00	0.296	11,470	12,740	14,010	1,270	9,560
	18.00	0.362	15,680	17,420	19,160	1,740	13,070
	21.40	0.437	20,830	23,140	25,450	2,310	17,360
	23.20	0.478	23,050	25,610	28,170	2,560	19,210
	24.10	0.500	24,100	26,780	29,460	2,680	20,090
5 1/2	15.50	0.275	10,530	11,700	12,870	1,170	8,780
	17.00	0.304	12,870	14,300	15,730	1,430	10,730
	20.00	0.361	17,550	19,500	21,450	1,950	14,630
	23.00	0.415	21,060	23,400	25,740	2,340	17,550
	26.00	0.476	22,230	24,700	27,170	2,470	18,530
	26.80	0.500	23,400	26,000	28,600	2,600	19,500
6	24.10	0.400	-	-	-	-	-
6 5/8	20.00	0.288	11,820	13,130	14,440	920	8,530
	24.00	0.352	16,900	18,770	20,640	1,310	12,200
	28.00	0.417	22,580	25,090	27,600	1,760	16,310
	32.00	0.475	28,550	31,720	34,890	2,220	20,620
7	23.00	0.317	16,210	17,520	18,840	1,230	11,390
	26.00	0.362	18,370	20,410	27,890	1,430	13,270
	29.00	0.408	25,640	27,720	29,800	1,940	18,020
	32.00	0.453	33,800	36,530	39,260	2,560	23,740
	35.00	0.498	34,590	37,400	40,210	2,620	24,310
	38.00	0.540	35,370	38,250	41,120	2,680	24,860
	42.70	0.625	35,370	38,250	41,120	2,680	24,860
	46.40	0.687	35,370	38,250	41,120	2,680	24,860
7 5/8	29.70	0.375	17,780	19,760	21,740	1,380	12,840
	33.70	0.430	19,770	21,970	24,170	1,540	14,280
	39.00	0.500	27,850	30,940	34,030	2,170	20,110
	42.80	0.562	32,990	36,660	40,330	2,570	23,830
	45.30	0.595	35,100	39,000	42,900	2,730	25,350
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	13,570	15,080	16,590	750	9,800
	36.00	0.400	16,970	18,850	20,740	940	12,250
	40.00	0.450	28,670	31,850	35,040	1,590	20,700
	44.00	0.500	30,190	33,540	36,890	1,680	21,800
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	14,510	16,120	17,730	810	10,480
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	28,390	31,550	34,710	1,580	20,510
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,420	33,800	37,180	1,690	21,970
	59.40	0.609	34,280	38,090	41,900	1,900	24,760

Clear-Run Carbon Grades

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	55 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,190	1,320	1,450	75	1,120
	5.80	0.254	1,620	1,800	1,980	90	1,530
	6.60	0.295	1,940	2,160	2,380	110	1,840
	7.35	0.336	2,270	2,520	2,770	130	2,140
2 7/8	6.40	0.217	1,940	2,160	2,380	110	1,730
	7.80	0.276	2,380	2,640	2,900	130	2,110
	8.60	0.308	3,020	3,360	3,700	170	2,690
	9.35	0.340	3,350	3,720	4,090	190	2,980
	10.50	0.392	3,890	4,320	4,750	220	3,460
	11.50	0.440	4,100	4,560	5,020	230	3,650
3 1/2	7.70	0.216	2,930	3,250	3,580	330	2,600
	9.20	0.254	3,390	3,770	4,150	380	3,020
	10.20	0.289	3,980	4,420	4,860	440	3,540
	12.70	0.375	5,500	6,110	6,720	610	4,890
	14.30	0.430	6,200	6,890	7,580	690	5,510
	15.50	0.476	6,900	7,670	8,440	770	6,140
	17.00	0.530	7,370	8,190	9,010	820	6,550
4	9.50	0.226	3,510	3,900	4,290	390	3,120
	10.70	0.262	4,210	4,680	5,150	470	3,740
	11.60	0.286	-	-	-	-	-
	13.20	0.330	5,500	6,110	6,720	610	4,890
	14.80	0.380	-	-	-	-	-
	16.10	0.415	7,020	7,800	8,580	780	6,240
4 1/2	11.60	0.250	3,960	4,400	4,840	440	3,520
	12.60	0.271	4,360	4,840	5,320	480	3,870
	13.50	0.290	4,750	5,280	5,810	530	4,220
	15.20	0.337	5,740	6,380	7,020	640	5,100
	17.00	0.380	6,530	7,260	7,990	730	5,810
	18.90	0.430	7,330	8,140	8,950	810	6,510
	21.50	0.500	8,510	9,460	10,410	950	7,570
	23.70	0.560	9,500	10,560	11,620	1,060	8,450
5	13.00	0.253	4,060	4,510	4,960	450	3,380
	15.00	0.296	5,450	6,050	6,660	610	4,540
	18.00	0.362	7,130	7,920	8,710	790	5,940
	21.40	0.437	8,910	9,900	10,890	990	7,430
	23.20	0.478	9,600	10,670	11,740	1,070	8,000
	24.10	0.500	10,100	11,220	12,340	1,120	8,420
5 1/2	15.50	0.275	5,970	6,630	7,290	660	4,970
	17.00	0.304	6,790	7,540	8,290	750	5,660
	20.00	0.361	8,660	9,620	10,580	960	7,220
	23.00	0.415	10,180	11,310	12,440	1,130	8,480
	26.00	0.476	11,470	12,740	14,010	1,270	9,560
	26.80	0.500	12,050	13,390	14,730	1,340	10,040
6	24.10	0.400	-	-	-	-	-
6 5/8	20.00	0.288	6,790	7,540	8,290	530	4,900
	24.00	0.352	8,890	9,880	10,870	690	6,420
	28.00	0.417	11,820	13,130	14,440	920	8,530
	32.00	0.475	14,390	15,990	17,590	1,120	10,390
7	23.00	0.317	8,070	8,970	9,870	630	5,830
	26.00	0.362	9,710	10,790	11,870	760	7,010
	29.00	0.408	11,930	13,260	14,590	930	8,620
	32.00	0.453	13,920	15,470	17,020	1,080	10,060
	35.00	0.498	15,440	17,160	18,880	1,200	11,150
	38.00	0.540	16,260	18,070	19,880	1,260	11,750
	42.70	0.625	17,080	18,980	20,880	1,330	12,340
	46.40	0.687	18,490	20,540	22,590	1,440	13,350
7 5/8	29.70	0.375	10,060	11,180	12,300	780	7,270
	33.70	0.430	10,880	12,090	13,300	850	7,860
	39.00	0.500	14,630	16,250	17,880	1,140	10,560
	42.80	0.562	17,080	18,980	20,880	1,330	12,340
	45.30	0.595	18,140	20,150	22,170	1,410	13,100
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	7,840	8,710	9,580	440	5,660
	36.00	0.400	9,590	10,660	11,730	530	6,930
	40.00	0.450	10,650	11,830	13,010	590	7,690
	44.00	0.500	12,290	13,650	15,020	680	8,870
	49.00	0.557	15,680	17,420	19,160	870	11,320
9 5/8	36.00	0.352	8,540	9,490	10,440	470	6,170
	40.00	0.395	9,480	10,530	11,580	530	6,840
	43.50	0.435	10,300	11,440	12,580	570	7,440
	47.00	0.472	12,520	13,910	15,300	700	9,040
	53.50	0.545	14,160	15,730	17,300	790	10,220
	58.40	0.595	15,910	17,680	19,450	880	11,490
	59.40	0.609	17,670	19,630	21,590	980	12,760

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80, 85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,440	1,560	1,680	80	1,330
	5.80	0.254	1,940	2,100	2,260	110	1,790
	6.60	0.295	2,170	2,350	2,530	120	2,000
	7.35	0.336	2,540	2,750	2,960	140	2,340
2 7/8	6.40	0.217	2,270	2,450	2,630	120	1,960
	7.80	0.276	2,820	3,050	3,280	150	2,440
	8.60	0.308	3,160	3,410	3,660	170	2,730
	9.35	0.340	3,600	3,890	4,190	190	3,120
	10.50	0.392	4,080	4,410	4,740	220	3,530
	11.50	0.440	4,440	4,800	5,160	240	3,840
3 1/2	7.70	0.216	3,340	3,710	4,080	370	2,960
	9.20	0.254	4,550	5,030	5,510	500	4,020
	10.20	0.289	5,250	5,840	6,420	580	4,670
	12.70	0.375	6,120	6,800	7,490	680	5,440
	14.30	0.430	7,110	7,900	8,700	790	6,320
	15.50	0.476	8,310	9,230	10,150	920	7,380
	17.00	0.530	8,890	9,880	10,870	990	7,900
4	9.50	0.226	4,500	4,870	5,230	490	3,890
	10.70	0.262	5,150	5,720	6,310	570	4,580
	11.60	0.286	5,710	6,340	6,980	630	5,080
	13.20	0.330	6,500	7,220	7,940	720	5,770
	14.80	0.380	7,610	8,450	9,300	850	6,760
	16.10	0.415	8,520	9,450	10,400	950	7,560
4 1/2	11.60	0.250	4,850	5,390	5,930	540	4,310
	12.60	0.271	5,350	5,940	6,530	590	4,750
	13.50	0.290	5,940	6,600	7,260	660	5,280
	15.20	0.337	7,230	8,030	8,830	800	6,420
	17.00	0.380	8,220	9,130	10,040	910	7,300
	18.90	0.430	9,500	10,560	11,620	1,060	8,450
	21.50	0.500	11,090	12,320	13,550	1,230	9,860
	23.70	0.560	12,380	13,750	15,130	1,380	11,000
5	13.00	0.253	5,450	6,050	6,660	610	4,540
	15.00	0.296	6,730	7,480	8,230	750	5,610
	18.00	0.362	8,620	9,580	10,540	960	7,190
	21.40	0.437	10,780	11,990	13,200	1,200	8,990
	23.20	0.478	12,570	13,970	15,370	1,400	10,480
	24.10	0.500	13,170	14,630	16,090	1,460	10,970
5 1/2	15.50	0.275	7,490	8,320	9,150	830	6,240
	17.00	0.304	8,660	9,620	10,580	960	7,220
	20.00	0.361	11,230	12,480	13,730	1,250	9,360
	23.00	0.415	13,220	14,690	16,160	1,470	11,020
	26.00	0.476	15,090	16,770	18,450	1,680	12,580
	26.80	0.500	15,910	17,680	19,450	1,770	13,260
6	24.10	0.400	15,470	17,190	18,900	1,720	12,890
6 5/8	20.00	0.288	8,540	9,490	10,440	660	6,170
	24.00	0.352	14,560	16,170	17,800	1,130	10,510
	28.00	0.417	18,540	20,590	22,660	1,440	13,380
	32.00	0.475	19,420	21,580	23,740	1,510	14,030
7	23.00	0.317	13,460	14,950	16,450	1,050	9,720
	26.00	0.362	15,340	17,040	18,750	1,190	11,080
	29.00	0.408	20,940	22,520	24,090	1,580	14,640
	32.00	0.453	29,170	31,540	33,900	2,210	20,500
	35.00	0.498	29,170	32,410	35,660	2,270	21,070
	38.00	0.540	29,250	32,500	35,750	2,280	21,130
	42.70	0.625	32,760	36,400	40,040	2,550	23,660
	46.40	0.687	33,930	37,700	41,470	2,640	24,510
7 5/8	29.70	0.375	12,870	14,300	15,730	1,000	9,300
	33.70	0.430	14,160	15,730	17,300	1,100	10,220
	39.00	0.500	19,420	21,580	23,740	1,510	14,030
	42.80	0.562	22,820	25,350	27,890	1,770	16,480
	45.30	0.595	24,220	26,910	29,600	1,880	17,490
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	9,950	11,050	12,160	550	7,180
	36.00	0.400	12,400	13,780	15,160	690	8,960
	40.00	0.450	23,400	26,000	28,600	1,300	16,900
	44.00	0.500	29,480	32,760	36,040	1,640	21,290
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	10,650	11,830	13,010	590	7,690
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,190	33,540	36,890	1,680	21,800
	59.40	0.609	30,190	33,540	36,890	1,680	21,800

JFEBEAR CLEAR-RUN Advanced Tubular System Clear-Run Carbon Grades

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90, 95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,660	1,790	1,920	90	1,520
	5.80	0.254	2,160	2,330	2,510	120	1,980
	6.60	0.295	2,380	2,560	2,740	130	2,180
	7.35	0.336	2,810	3,040	3,260	150	2,580
2 7/8	6.40	0.217	2,380	2,570	2,760	130	2,050
	7.80	0.276	2,990	3,230	3,470	160	2,580
	8.60	0.308	3,530	3,800	4,080	190	3,040
	9.35	0.340	4,080	4,410	4,740	220	3,530
	10.50	0.392	4,750	5,140	5,520	260	4,110
	11.50	0.440	5,040	5,450	5,860	270	4,360
3 1/2	7.70	0.216	4,100	4,550	5,010	460	3,640
	9.20	0.254	4,730	5,250	5,790	530	4,200
	10.20	0.289	6,100	6,770	7,450	680	5,420
	12.70	0.375	7,440	8,270	9,100	830	6,610
	14.30	0.430	8,890	9,880	10,870	990	7,900
	15.50	0.476	9,010	10,010	11,010	1,000	8,010
	17.00	0.530	9,480	10,530	11,580	1,050	8,420
4	9.50	0.226	5,190	5,760	6,330	580	4,610
	10.70	0.262	6,400	7,110	7,830	710	5,690
	11.60	0.286	6,980	7,760	8,540	780	6,210
	13.20	0.330	7,900	8,790	9,660	880	7,030
	14.80	0.380	8,780	9,750	10,730	980	7,800
	16.10	0.415	10,150	10,970	11,800	1,100	8,780
4 1/2	11.60	0.250	5,250	5,830	6,410	580	4,660
	12.60	0.271	5,840	6,490	7,140	650	5,190
	13.50	0.290	6,510	7,240	7,960	720	5,790
	15.20	0.337	7,820	8,690	9,560	870	6,950
	17.00	0.380	8,950	9,960	10,990	1,000	7,960
	18.90	0.430	10,100	11,220	12,340	1,120	8,980
	21.50	0.500	11,880	13,200	14,520	1,320	10,560
	23.70	0.560	12,970	14,410	15,850	1,440	11,530
5	13.00	0.253	5,840	6,490	7,140	650	4,870
	15.00	0.296	7,030	7,810	8,590	780	5,860
	18.00	0.362	8,990	9,990	10,990	1,000	7,490
	21.40	0.437	11,440	12,720	13,990	1,270	9,540
	23.20	0.478	13,170	14,630	16,090	1,460	10,970
	24.10	0.500	13,760	15,290	16,820	1,530	11,470
5 1/2	15.50	0.275	8,070	8,970	9,870	900	6,730
	17.00	0.304	9,360	10,400	11,440	1,040	7,800
	20.00	0.361	12,290	13,650	15,020	1,370	10,240
	23.00	0.415	14,510	16,120	17,730	1,610	12,090
	26.00	0.476	16,500	18,330	20,160	1,830	13,750
	26.80	0.500	17,430	19,370	21,310	1,940	14,530
6	24.10	0.400	17,380	19,310	21,240	1,930	14,480
6 5/8	20.00	0.288	9,240	10,270	11,300	720	6,680
	24.00	0.352	16,900	18,770	20,640	1,310	12,200
	28.00	0.417	21,330	23,700	26,070	1,660	15,400
	32.00	0.475	21,330	23,700	26,070	1,660	15,400
7	23.00	0.317	16,210	17,520	18,840	1,230	11,390
	26.00	0.362	17,560	18,980	20,410	1,330	12,340
	29.00	0.408	25,640	27,720	29,800	1,940	18,020
	32.00	0.453	33,800	36,530	39,260	2,560	23,740
	35.00	0.498	34,590	37,400	40,210	2,620	24,310
	38.00	0.540	35,370	38,250	41,120	2,680	24,860
	42.70	0.625	35,370	38,250	41,120	2,680	24,860
	46.40	0.687	35,370	38,250	41,120	2,680	24,860
7 5/8	29.70	0.375	14,040	15,600	17,160	1,090	10,140
	33.70	0.430	23,170	25,740	28,310	1,800	16,730
	39.00	0.500	21,290	23,660	26,030	1,660	15,380
	42.80	0.562	24,570	27,300	30,030	1,910	17,750
	45.30	0.595	25,740	28,600	31,460	2,000	18,590
	47.10	0.625	30,190	33,540	36,890	2,348	21,800
7 3/4	46.10	0.595	44,230	49,140	54,050	2,460	31,940
8 5/8	32.00	0.352	10,530	11,700	12,870	590	7,610
	36.00	0.400	12,990	14,430	15,870	720	9,380
	40.00	0.450	25,160	27,950	30,750	1,400	18,170
	44.00	0.500	30,190	33,540	36,890	1,680	21,800
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	11,700	13,000	14,300	650	8,450
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,190	33,540	36,890	1,680	21,800
	59.40	0.609	30,190	33,540	36,890	1,680	21,800

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	105, 110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,680	1,810	1,940	90	1,540
	5.80	0.254	2,170	2,350	2,530	120	2,000
	6.60	0.295	2,580	2,790	3,000	140	2,370
	7.35	0.336	2,940	3,180	3,420	160	2,700
2 7/8	6.40	0.217	2,510	2,780	3,060	140	2,230
	7.80	0.276	3,160	3,500	3,850	180	2,800
	8.60	0.308	3,780	4,090	4,390	200	3,270
	9.35	0.340	4,440	4,800	5,160	240	3,840
	10.50	0.392	5,040	5,450	5,860	270	4,360
	11.50	0.440	5,400	5,840	6,280	290	4,670
3 1/2	7.70	0.216	4,270	4,750	5,220	470	3,800
	9.20	0.254	4,910	5,460	6,010	550	4,370
	10.20	0.289	6,160	6,850	7,540	690	5,480
	12.70	0.375	8,070	8,970	9,870	900	7,180
	14.30	0.430	9,010	10,010	11,010	1,000	8,010
	15.50	0.476	9,750	10,830	11,910	1,080	8,660
	17.00	0.530	10,400	11,560	12,710	1,160	9,250
4	9.50	0.226	5,730	6,370	7,010	640	5,100
	10.70	0.262	6,620	7,360	8,100	740	5,890
	11.60	0.286	7,120	7,920	8,710	790	6,330
	13.20	0.330	8,000	8,880	9,760	890	7,100
	14.80	0.380	9,360	10,400	11,440	1,040	8,320
	16.10	0.415	10,470	11,640	12,790	1,160	9,310
4 1/2	11.60	0.250	5,740	6,380	7,020	640	5,100
	12.60	0.271	6,440	7,150	7,870	720	5,720
	13.50	0.290	7,030	7,810	8,590	780	6,250
	15.20	0.337	8,810	9,790	10,770	980	7,830
	17.00	0.380	10,200	11,330	12,460	1,130	9,060
	18.90	0.430	11,290	12,540	13,790	1,250	10,030
	21.50	0.500	13,270	14,740	16,210	1,470	11,790
	23.70	0.560	14,650	16,280	17,910	1,630	13,020
5	13.00	0.253	6,530	7,260	7,990	730	5,450
	15.00	0.296	8,120	9,020	9,920	900	6,770
	18.00	0.362	11,090	12,320	13,550	1,230	9,240
	21.40	0.437	14,060	15,620	17,180	1,560	11,720
	23.20	0.478	14,850	16,500	18,150	1,650	12,380
	24.10	0.500	15,940	17,710	19,480	1,770	13,280
5 1/2	15.50	0.275	9,010	10,010	11,010	1,000	7,510
	17.00	0.304	10,410	11,570	12,730	1,160	8,680
	20.00	0.361	13,690	15,210	16,730	1,520	11,410
	23.00	0.415	19,510	21,680	23,860	2,170	16,260
	26.00	0.476	19,510	21,680	23,860	2,170	16,260
	26.80	0.500	19,510	21,680	23,860	2,170	16,260
6	24.10	0.400	20,120	22,360	24,600	2,240	16,770
6 5/8	20.00	0.288	9,830	10,920	12,010	760	7,100
	24.00	0.352	16,900	18,770	20,640	1,310	12,200
	28.00	0.417	21,330	23,700	26,070	1,660	15,400
	32.00	0.475	22,100	24,560	27,010	1,720	15,960
7	23.00	0.317	16,210	17,520	18,840	1,230	11,390
	26.00	0.362	17,560	18,980	20,410	1,330	12,340
	29.00	0.408	25,640	27,720	29,800	1,940	18,020
	32.00	0.453	33,800	36,530	39,260	2,560	23,740
	35.00	0.498	34,590	37,400	40,210	2,620	24,310
	38.00	0.540	35,370	38,250	41,120	2,680	24,860
	42.70	0.625	35,370	38,250	41,120	2,680	24,860
	46.40	0.687	35,370	38,250	41,120	2,680	24,860
7 5/8	29.70	0.375	14,980	16,640	18,300	1,160	10,820
	33.70	0.430	16,610	18,460	20,310	1,290	12,000
	39.00	0.500	23,050	25,610	28,170	1,790	16,650
	42.80	0.562	27,140	30,160	33,180	2,110	19,600
	45.30	0.595	28,900	32,110	35,320	2,250	20,870
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	45,510	50,570	55,630	2,530	32,870
8 5/8	32.00	0.352	11,000	12,220	13,440	610	7,940
	36.00	0.400	14,270	15,860	17,450	790	10,310
	40.00	0.450	26,910	29,900	32,890	1,500	19,440
	44.00	0.500	30,190	33,540	36,890	1,680	21,800
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	12,400	13,780	15,160	690	8,960
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,190	33,540	36,890	1,680	21,800
	59.40	0.609	30,190	33,540	36,890	1,680	21,800

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	125 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,840	1,990	2,140	100	1,690
	5.80	0.254	2,400	2,600	2,800	130	2,210
	6.60	0.295	2,810	3,040	3,270	150	2,580
	7.35	0.336	3,300	3,560	3,830	180	3,030
2 7/8	6.40	0.217	2,810	3,040	3,260	150	2,430
	7.80	0.276	3,360	3,640	3,910	180	2,910
	8.60	0.308	4,120	4,450	4,790	220	3,560
	9.35	0.340	4,740	5,120	5,510	260	4,100
	10.50	0.392	5,270	5,700	6,130	290	4,560
	11.50	0.440	5,640	6,100	6,550	300	4,880
3 1/2	7.70	0.216	4,500	5,010	5,510	500	4,000
	9.20	0.254	5,100	5,670	6,230	570	4,530
	10.20	0.289	6,590	7,320	8,050	730	5,860
	12.70	0.375	8,450	9,390	10,320	940	7,510
	14.30	0.430	9,360	10,400	11,440	1,040	8,320
	15.50	0.476	10,400	11,560	12,710	1,160	9,250
	17.00	0.530	11,050	12,280	13,510	1,230	9,820
4	9.50	0.226	6,270	6,970	7,670	700	5,570
	10.70	0.262	7,140	7,930	8,720	790	6,340
	11.60	0.286	7,590	8,440	9,280	840	6,750
	13.20	0.330	8,540	9,490	10,440	950	7,590
	14.80	0.380	-	-	-	-	-
	16.10	0.415	11,170	12,410	13,650	1,240	9,930
4 1/2	11.60	0.250	6,140	6,820	7,500	680	5,460
	12.60	0.271	6,930	7,700	8,470	770	6,160
	13.50	0.290	7,620	8,470	9,320	850	6,780
	15.20	0.337	9,650	10,730	11,800	1,070	8,580
	17.00	0.380	11,240	12,490	13,730	1,250	9,990
	18.90	0.430	12,380	13,750	15,130	1,380	11,000
	21.50	0.500	14,060	15,620	17,180	1,560	12,500
	23.70	0.560	15,820	17,580	19,340	1,760	14,060
5	13.00	0.253	7,130	7,920	8,710	790	5,940
	15.00	0.296	8,910	9,900	10,890	990	7,430
	18.00	0.362	11,780	13,090	14,400	1,310	9,820
	21.40	0.437	15,440	17,160	18,880	1,720	12,870
	23.20	0.478	16,040	17,820	19,600	1,780	13,370
	24.10	0.500	17,330	19,250	21,180	1,930	14,440
5 1/2	15.50	0.275	9,240	10,270	11,300	1,030	7,700
	17.00	0.304	11,120	12,350	13,590	1,240	9,260
	20.00	0.361	14,270	15,860	17,450	1,590	11,900
	23.00	0.415	19,510	21,680	23,860	2,170	16,260
	26.00	0.476	19,510	21,680	23,860	2,170	16,260
	26.80	0.500	19,510	21,680	23,860	2,170	16,260
6	24.10	0.400	21,670	24,080	26,480	2,410	18,060
6 5/8	20.00	0.288	10,650	11,830	13,010	830	7,690
	24.00	0.352	16,900	18,770	20,640	1,310	12,200
	28.00	0.417	21,330	23,700	26,070	1,660	15,400
	32.00	0.475	22,100	24,560	27,010	1,720	15,960
7	23.00	0.317	16,210	17,520	18,840	1,230	11,390
	26.00	0.362	17,560	18,980	20,410	1,330	12,340
	29.00	0.408	25,640	27,720	29,800	1,940	18,020
	32.00	0.453	33,800	36,530	39,260	2,560	23,740
	35.00	0.498	34,590	37,400	40,210	2,620	24,310
	38.00	0.540	35,370	38,250	41,120	2,680	24,860
	42.70	0.625	35,370	38,250	41,120	2,680	24,860
	46.40	0.687	35,370	38,250	41,120	2,680	24,860
7 5/8	29.70	0.375	15,800	17,550	19,310	1,230	11,410
	33.70	0.430	17,200	19,110	21,020	1,340	12,420
	39.00	0.500	23,990	26,650	29,320	1,870	17,320
	42.80	0.562	29,250	32,500	35,750	2,280	21,130
	45.30	0.595	31,240	34,710	38,180	2,430	22,560
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	12,170	13,520	14,870	680	8,790
	36.00	0.400	14,980	16,640	18,300	830	10,820
	40.00	0.450	28,670	31,850	35,040	1,590	20,700
	44.00	0.500	30,190	33,540	36,890	1,680	21,800
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	13,220	14,690	16,160	730	9,550
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,190	33,540	36,890	1,680	21,800
	59.40	0.609	30,420	33,800	37,180	1,690	21,970

JFEBEAR CLEAR-RUN Advanced Tubular System Clear-Run Carbon Grades

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	140 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 3/8	4.60	0.190	1,940	2,160	2,380	110	1,840
	5.80	0.254	2,700	3,000	3,300	150	2,550
	6.60	0.295	3,020	3,360	3,700	170	2,860
	7.35	0.336	3,780	4,200	4,620	210	3,570
2 7/8	6.40	0.217	3,020	3,360	3,700	170	2,690
	7.80	0.276	4,320	4,800	5,280	240	3,840
	8.60	0.308	4,860	5,400	5,940	270	4,320
	9.35	0.340	5,940	6,600	7,260	330	5,280
	10.50	0.392	6,480	7,200	7,920	360	5,760
	11.50	0.440	7,340	8,160	8,980	410	6,530
3 1/2	7.70	0.216	4,500	5,010	5,510	500	4,000
	9.20	0.254	5,620	6,240	6,860	620	4,990
	10.20	0.289	8,190	9,100	10,010	910	7,280
	12.70	0.375	9,590	10,660	11,730	1,070	8,530
	14.30	0.430	10,650	11,830	13,010	1,180	9,460
	15.50	0.476	11,470	12,740	14,010	1,270	10,190
	17.00	0.530	12,520	13,910	15,300	1,390	11,130
4	9.50	0.226	6,550	7,280	8,010	730	5,820
	10.70	0.262	7,840	8,710	9,580	870	6,970
	11.60	0.286	-	-	-	-	-
	13.20	0.330	9,010	10,010	11,010	1,000	8,010
	14.80	0.380	-	-	-	-	-
	16.10	0.415	12,520	13,910	15,300	1,390	11,130
4 1/2	11.60	0.250	6,630	7,370	8,110	740	5,900
	12.60	0.271	7,620	8,470	9,320	850	6,780
	13.50	0.290	8,510	9,460	10,410	950	7,570
	15.20	0.337	10,790	11,990	13,190	1,200	9,590
	17.00	0.380	12,570	13,970	15,370	1,400	11,180
	18.90	0.430	14,060	15,620	17,180	1,560	12,500
	21.50	0.500	16,040	17,820	19,600	1,780	14,260
	23.70	0.560	17,920	19,910	21,900	1,990	15,930
5	13.00	0.253	7,720	8,580	9,440	860	6,440
	15.00	0.296	9,700	10,780	11,860	1,080	8,090
	18.00	0.362	13,270	14,740	16,210	1,470	11,060
	21.40	0.437	17,620	19,580	21,540	1,960	14,690
	23.20	0.478	19,500	21,670	23,840	2,170	16,250
	24.10	0.500	20,390	22,660	24,930	2,270	17,000
5 1/2	15.50	0.275	10,530	11,700	12,870	1,170	8,780
	17.00	0.304	12,870	14,300	15,730	1,430	10,730
	20.00	0.361	17,550	19,500	21,450	1,950	14,630
	23.00	0.415	21,060	23,400	25,740	2,340	17,550
	26.00	0.476	22,230	24,700	27,170	2,470	18,530
	26.80	0.500	23,400	26,000	28,600	2,600	19,500
6	24.10	0.400	-	-	-	-	-
6 5/8	20.00	0.288	11,820	13,130	14,440	920	8,530
	24.00	0.352	16,900	18,770	20,640	1,310	12,200
	28.00	0.417	22,580	25,090	27,600	1,760	16,310
	32.00	0.475	28,550	31,720	34,890	2,220	20,620
7	23.00	0.317	16,210	17,520	18,840	1,230	11,390
	26.00	0.362	18,370	20,410	27,890	1,430	13,270
	29.00	0.408	25,640	27,720	29,800	1,940	18,020
	32.00	0.453	33,800	36,530	39,260	2,560	23,740
	35.00	0.498	34,590	37,400	40,210	2,620	24,310
	38.00	0.540	35,370	38,250	41,120	2,680	24,860
	42.70	0.625	35,370	38,250	41,120	2,680	24,860
	46.40	0.687	35,370	38,250	41,120	2,680	24,860
7 5/8	29.70	0.375	17,780	19,760	21,740	1,380	12,840
	33.70	0.430	19,770	21,970	24,170	1,540	14,280
	39.00	0.500	27,850	30,940	34,030	2,170	20,110
	42.80	0.562	32,990	36,660	40,330	2,570	23,830
	45.30	0.595	35,100	39,000	42,900	2,730	25,350
	47.10	0.625	-	-	-	-	-
7 3/4	46.10	0.595	-	-	-	-	-
8 5/8	32.00	0.352	13,570	15,080	16,590	750	9,800
	36.00	0.400	16,970	18,850	20,740	940	12,250
	40.00	0.450	28,670	31,850	35,040	1,590	20,700
	44.00	0.500	30,190	33,540	36,890	1,680	21,800
	49.00	0.557	30,190	33,540	36,890	1,680	21,800
9 5/8	36.00	0.352	14,510	16,120	17,730	810	10,480
	40.00	0.395	26,470	29,410	32,340	1,470	19,110
	43.50	0.435	30,190	33,540	36,890	1,680	21,800
	47.00	0.472	30,190	33,540	36,890	1,680	21,800
	53.50	0.545	30,190	33,540	36,890	1,680	21,800
	58.40	0.595	30,420	33,800	37,180	1,690	21,970
	59.40	0.609	34,280	38,090	41,900	1,900	24,760

JFEBEAR High Torque DRHA (HT-DRHA)

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80,85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	6,480	7,200	7,920	720	5,760
	13.50	0.290	7,130	7,920	8,710	792	6,336
5 1/2	17.00	0.304	9,000	10,000	11,000	1,000	7,500

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90,95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	6,980	7,760	8,540	776	6,208
	13.50	0.290	7,700	8,560	9,420	856	6,848
5 1/2	17.00	0.304	-	-	-	-	-

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	105,110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	7,420	8,240	9,060	824	6,592
	13.50	0.290	8,210	9,120	10,030	912	7,296
5 1/2	17.00	0.304	-	-	-	-	-

JFEBEAR High Torque DRHA CLEAR-RUN (Chrome)

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80, 85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	8,000	9,000	10,000	900	7,200
	13.50	0.290	8,910	9,900	10,890	990	7,920

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90, 95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	8,700	9,700	10,700	970	7,760
	13.50	0.290	9,600	10,700	11,800	1,070	8,560

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	105,110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	9,300	10,300	11,300	1,030	8,240
	13.50	0.290	10,300	11,400	12,500	1,140	9,120

JFEBEAR High Torque DRHA CLEAR-RUN (Carbon)

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80,85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	7,130	7,920	8,710	792	6,336
	13.50	0.290	7,840	8,710	9,580	871	6,968
5 1/2	17.00	0.304	11,700	13,000	14,300	1,300	9,750

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90,95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	7,690	8,540	9,390	854	6,832
	13.50	0.290	8,480	9,420	10,360	942	7,536
5 1/2	17.00	0.304	-	-	-	-	-

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	105, 110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
4 1/2	12.60	0.271	8,200	9,060	9,970	906	7,248
	13.50	0.290	9,030	10,030	11,030	1,003	8,024
5 1/2	17.00	0.304	-	-	-	-	-

It is recommended to check the following website for up to date torque information: www.jfetc.com

JFEBEAR HTP CLEAR-RUN

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80,85,90,95 ksi				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
7	29.00	0.408	N/A				
	32.00	0.453	N/A				

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	110 ksi (P110) Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
7	29.00	0.408	37,000	39,000	41,000	2,730	25,350
	32.00	0.453	40,500	42,500	44,500	2,975	27,625

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	125 ksi (P110 CY) Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
7	29.00	0.408	42,500	44,500	46,500	3,115	28,925
	32.00	0.453	46,500	48,500	50,500	3,395	31,525

JFEBEAR DRHA

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80,85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
3.250	6.60	0.200	2,160	2,400	2,640	360	1,920

JFEBEAR DRHA CLEAR-RUN (Chrome)

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80,85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
3.250	6.60	0.200	3,240	3,800	4,180	570	3,040

JFEBEAR DRHA CLEAR-RUN (Carbon)

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80,85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
3.250	6.60	0.200	2,790	3,100	3,410	465	2,480

It is recommended to check the following website for up to date torque information: www.jfetc.com

11.8 Hydrostatic Test Fixtures

JFEBEAR Hydrostatic test fixtures are low torque, however require metal to metal seal contact to achieve a pressure test. Soft seal options are currently not available.

The following points shall be noted when manufacturing JFEBEAR Test Caps and Plugs:

- The following information shall be low stress stamped on all test fixtures. Size, Weight, and Maximum Working Pressure, the maximum pressure shall not exceed 10,000psi.

  Example: 3.5" All weights JFEBEAR P110 MWP = 10,000psi
- Test caps and plugs shall be manufactured from low alloy steel with a minimum yield strength of 110ksi and maximum yield strength of 140ksi.
- Higher rated Autoclave connections can be used instead of ½" NPT. But the maximum working pressure will remain limited to 10,000psi unless otherwise specified by the controlling center.

11.8.1 Make-up of JFEBEAR Hydrostatic Cap or Plug

Only low torque is required to engage the seal for testing, therefore the test cap or plug should not be made up with a power unit.

For caps or plugs that do not have handles installed a strap/chain wrench should be used after hand tightening to assure seal engagement.

For cap or plugs that have handles installed, hand tightening with the handles should be sufficient. If not a cheater bar positioned over the handle can be used to further engage the seals.

JFE do not advise the use of any type of seal rings during pressure testing.

11.8.2 Storage and Maintenance

After use, the fixtures should be thoroughly cleaned and inspected for any damage that may have occurred during assembly. The connection should be dried and a suitable storage compound such as Kendex applied prior to installation of thread protectors. It is recommended that the fixtures be stored indoors and are not subjected to outdoor weather conditions.

It is recommended to perform NDE on the entire body of the fixture annually to check for any surface breaking and or sub-surface defects such as cracks.

11.8.3 Disclaimer

The users of these test caps and plugs are liable for the maintenance, use and safe operation. In no event shall JFE be liable for any damages, costs and expenses incurred in connection with the use of these test fixtures.

11.9 End Finishing Requirements

11.9.1 JFEBEAR Standard End Finishing Requirements

OD (inch)	High Chrome[1] Steel Pin End Finish	High Chrome[1] Steel Box End Finish	Carbon Steel Pin End Finish	Carbon Steel Box End Finish
2 ⅜ – 4 ½	Bead Blast Mill & Field End	Copper-Plate or Clear-Plate™	Bead Blast Mill & Field End	Manganese Phosphate or Clear-Plate™
5 – 9 ⅝			Bare or Bead Blast Mill & Field End	

11.9.2 JFEBEAR Clear Run End Finishing Requirements

OD (inch)	High Chrome[1] Steel Pin End Finish	High Chrome[1] Steel Box End Finish	Carbon Steel Pin End Finish	Carbon Steel Box End Finish
2 ⅜ – 6 ⅝	Bead Blast Mill & Field End	Clear-Plate™	Bead Blast Mill & Field End	Manganese Phosphate
7 – 9 ⅝			Bare or Bead Blast Mill & Field End	Clear-Plate™
7 HTP	Not applicable		Bead Blast Mill & Field End	

Note[1] - Definition of high chrome steel: Containing ≥ 9%Cr

An example of a JFEBEAR coupling where Clear-Plate™ has been applied as the end finish

11.10 Special clearance OD dimensions

JFEBEAR Special Clearance Coupling OD's					
Size (inch)	Weight (lb/ft)	Wall Thickness (inch)	SC80 (inch)	SC90 (inch)	Tolerance (inch)
2 ⅜	4.60	0.190	2.621	2.652	
	5.80	0.254	2.695	2.735	
	6.60	0.295	2.739	2.784	
	7.35	0.336	2.781	2.830	
2 ⅞	6.40	0.217	3.140	3.176	
	7.80	0.276	3.211	3.255	
	8.60	0.308	3.247	3.295	
	9.35	0.340	3.282	3.334	
	10.50	0.392	3.336	3.394	
	11.50	0.440	3.383	3.445	
3 ½	7.70	0.216	3.743	3.781	
	9.20	0.254	3.792	3.836	
	10.20	0.289	3.836	3.884	
	12.70	0.375	3.936	3.995	
	14.30	0.430	3.996	4.061	
	15.50	0.476	4.043	4.114	
	17.00	0.530	4.096	4.172	
4	9.50	0.226	4.241	4.281	
	10.70	0.262	4.288	4.334	
	11.60	0.286	4.319	4.368	
	13.20	0.330	4.374	4.429	
	14.80	0.380	4.434	4.495	
	16.10	0.415	4.474	4.540	
4 ½	11.60	0.250	4.778	4.822	
	12.60	0.271	4.806	4.853	
	13.50	0.290	4.831	4.881	
	15.20	0.337	4.891	4.948	
	17.00	0.380	4.944	5.007	
	18.90	0.430	5.003	5.073	
	21.50	0.500	5.082	5.160	
	23.70	0.560	5.147	5.232	
5	13.00	0.253	5.273	5.318	
	15.00	0.296	5.331	5.383	
	18.00	0.362	5.416	5.478	
	21.40	0.437	5.508	5.580	
	23.20	0.478	5.557	5.634	
	24.10	0.500	5.582	5.662	
5 ½	15.50	0.275	5.806	5.855	+ 0.020 / - 0
	17.00	0.304	5.845	5.899	
	20.00	0.361	5.920	5.982	
	23.00	0.415	5.988	6.058	
	26.00	0.476	6.063	6.141	
	26.80	0.500	6.091	6.173	
6	24.10	0.400	6.472	6.541	
6 ⅝	20.00	0.288	6.942	6.995	
	24.00	0.352	7.030	7.092	
	28.00	0.417	7.116	7.188	
	32.00	0.475	7.190	7.271	
7	23.00	0.317	7.347	7.404	
	26.00	0.362	7.409	7.473	
	29.00	0.408	7.470	7.542	
	32.00	0.453	7.529	7.607	
	35.00	0.498	7.587	7.672	
	38.00	0.540	7.639	7.730	
	42.70	0.625	7.743	7.845	
	46.40	0.687	7.815	7.925	
7 ⅝	29.70	0.375	8.043	8.111	
	33.70	0.430	8.118	8.193	
	39.00	0.500	8.209	8.296	
	42.80	0.562	8.288	8.384	
	45.30	0.595	8.329	8.429	
	47.10	0.625	8.366	8.470	
7 ¾	46.10	0.595	8.456	8.556	
8 ⅝	32.00	0.352	9.016	9.080	
	36.00	0.400	9.082	9.155	
	40.00	0.450	9.151	9.231	
	44.00	0.500	9.217	9.305	
	49.00	0.557	9.292	9.388	
9 ⅝	36.00	0.352	10.019	10.084	
	40.00	0.395	10.079	10.151	
	43.50	0.435	10.135	10.214	
	47.00	0.472	10.186	10.270	
	53.50	0.545	10.284	10.380	
	58.40	0.595	10.350	10.453	
	59.40	0.609	10.368	10.473	

12 JFETIGER

12.1 Design Features

Figure 12.1.1 – Box Detail

Figure 12.1.2 – Pin Detail

Figure 12.1.3 – Pin Detail with swage

OD (inch)	Threads per Inch (TPI)
7 to 9 5/8	5
9 7/8"	4

12.2 Interchangeability

JFETIGER connections with differing weights are interchangeable within a given OD. Rules when mixing differing weights & grades:

- The lower make-up torque of the lighter weight/ lower grade connection should be used
- If pin weight is heavier, a step will extrude into pipe bore from pin
- If box weight is heavier, a step will extrude into pipe bore from box
- Couplings with differing weights may have differing OD's

The following tables provide examples of the rules when mixing various weights and grades for JFETIGER.

Figure 12.2.1 – Differing Weights + Identical Grades (ID step = 0.031", Applied torque is the lesser torque value of the combined connections.)

3 ½" JFETIGER	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	10.2	80	2.915	4040	4490	4940
Pin	12.7	80	2.853	4710	5230	5760
				Applicable Torque		
Step/side (inch)			0.031	4040	4490	4940

Figure 12.2.2 – Identical Weights + Differing Grades (No ID step, Applied torque is the lesser torque value of the combined connections.)

3 ½" JFETIGER	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	10.2	80	2.915	4040	4490	4940
Pin	10.2	95	2.915	4690	5210	5730
				Applicable Torque		
Step/side (inch)			0	4040	4490	4940

Figure 12.2.3 – Differing Weights + Differing Grades (ID step = 0.042", Applied torque is the lesser torque value of the combined connections.)

4 ½" JFETIGER	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	15.2	95	3.852	7110	7900	8690
Pin	12.6	80	3.936	4860	5400	5940
				Applicable Torque		
Step/side (inch)			0.042	4860	5400	5940

12.3 Field Inspection

Field Inspection Tools

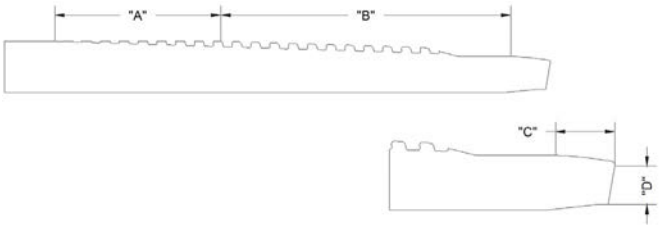
The following tools are commonly used but not limited to during field inspection & repair procedures:

- Depth Gauge
- Fine Tooth Triangle File
- Scotch Brite
- Emery Cloth
- Soft Stone
- Vernier Calipers
- Rotary Tools[1]

[1] Rotary tools can only be used by qualified JFE field service personnel.

A selection of field repair tools are shown in the image below.

12.3.1 JFETIGER Pin Visual Inspection Criteria & Guidelines



Condition: Corrosion

Zone	Criteria	Action
A, B, D	All surfaces. Pitting less than 0.004" (0.1mm) deep or minor surface corrosion	Hand repair with soft bristle (no steel wire) brush or emery cloth
	Deeper than 0.004" (0.1mm)	Cut off & re-thread
C	No pitting acceptable	If present, cut off & re-thread
	Light surface corrosion (rust)	Hand repair with scotch brite or #400 emery cloth. Do not alter seal dimension. Repair should be made in a larger area than actual surface corrosion and should move around the circumference of the seal

Condition: Burr, Tear, Ding, Mash, Scratch

Zone	Criteria	Action
A, B, D	All surfaces. Any condition which could cause galling, i.e. conditions described greater than 0.010" (0.3mm).	Hand repair with a fine triangle file; emery cloth or rotary tool[1]. Repair should be made in a larger area than actual effected area and should move around the helix of the thread. Otherwise - reject.
C	Not acceptable	If present, cut off & re-thread

Condition: Burnishing

Zone	Criteria	Action
C	Acceptable	On as-machined surfaces, burnishing from the thread protector may be evident. As long as this does not appear as a step, this is acceptable.

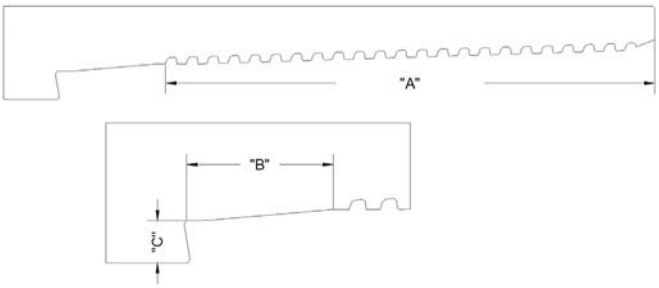
Condition: Bead Peening

Zone	Criteria	Action
A,B, C, D	Inspect for peened surface. If previously made-up, normal wear is expected and is acceptable	Bead peening is an optional end finish

Condition: Phosphate

Zone	Criteria	Action
A,B, C, D	Inspect for phosphate surface. If previously made-up, burnishing is expected and is acceptable	Phosphate is an optional end finish

12.3.2 JFETIGER Box Visual Inspection Criteria & Guidelines



Condition: Corrosion

Zone	Criteria	Action
A, C	Slight imperfections and light surface corrosion, i.e. Less than 0.004" (0.1mm)	Hand repair with soft bristle (no steel wire) brush, emery cloth or scotch brite
	All other imperfections deeper than 0.004" (0.1mm)	Reject or re-thread
B	No pitting acceptable	Reject or re-thread
	Light surface corrosion (rust)	Hand repair with scotch brite or #400 emery cloth. Do not alter seal dimension. Repair should be made in a larger area than actual surface corrosion and should move around the circumference of the seal
Coupling OD, ID Bore & Bearing Face	Pitting or corrosion less than 0.020" (0.5mm) deep	Grind to the bottom of the pit & smooth edges. Keep within product tolerances.
	Deeper than 0.020" (0.5mm)	Reject or re-thread

Condition: Burr, Tear, Ding, Mash, Scratch

Zone	Criteria	Action
A, C	All surfaces. Any condition which could cause galling, i.e. conditions described greater than 0.010" (0.3mm)	Hand repair with a honing stone / small file; emery cloth or rotary tool[1]. Repair should be made in a larger area than actual effected area and should move around the helix of the thread. Otherwise - reject.
B	Not acceptable	Reject or re-thread

Condition: Manganese phosphate

Zone	Criteria	Action
A, B, C	Must be present. Inspect for medium grey surface color. If previously made-up, normal wear is expected and is acceptable	Manganese phosphate if not present, reject, or re phosphate

Condition: Copper-plate and Clear-Plate™

Zone	Criteria	Action
A, B, C	Inspect the electroplated surface. Oxidation or discolouration of the plated surface is acceptable. If previously made-up, normal wear is expected and acceptable. Any delamination of plating is cause for reject	If holiday/delamination exists, reject or re-plate

12.4 Approved Thread Compounds

This procedure recommends the thread compounds that can be used to make-up JFE connections.

JFE do not recommend the use of thread compounds containing PTFE (Teflon®) for premium connections.

List of Approved Thread Compounds include, but are not limited to:

JFETIGER Approved Thread Compounds

Connection	Material Grade	API Modified [1]	Weatherford Lube Seal	Jet-Lube HPHT
JFETIGER®	Carbon	✓	✓	✗
	9Cr to 17Cr	✓	✓	✗
	CRA	✓	✓	✗

Connection	Material Grade	BOL 4010NM	TOPCO Green Seal II	Clear-Glide™ [2]	BOL 2000
JFETIGER®	Carbon	✓	✗	[3]	✗
	9Cr to 17Cr	[4]	✗	[3]	✗
	CRA	[4]	✗	[3]	✗

[1] Thread compounds that are in compliance with API RP 5A3 Annex A can be used on JFE connections. Different names are given and are dependent on the thread compound manufacturer.

[2] Clear-Glide™ is to be used only with Clear-Run™ prepared tubulars, i.e. when the proper end finishing is applied.

[3] Contact your local JFETC office for further information.

[4] Can be applied to sizes larger than 5.5" with Mn phosphate on the couplings, if the pin ends are abrasive blasted in accordance with JFE specifications.

JFE continues to evaluate the use of thread compounds. It is recommended to contact your nearest JFE-TC office for further information if other compounds that are not listed are required. Please continuously refer to www.jfetc.com for the most updated list and technical data.

This table is for informational purpose only.

12.5 Lifting Plugs

Figure 12.5.1 – Example of main body for lift plug (seal removed)

The following points shall be adhered to for JFETIGER lift plugs:

- The lift plug shall be manufactured from low alloy steel with a specified minimum yield stress (SMYS) of 110ksi, and a maximum yield stress of 140ksi.
- The lift plug shall be bead peened, phosphated or copper-plated as per the relevant procedures. Once machining has been completed, weld on handles can be installed to assist with handling and assembling operations. If handles are installed, they shall be of appropriate size and orientated 0° and 180°.
- The lift plug is low torque and therefore a power tong is not required. Final positioning before lifting operation can be achieved using the handles or strap wrench/chain tong

The following information shall be low stress stamped on the lift plug where drifting operations are not required:

Size, All weights, grade and JFETIGER Lift Plug
Licensee code plus manufacturing date
For lifting a maximum of three joints only

Stencil Example
9 ⅝" All weights AISI 4145 110ksi JFETIGER Lift Plug
SI-081; 22nd April 2021
For lifting a maximum of three joints only

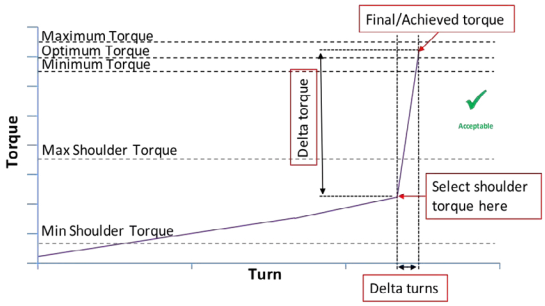
The following information shall be low stress stamped on the lift plug where drifting through the plug is required:

Size, weight, grade and JFETIGER Lift Plug
Bore ID = XXXX
Licensee code plus manufacturing date
For lifting a maximum of three joints only

Example
7" 32# AISI 110ksi JFETIGER Lift Plug
Bore ID = 6.094"
SI-081; 22nd April 2021
For lifting a maximum of three joints only

12.6 Make-Up Acceptance Criteria

Figure 12.6.1 – Example of an acceptable, typical JFELION/JFETIGER make up graph



If a case exists where premature dump torque occurs or a high shoulder is observed, if:

Achieved delta torque = minimum torque – maximum shoulder

the graph may be accepted. This rule can be applied for standalone cases, however if high shoulders continue to occur/premature dump occurs, contact your local JFE-TC office for further advice.

Figure 12.6.2 – Example of an acceptable JFELION/JFETIGER make-up graph (shoulder torque and maximum torque value of the dope hump are below maximum shoulder torque and linearity has since been re-established prior to shouldering)

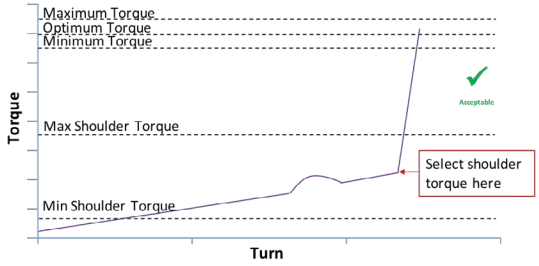


Figure 12.6.3 – Example of an acceptable JFELION/JFETIGER make-up graph (the maximum torque value of the dope hump does not exceed the maximum shoulder torque, and the dope hump extends immediately into the shoulder torque point).

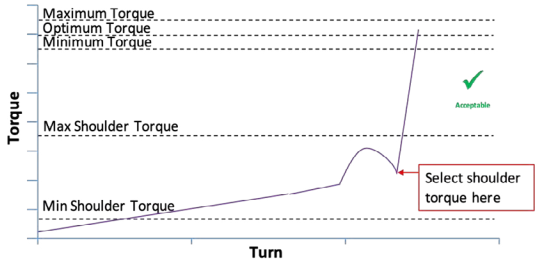


Figure 12.6.4 – Example of an acceptable JFELION/JFETIGER make-up graph (minor loss of linearity within 0.1 delta turns). If delta turns are higher than 0.1, however the graph remains linear, the graph is acceptable.

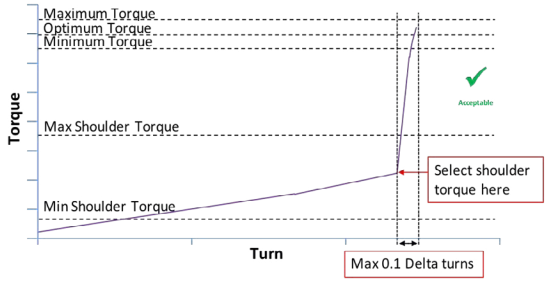
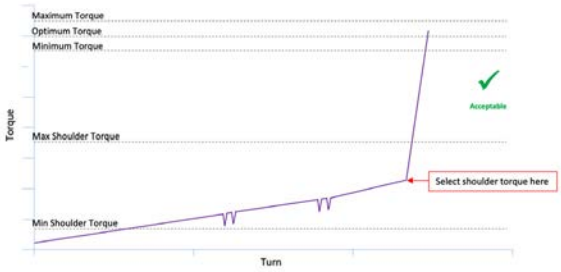


Figure 12.6.5 – Example of an acceptable JFELION/JFETIGER make-up graph. Minor slippage during thread engagement and slope returns to similar gradient once slipping occurs. Rectify for next make-up



Possible causes of graph profile but not limited to, are as follows:

- Pipe may not be straight
- Jaw of power tong is worn out or dirty

Figure 12.6.6 – Example of an unacceptable JFELION/JFETIGER make-up graph (the maximum torque value of the dope hump exceeds the maximum shoulder torque, however linearity is re-established prior to shouldering at a value below maximum shoulder torque)

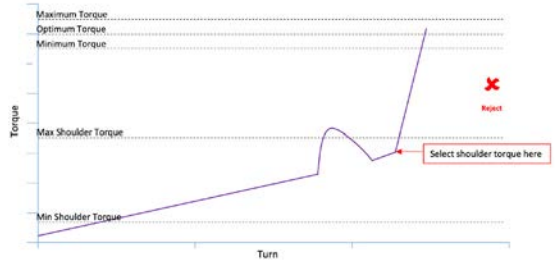
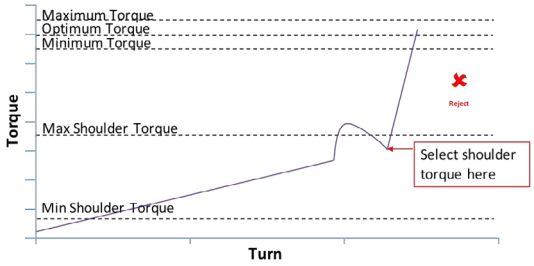


Figure 12.6.7 – Example of an unacceptable JFELION/JFETIGER make-up graph (the peak torque value of the dope hump is above the maximum shoulder torque value and the selected position is within the dope hump area)



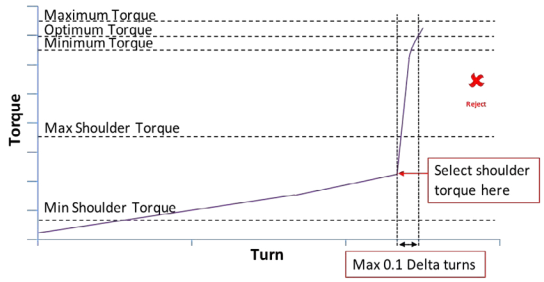
Possible causes of unacceptable graph profile but not limited to, are as follows:

- Dope is contaminated
- Excessive dope application

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 12.6.8 – Example of an unacceptable JFELION/JFETIGER make-up graph (loss of linearity falls out of the 0.1 delta turns criteria). If in doubt, please contact your local JFE Technical Center



Possible causes of unacceptable graph profile but not limited to, are as follows:

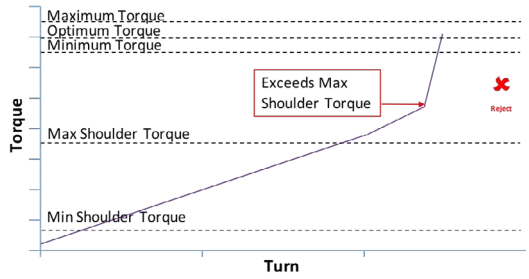
- Dope is contaminated
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range
- Friction factor of dope is too low
- Load cell error

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Check for deformed torque shoulder and if deformation is evident, lay down both pin and box
- Re-make up if no galling exists

It should be noted that if the delta turns are greater than 0.1, however no loss of linearity exists, the graph can be accepted

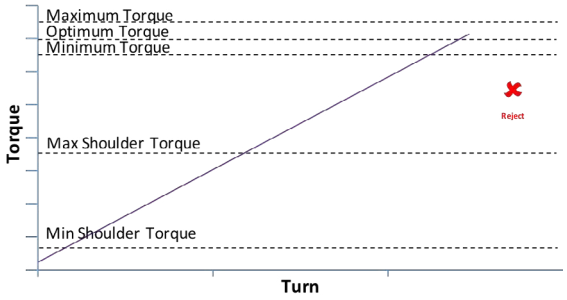
Figure 12.6.9 – Example of an unacceptable JFELION/JFETIGER make up graph (Exceeds Max Shoulder Torque)



Possible causes of unacceptable graph profile but not limited to, are as follows:

- Friction factor of dope is too high
- Pipe may not be straight
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range
- Procedure if the above graph profile is encountered:
- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

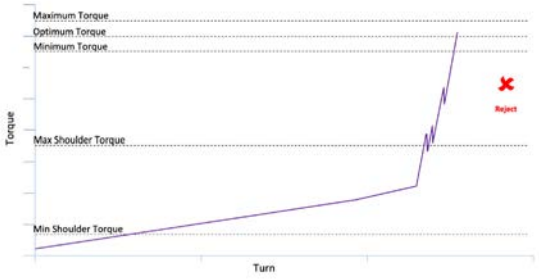
Figure 12.6.10 – Example of an unacceptable JFELION/JFETIGER make up graph (Exceeds Max Shoulder Torque)



Possible causes of unacceptable graph profile but not limited to, are as follows:

- Friction factor of dope is too high
- Dope is contaminated
- Pipe may not be straight
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range
- Procedure if the above graph profile is encountered:
- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 12.6.11 – Example of graph where unacceptable slippage has occurred after shouldering



Possible causes of unacceptable graph profile but not limited to, are as follows:

- Jaw of power tong is worn
- Contamination on pipe/coupling or dies/jaw
- Gripping pressure too low

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Determine the root cause of slippage
- Re-make up if no galling exists

12.7 Torque Information

JFETIGER

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80, 85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
7	23.00	0.317	8,500	9,440	10,390	944	6,608
	26.00	0.362	9,880	10,980	12,080	1,098	7,686
	29.00	0.408	13,210	14,680	16,150	1,468	11,744
	32.00	0.453	12,170	13,520	14,870	1,352	9,464
	35.00	0.498	13,410	14,900	16,390	1,490	10,430
	38.00	0.540	14,460	16,070	17,670	1,607	11,249
7 5/8	29.70	0.375	13,010	14,460	15,900	1,446	10,122
	33.70	0.430	15,240	16,930	18,630	1,693	11,851
	39.00	0.500	17,000	18,890	20,780	1,889	13,223
	42.80	0.562	18,520	20,580	22,640	2,058	14,406
	45.30	0.595	19,430	21,590	23,750	2,159	15,113
	47.10	0.625	19,870	22,080	24,290	2,208	15,456
9 5/8	40.00	0.395	15,200	16,890	18,580	1,689	11,823
	43.50	0.435	16,990	18,880	20,770	1,888	13,216
	47.00	0.472	18,780	20,870	22,950	2,087	14,609
	53.50	0.545	20,970	23,300	25,630	2,330	16,310
	58.40	0.595	22,530	25,030	27,540	2,503	17,521
	59.40	0.609	25,210	28,010	30,810	2,801	19,607
9 7/8	62.80	0.625	22,610	25,120	27,630	2,512	17,584
	65.30	0.650	23,220	25,800	28,380	2,580	18,060
	66.40	0.661	23,480	26,090	28,700	2,609	18,263
	66.90	0.668	23,650	26,280	28,910	2,628	18,396
	67.50	0.678	23,880	26,530	29,190	2,653	18,571
	68.00	0.694	24,250	26,940	29,640	2,694	18,858
	68.90	0.700	24,380	27,090	29,800	2,709	18,963

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90, 95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
7	23.00	0.317	10,090	11,210	12,330	1,121	7,847
	26.00	0.362	11,730	13,030	14,340	1,303	9,121
	29.00	0.408	13,210	14,680	16,150	1,468	11,744
	32.00	0.453	14,450	16,050	17,660	1,605	11,235
	35.00	0.498	15,920	17,690	19,460	1,769	12,383
	38.00	0.540	17,170	19,080	20,990	1,908	13,356
7 5/8	29.70	0.375	15,450	17,170	18,880	1,717	12,019
	33.70	0.430	18,100	20,110	22,120	2,011	14,077
	39.00	0.500	20,190	22,430	24,680	2,243	15,701
	42.80	0.562	22,000	24,440	26,890	2,444	17,108
	45.30	0.595	23,080	25,640	28,210	2,564	17,948
	47.10	0.625	23,600	26,220	28,840	2,622	18,354
9 5/8	40.00	0.395	18,050	20,060	22,060	2,006	14,042
	43.50	0.435	20,170	22,410	24,650	2,241	15,687
	47.00	0.472	22,300	24,780	27,260	2,478	17,346
	53.50	0.545	24,900	27,700	30,500	2,770	19,390
	58.40	0.595	26,760	29,730	32,710	2,973	20,811
	59.40	0.609	29,930	33,260	36,580	3,326	23,282
9 7/8	62.80	0.625	26,850	29,830	32,820	2,983	20,881
	65.30	0.650	27,570	30,630	33,700	3,063	21,441
	66.40	0.661	27,890	30,990	34,090	3,099	21,693
	66.90	0.668	28,080	31,200	34,320	3,120	21,840
	67.50	0.678	28,360	31,510	34,660	3,151	22,057
	68.00	0.694	28,790	31,990	35,190	3,199	22,393
	68.90	0.700	28,950	32,170	35,380	3,217	22,519

Size (inch)	Weight (lb/ft)	Pipe Body Wall (in)	105, 110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Min	Optimum	Max	Min	Max
7	23.00	0.317	10,090	11,210	12,330	1,121	7,847
	26.00	0.362	11,730	13,030	14,340	1,303	9,121
	29.00	0.408	13,210	14,680	16,150	1,468	11,744
	32.00	0.453	14,450	16,050	17,660	1,605	11,235
	35.00	0.498	15,920	17,690	19,460	1,769	12,383
	38.00	0.540	17,170	19,080	20,990	1,908	13,356
7 5/8	29.70	0.375	15,450	17,170	18,880	1,717	12,019
	33.70	0.430	18,100	20,110	22,120	2,011	14,077
	39.00	0.500	20,190	22,430	24,680	2,243	15,701
	42.80	0.562	22,000	24,440	26,890	2,444	17,108
	45.30	0.595	23,080	25,640	28,210	2,564	17,948
	47.10	0.625	23,600	26,220	28,840	2,622	18,354
8 5/8	40.00	0.450	22,710	25,230	27,760	2,520	17,661
	44.00	0.500	24,720	27,470	30,210	2,750	19,229
	49.00	0.557	25,295	28,110	30,920	2,810	19,677
	52.00	0.595	25,640	28,490	31,340	2,850	19,943
	54.00	0.625	26,990	29,990	32,990	3,000	20,993
	57.40	0.656	28,360	31,510	34,660	3,150	22,057
	58.70	0.687	29,730	33,030	36,340	3,300	23,121
	59.20	0.700	30,300	33,670	37,030	3,370	23,569
	44.00(SC90)	0.500	24,720	27,470	30,210	2,750	19,229
	58.70(SC90)	0.687	29,730	33,030	36,340	3,300	23,121
	59.20(SC83)	0.700	30,300	33,670	37,030	3,370	23,569
9 5/8	40.00	0.395	18,050	20,060	22,060	2,006	14,042
	43.50	0.435	20,170	22,410	24,650	2,241	15,687
	47.00	0.472	22,300	24,780	27,260	2,478	17,346
	53.50	0.545	24,900	27,700	30,500	2,770	19,390
	58.40	0.595	26,760	29,730	32,710	2,973	20,811
	59.40	0.609	29,930	33,260	36,580	3,326	23,282
9 7/8	62.80	0.625	26,850	29,830	32,820	2,983	20,881
	65.30	0.650	27,570	30,630	33,700	3,063	21,441
	66.40	0.661	27,890	30,990	34,090	3,099	21,693
	66.90	0.668	28,080	31,200	34,320	3,120	21,840
	67.50	0.678	28,360	31,510	34,660	3,151	22,057
	68.00	0.694	28,790	31,990	35,190	3,199	22,393
	68.90	0.700	28,950	32,170	35,380	3,217	22,519

Size (inch)	Weight (lb/ft)	Pipe Body Wall (in)	125 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Min	Optimum	Max	Min	Max
7	23.00	0.317	10,090	11,210	12,330	1,121	7,847
	26.00	0.362	11,730	13,030	14,340	1,303	9,121
	29.00	0.408	13,210	14,680	16,150	1,468	11,744
	32.00	0.453	14,450	16,050	17,660	1,605	11,235
	35.00	0.498	15,920	17,690	19,460	1,769	12,383
	38.00	0.540	17,170	19,080	20,990	1,908	13,356
7 5/8	29.70	0.375	15,450	17,170	18,880	1,717	12,019
	33.70	0.430	18,100	20,110	22,120	2,011	14,077
	39.00	0.500	20,190	22,430	24,680	2,243	15,701
	42.80	0.562	22,000	24,440	26,890	2,444	17,108
	45.30	0.595	23,080	25,640	28,210	2,564	17,948
	47.10	0.625	23,600	26,220	28,840	2,622	18,354
8 5/8	40.00	0.450	22,710	25,230	27,760	2,520	17,661
	44.00	0.500	24,720	27,470	30,210	2,750	19,229
	49.00	0.557	25,295	28,110	30,920	2,810	19,677
	52.00	0.595	25,640	28,490	31,340	2,850	19,943
	54.00	0.625	26,990	29,990	32,990	3,000	20,993
	57.40	0.656	28,360	31,510	34,660	3,150	22,057
	58.70	0.687	29,730	33,030	36,340	3,300	23,121
	59.20	0.700	30,300	33,670	37,030	3,370	23,569
	44.00(SC90)	0.500	24,720	27,470	30,210	2,750	19,229
	58.70(SC90)	0.687	29,730	33,030	36,340	3,300	23,121
	59.20(SC83)	0.700	30,300	33,670	37,030	3,370	23,569
9 5/8	40.00	0.395	18,050	20,060	22,060	2,006	14,042
	43.50	0.435	20,170	22,410	24,650	2,241	15,687
	47.00	0.472	22,300	24,780	27,260	2,478	17,346
	53.50	0.545	24,900	27,700	30,500	2,770	19,390
	58.40	0.595	26,760	29,730	32,710	2,973	20,811
	59.40	0.609	29,930	33,260	36,580	3,326	23,282
9 7/8	62.80	0.625	26,850	29,830	32,820	2,983	20,881
	65.30	0.650	27,570	30,630	33,700	3,063	21,441
	66.40	0.661	27,890	30,990	34,090	3,099	21,693
	66.90	0.668	28,080	31,200	34,320	3,120	21,840
	67.50	0.678	28,360	31,510	34,660	3,151	22,057
	68.00	0.694	28,790	31,990	35,190	3,199	22,393
	68.90	0.700	28,950	32,170	35,380	3,217	22,519

12.8 End Finishing Requirements

OD (inch)	High Chrome[1] Steel Pin End Finish	High Chrome[1] Steel Box End Finish	Carbon Steel Pin End Finish	Carbon Steel Box End Finish
All	Bead Blast Mill & Field End	Clear-Plate™[2]	Bead Blast Mill & Field End	Manganese Phosphate or Clear-Plate™[3]

Note[1] - Definition of high chrome steel: Containing ≥ 9%Cr

Note[2] - Copper-plate is applicable to accessories, however dry lubricant spray containing Molybdenum disulphide shall be sprayed over the seal and shoulder area for anti-galling. This shall be approved by JFE-TC prior to make-up.

Note[3] - Clear-Plate™ is mandatory when being used within the Clear Run™ system and blasting is not required prior to Clear-Plate. API modified can also be used in conjunction with Clear-Plate™ where there will be no change to the friction factor (FF).

12.9 Special Clearance OD Dimensions

It is recommended to use slip type elevators for special clearance OD couplings.

JFETIGER Special Clearance Coupling OD's					
Size (inch)	Weight (lb/ft)	Wall Thickness (inch)	SC80 (inch)	SC90 (inch)	Tolerance (inch)
7	23.00	0.317	7.602	7.658	+ 0.020 / - 0
	26.00	0.362	7.651	7.714	
	29.00	0.408	7.676	7.746	
	32.00	0.453	7.676	7.753	
	35.00	0.498	7.730	7.814	
	38.00	0.540	7.766	7.856	
7 5/8	29.70	0.375	8.212	8.278	
	33.70	0.430	8.269	8.343	
	39.00	0.500	8.331	8.416	
	42.80	0.562	8.385	8.479	
	45.30	0.595	8.430	8.528	
	47.10	0.625	8.471	8.574	
8 5/8	40.00	0.450	9.407	9.485	
	44.00	0.500	9.391	9.477	
	49.00	0.557	9.482	9.577	
	52.00	0.595	9.542	9.641	
	54.00	0.625	9.588	9.691	
	57.40	0.656	9.635	9.743	
	58.70	0.687	9.682	9.794	
	59.20	0.700	9.702	9.816	
9 5/8	40.00	0.395	10.345	10.415	
	43.50	0.435	10.331	10.408	
	47.00	0.472	10.354	10.438	
	53.50	0.545	10.437	10.531	
	58.40	0.595	10.453	10.556	
	59.40	0.609	10.473	10.578	
9 7/8	62.80	0.625	10.852	10.958	
	65.30	0.650	10.844	10.954	
	66.40	0.661	10.841	10.952	
	66.90	0.668	10.838	10.951	
	67.50	0.678	10.835	10.950	
	68.00	0.694	10.830	10.947	
	68.90	0.700	10.828	10.946	

13 JFELION

13.1 Design Features

Figure 13.1.1 – Box Detail

Figure 13.1.2 – Pin Detail

Figure 13.1.3 – Pin Detail with swage

OD (inch) & Classification Number	Threads per Inch (TPI)
2 ⅞ to 2 ⅞	8
3 ½ to 5*	6
5 ½ to 9 ⅝	5
9 ⅞ to 14	4

*4 ½" SD 51 (21.5lb/ft & 23.7lb/ft) are 5 threads per inch

13.2 Interchangeability

Interchangeability rules for JFELION only apply to connections with identical SD number. If differing weights of the same diameter connection do not have the same SD number, the connections are not interchangeable.

Figure 13.2.1 – Example: JFELION 7" 23# SD49 & 7" 29# SD49 are interchangeable. JFELION 7" 23# SD49 is not interchangeable with 7" 32# SD52. The following table details the interchangeable weights within a given size for the JFELION connection.

OD (inch)	Classification / SD No.	Lower Weight (lb/ft)	Upper Weight (lb/ft)
2 ⅞	SD26	6.4	6.4
	SD30	7.8	9.4
3 ½	SD29	9.2	10.2
	SD35	12.7	14.8
4	SD35	11.6	16.1
4 ½	SD29	11.6	12.6
	SD32	13.5	15.2
	SD35	17.0	18.9
	SD51	21.5	23.7
5	SD30	15.0	15.0
	SD36	18.0	21.4
	SD38	23.2	24.1
5 ½	SD41	15.5	17.0
	SD46	20.0	23.0
	SD49	26.0	26.8
	SD51	28.4	29.7
6	SD45	22.8	22.8
	SD50	32.0	32.0
6.068	SD61	32.6	32.6
6 ⅝	SD41	20.0	20.0
	SD49	24.0	32.0
	SD54	40.2	40.2

OD (inch)	Classification / SD No.	Lower Weight (lb/ft)	Upper Weight (lb/ft)
7	SD49	23.0	29.0
	SD52	32.0	35.0
	SD54	38.0	42.7
7 ⅝	SD47	26.4	29.7
	SD52	33.7	39.0
	SD57	42.8	42.8
8 ⅝	SD50	36.0	44.0
	SD57	49.0	52.0
	SD62	54.0	57.4
9 ⅝	SD51	40.0	43.5
	SD57	47.0	59.4
9 ⅞	SD68	62.8	68.9
10 ¾	SD56	51.0	51.0
	SD65	55.5	73.2
10 ⅞	SD65	72.0	72.0
11 ¾	SD62	60.0	71.0
11 ⅞	SD62	62.0	71.8
13 ⅜	SD63	68.0	77.0
	SD65	80.7	86.0
	SD68	92.0	92.0
13 ⅝	SD65	88.2	88.2
14	SD66	93.0	93.0
	SD68	100.0	115.0
9 ⅝	CBR	53.5	53.5

Rules when mixing differing weights & grades:

- The lower make-up torque of the lighter weight / lower grade connection should be used
- If pin weight is heavier, a step will extrude into pipe bore from pin
- If box weight is heavier, a step will extrude into pipe bore from box
- Couplings with differing weights may have differing OD's
- JFELION CBR, & JFELION DR ASM do not offer interchangeability with any other connections

The following tables provide examples of the rules when mixing various weights (within the given SD number) and grades for the JFELION connection.

Figure 13.2.2 – Differing Weights + Identical SD# + Identical Grades (ID step = 0.0285", Applied torque is the lesser torque value of the combined connections.)

7" JFELION SD49	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	23.0	80	6.277	9900	11000	12100
Pin	29.0	80	6.220	13140	14600	16060
				Applicable Torque		
Step/side (inch)			0.0285	9900	11000	12100

Figure 13.2.3 – Identical Weights + Identical SD# + Differing Grades (No ID step, Applied torque is the lesser torque value of the combined connections.)

7" JFELION SD49	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	29.0	80	6.220	13140	14600	16060
Pin	29.0	95	6.220	14040	15600	17160
				Applicable Torque		
Step/side (inch)			0	13140	14600	16060

Figure 13.2.4 – Differing Weights + Identical SD# + Differing Grades (ID step: 0.0225", Applied torque is the lesser torque value of the combined connections.)

10.750" JFELION SD65	Weight	Grade	Nominal Connection ID	Minimum Field Torque	Optimum Field Torque	Maximum Field Torque
	lb/ft	ksi	inch	ft-lb		
Box	65.7	95	9.716	33750	37500	41250
Pin	60.7	80	9.840	26550	29500	32450
				Applicable Torque		
Step/side (inch)			0.0285	26550	29500	32450

Note: These interchangeability rules are to be used when running tubing and casing. When assembling/ running accessories, it is recommended to contact your local JFE-TC office.

13.3 Field Inspection

Field Inspection Tools

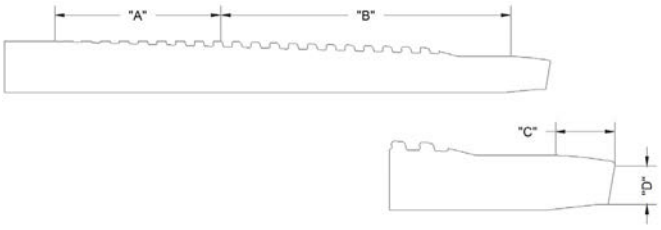
The following tools are commonly used but not limited to during field inspection & repair procedures:

- Depth Gauge
- Fine Tooth Triangle File
- Scotch Brite
- Emery Cloth
- Soft Stone
- Vernier Calipers
- Rotary Tools[1]

[1] Rotary tools can only be used by qualified JFE field service personnel.

A selection of field repair tools are shown in the image below.

13.3.1 JFELION Pin Visual Inspection Criteria & Guidelines



Condition: Corrosion

Zone	Criteria	Action
A, B, D	All surfaces. Pitting less than 0.004" (0.1mm) deep or minor surface corrosion	Hand repair with soft bristle (no steel wire) brush or emery cloth
	Deeper than 0.004" (0.1mm)	Cut off & re-thread
C	No pitting acceptable	If present, cut off & re-thread
	Light surface corrosion (rust)	Hand repair with scotch brite or #400 emery cloth. Do not alter seal dimension. Repair should be made in a larger area than actual surface corrosion and should move around the circumference of the seal

Condition: Burr, Tear, Ding, Mash, Scratch

Zone	Criteria	Action
A, B, D	All surfaces. Any condition which could cause galling, i.e. conditions described greater than 0.010" (0.3mm).	Hand repair with a fine triangle file; emery cloth or rotary tool[1]. Repair should be made in a larger area than actual effected area and should move around the helix of the thread. Otherwise - reject.
C	Not acceptable	If present, cut off & re-thread

Condition: Burnishing

Zone	Criteria	Action
C	Acceptable	On as-machined surfaces, burnishing from the thread protector may be evident. As long as this does not appear as a step, this is acceptable.

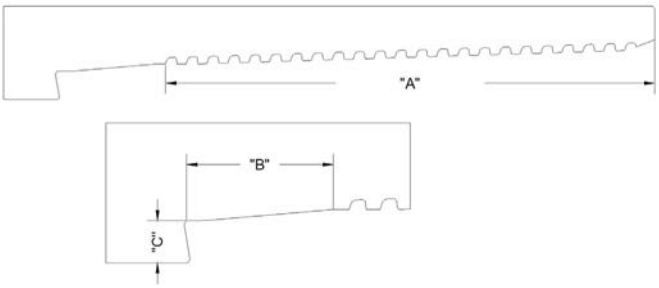
Condition: Bead Peening

Zone	Criteria	Action
A,B, C, D	Inspect for peened surface. If previously made-up, normal wear is expected and is acceptable	Bead peening is an optional end finish

Condition: Phosphate

Zone	Criteria	Action
A,B, C, D	Inspect for phosphate surface. If previously made-up, burnishing is expected and is acceptable	Phosphate is an optional end finish

13.3.2 JFELION Box Visual Inspection Criteria & Guidelines



Condition: Corrosion

Zone	Criteria	Action
A, C	Slight imperfections and light surface corrosion, i.e. Less than 0.004" (0.1mm)	Hand repair with soft bristle (no steel wire) brush, emery cloth or scotch brite
	All other imperfections deeper than 0.004" (0.1mm)	Reject or re-thread
B	No pitting acceptable	Reject or re-thread
	Light surface corrosion (rust)	Hand repair with scotch brite or #400 emery cloth. Do not alter seal dimension. Repair should be made in a larger area than actual surface corrosion and should move around the circumference of the seal
Coupling OD, ID Bore & Bearing Face	Pitting or corrosion less than 0.020" (0.5mm) deep	Grind to the bottom of the pit & smooth edges. Keep within product tolerances.
	Deeper than 0.020" (0.5mm)	Reject or re-thread

Condition: Burr, Tear, Ding, Mash, Scratch

Zone	Criteria	Action
A, C	All surfaces. Any condition which could cause galling, i.e. conditions described greater than 0.010" (0.3mm)	Hand repair with a honing stone / small file; emery cloth or rotary tool[1]. Repair should be made in a larger area than actual effected area and should move around the helix of the thread. Otherwise - reject.
B	Not acceptable	Reject or re-thread

Condition: Manganese phosphate

Zone	Criteria	Action
A, B, C	Must be present. Inspect for medium grey surface color. If previously made-up, normal wear is expected and is acceptable	Manganese phosphate if not present, reject, or re phosphate

Condition: Copper-plate and Clear-Plate™

Zone	Criteria	Action
A, B, C	Inspect the electroplated surface. Oxidation or discolouration of the plated surface is acceptable. If previously made-up, normal wear is expected and acceptable. Any delamination of plating is cause for reject	If holiday/delamination exists, reject or re-plate

13.4 Approved Thread Compounds

This procedure recommends the thread compounds that can be used to make-up JFE connections.

JFE do not recommend the use of thread compounds containing PTFE (Teflon®) for premium connections.

List of Approved Thread Compounds include, but are not limited to:

JFELION Approved Thread Compounds

Connection	Material Grade	API Modified [1]	Weatherford Lube Seal	Jet-Lube HPHT
JFELION®	Carbon	✓	✓	✗
	9Cr to 17Cr	✓	✓	[8]
	CRA	✓	✓	[4]

Connection	Material Grade	BOL 4010NM	TOPCO Green Seal II	Clear-Glide™ [2]	BOL 2000
JFELION®	Carbon	≤5.5" [5][6]	[3]	[4]	✗
	9Cr to 17Cr	≤5.5" [7]	✗	[4]	✗
	CRA	≤5.5" [7]	✗	[4]	✗

[1] Thread compounds that are in compliance with API RP 5A3 Annex A can be used on JFE connections. Different names are given and are dependent on the thread compound manufacturer.

[2] Clear-Glide™ is to be used only with Clear-Run™ prepared tubulars, i.e. when the proper end finishing is applied.

[3] For use in geothermal well applications.

[4] Contact your local JFETC office for further information.

[5] Can be applied to sizes larger than 5.5" with as machined pins if Clear-Plate™ is applied to the coupling/box.

[6] Can be applied to sizes larger than 5.5" with Mn phosphate on the couplings, if the pin ends are abrasive blasted in accordance with JFE specifications.

[7] Can be applied to sizes larger than 5.5" if Clear-Plate™ is applied to the coupling/box.

JFE continues to evaluate the use of thread compounds. It is recommended to contact your nearest JFE-TC office for further information if other compounds that are not listed are required. Please continuously refer to www.jfetc.com for the most updated list and technical data.

This table is for informational purpose only.

13.5 Lifting Plugs

Figure 13.5.1 – Example of main body for lift plug (seal removed)

The following points shall be adhered to for JFELION lift plugs:

- The lift plug shall be manufactured from low alloy steel with a specified minimum yield stress (SMYS) of 110ksi, and a maximum yield stress of 140ksi.
- The lift plug shall be bead peened, phosphated or copper-plated as per the relevant procedures. Once machining has been completed, weld on handles can be installed to assist with handling and assembling operations. If handles are installed, they shall be of appropriate size and orientated 0° and 180°.
- The lift plug is low torque and therefore a power tong is not required. Final positioning before lifting operation can be achieved using the handles or strap wrench/chain tong

The following information shall be low stress stamped on the lift plug where drifting operations are not required:

Size, All weights, grade and JFELION Lift Plug
Licensee code plus manufacturing date
For lifting a maximum of three joints only

Stencil Example
9 ⅝" 58.4# AISI 4145 110ksi JFELION SD57 Lift Plug
SI-081; 22nd April 2021
For lifting a maximum of three joints only
Note: 58.4# is stamped as this is the heaviest weight within the SD

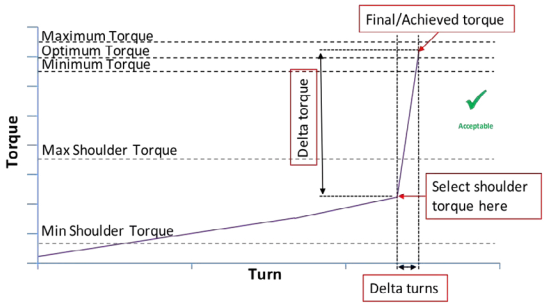
The following information shall be low stress stamped on the lift plug where drifting through the plug is required:

Size, weight, grade JFELION SDXX Lift Plug
Bore ID = XXXX
Licensee code plus manufacturing date
For lifting a maximum of three joints only

Example
7" 29# AISI 110ksi JFELION SD49 Lift Plug
Bore ID = 6.184"
SI-081; 22nd April 2021
For lifting a maximum of three joints only

13.6 Make-Up Acceptance Criteria

Figure 13.6.1 – Example of an acceptable, typical JFELION/JFETIGER make up graph



If a case exists where premature dump torque occurs or a high shoulder is observed, if:

Achieved delta torque = minimum torque – maximum shoulder

the graph may be accepted. This rule can be applied for standalone cases, however if high shoulders continue to occur/premature dump occurs, contact your local JFE-TC office for further advice.

Figure 13.6.2 – Example of an acceptable JFELION/JFETIGER make-up graph (shoulder torque and maximum torque value of the dope hump are below maximum shoulder torque and linearity has since been re-established prior to shouldering)

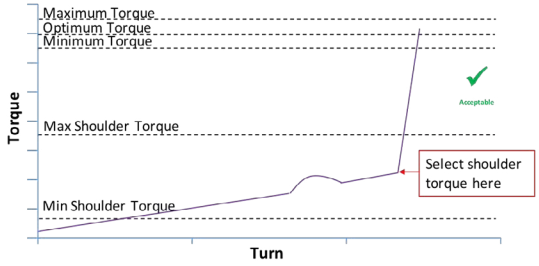


Figure 13.6.3 – Example of an acceptable JFELION/JFETIGER make-up graph (the maximum torque value of the dope hump does not exceed the maximum shoulder torque, and the dope hump extends immediately into the shoulder torque point).

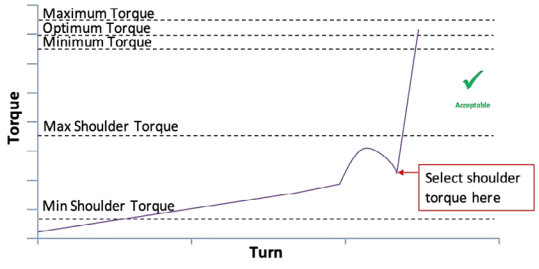


Figure 13.6.4 – Example of an acceptable JFELION/JFETIGER make-up graph (minor loss of linearity within 0.1 delta turns). If delta turns are higher than 0.1, however the graph remains linear, the graph is acceptable.

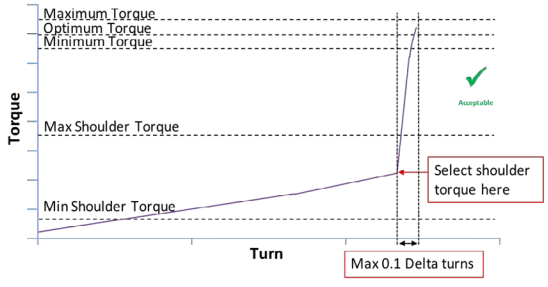
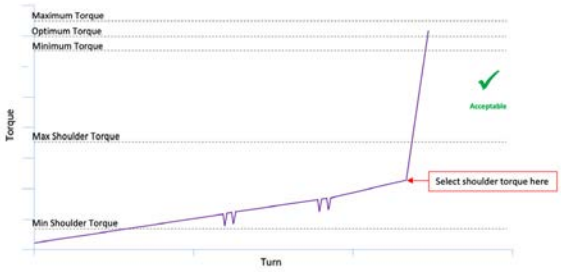


Figure 13.6.5 – Example of an acceptable JFELION/JFETIGER make-up graph. Minor slippage during thread engagement and slope returns to similar gradient once slipping occurs. Rectify for next make-up



Possible causes of graph profile but not limited to, are as follows:

- Pipe may not be straight
- Jaw of power tong is worn out or dirty

Figure 13.6.6 – Example of an unacceptable JFELION/JFETIGER make-up graph (the maximum torque value of the dope hump exceeds the maximum shoulder torque, however linearity is re-established prior to shouldering at a value below maximum shoulder torque)

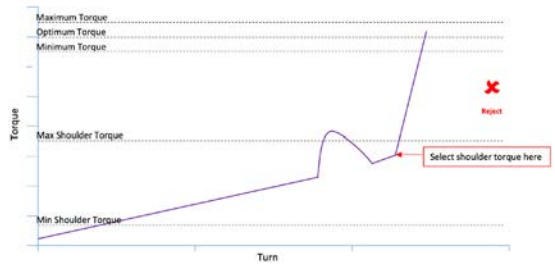
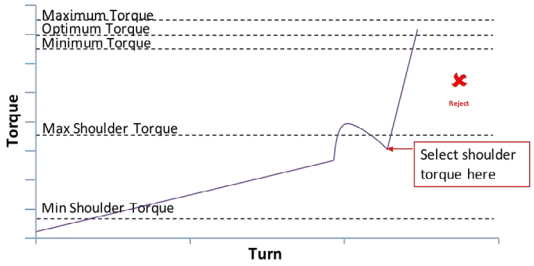


Figure 13.6.7 – Example of an unacceptable JFELION/JFETIGER make-up graph (the peak torque value of the dope hump is above the maximum shoulder torque value and the selected position is within the dope hump area)



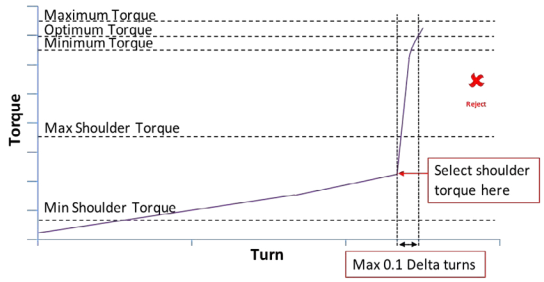
Possible causes of unacceptable graph profile but not limited to, are as follows:

- Dope is contaminated
- Excessive dope application

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 13.6.8 – Example of an unacceptable JFELION/JFETIGER make-up graph (loss of linearity falls out of the 0.1 delta turns criteria). If in doubt, please contact your local JFE Technical Center



Possible causes of unacceptable graph profile but not limited to, are as follows:

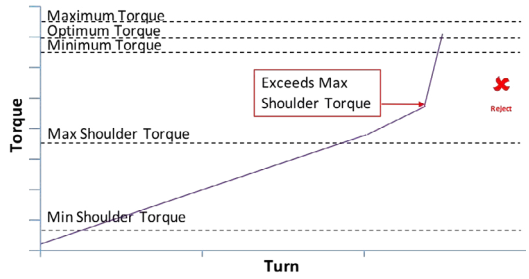
- Dope is contaminated
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range
- Friction factor of dope is too low
- Load cell error

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Check for deformed torque shoulder and if deformation is evident, lay down both pin and box
- Re-make up if no galling exists

It should be noted that if the delta turns are greater than 0.1, however no loss of linearity exists, the graph can be accepted

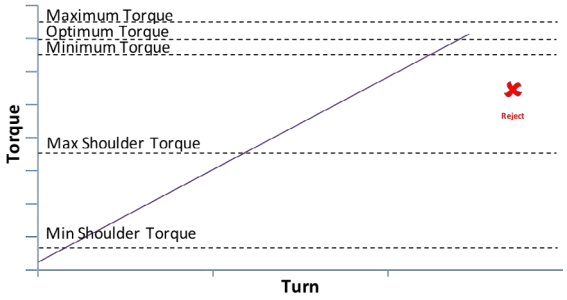
Figure 13.6.9 – Example of an unacceptable JFELION/JFETIGER make up graph (Exceeds Max Shoulder Torque)



Possible causes of unacceptable graph profile but not limited to, are as follows:

- Friction factor of dope is too high
- Pipe may not be straight
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range
- Procedure if the above graph profile is encountered:
- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

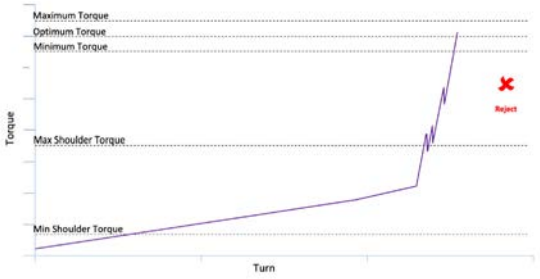
Figure 13.6.10 – Example of an unacceptable JFELION/JFETIGER make up graph (Exceeds Max Shoulder Torque)



Possible causes of unacceptable graph profile but not limited to, are as follows:

- Friction factor of dope is too high
- Dope is contaminated
- Pipe may not be straight
- Pin or box dimensions are out with the tolerance range
- The surface treatment for the pin or box is out with the tolerance range
- Procedure if the above graph profile is encountered:
- Break-out, clean and inspect the connection
- Investigate the other components if connection looks OK
- Re-make up if no galling exists

Figure 13.6.11 – Example of graph where unacceptable slippage has occurred after shouldering



Possible causes of unacceptable graph profile but not limited to, are as follows:

- Jaw of power tong is worn
- Contamination on pipe/coupling or dies/jaw
- Gripping pressure too low

Procedure if the above graph profile is encountered:

- Break-out, clean and inspect the connection
- Determine the root cause of slippage
- Re-make up if no galling exists

13.7 Torque Information

JFELION™

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80, 85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 7/8	6.4	0.217	2,000	2,100	2,220	210	1,890
	7.8	0.276	2,840	2,990	3,140	299	2,691
	8.6	0.308	3,100	3,260	3,420	326	2,934
	9.35	0.34	3,350	3,530	3,710	353	3,177
3 1/2	9.2	0.254	3,240	3,590	3,950	359	3,052
	10.2	0.289	3,730	4,140	4,550	414	3,519
	12.7	0.375	4,940	5,480	6,030	548	4,658
	14.3	0.43	5,710	6,340	6,970	634	5,389
	14.8	0.449	5,980	6,640	7,300	664	5,644
4 1/2	12.6	0.271	6,030	6,690	7,360	669	5,687
	13.5	0.29	6,200	6,880	7,570	688	5,848
	15.2	0.337	6,460	7,170	7,890	717	6,095
	17	0.38	6,740	7,490	8,240	749	6,367
	17.7	0.402	6,890	7,650	8,410	765	6,502
	18.9	0.43	7,070	7,850	8,640	785	6,673
	21.5	0.5	10,930	11,880	12,830	1188	10,098
	23.7	0.56	13,520	14,700	15,880	1,470	12,495
5	15	0.296	6,380	7,100	7,820	710	6,035
	18	0.362	8,040	8,900	9,760	890	7,565
	21.4	0.437	9,310	10,300	11,290	1,030	8,755
	23.2	0.478	9,970	11,100	12,230	1,110	9,435
	24.1	0.5	10,250	11,400	12,550	1,140	9,690
5 1/2	15.5	0.275	8,510	9,200	9,890	920	7,820
	17	0.304	9,690	10,480	11,270	1,048	8,908
	20	0.361	12,030	13,000	14,000	1,300	11,050
	23	0.415	14,060	15,200	16,340	1,520	12,920
	26	0.476	15,240	16,480	17,720	1,648	14,008
	26.8	0.5	15,240	16,480	17,720	1,648	14,008
	28.4	0.53	16,820	18,180	19,540	1,818	15,453
	29.7	0.562	18,050	19,510	20,970	1,951	16,584
6	22.8	0.375	11,610	12,900	14,190	1,290	10,965
	32	0.519	15,570	17,300	19,030	1,770	13,275
6.068	32.6	0.553	11,700	13,000	14,300	1,300	11,050
6 5/8	20	0.288	7.32	10,000	11,000	1,000	8,500
	24	0.352	8.94	13,760	14,790	1376	11,696
	28	0.417	10.59	15,670	16,850	1567	13,319
	32	0.475	12.06	18,680	20,080	1868	15,878
	40.2	0.625	15.88	25,000	27,500	2,500	21,250
7	23	0.317	8.05	11,600	12,470	1,160	9,860
	26	0.362	9.19	13,800	14,840	1,380	11,730
	29	0.408	10.36	15,400	16,560	1,540	13,090
	32	0.453	11.51	15,800	16,990	1,580	13,430
	35	0.498	12.65	18,600	20,000	1,860	15,810
	38	0.54	13.72	21,300	22,900	2,130	18,105
	42.7	0.625	15.88	22,800	24,510	2,280	19,380
7 5/8	26.4	0.328	8.33	10,900	11,720	1,090	9,265
	29.7	0.375	9.52	12,100	13,010	1,210	10,285
	33.7	0.43	10.92	15,700	16,880	1,570	13,345
	35.8	0.46	11.68	17,300	18,600	1,730	14,705
	39	0.5	12.7	21,000	22,580	2,100	17,850
	42.8	0.562	14.27	23,800	25,590	2,380	20,230
8 5/8	36	0.4	10.16	16,000	17,600	1,600	12,000
	40	0.45	11.43	18,900	20,790	1,890	14,175
	44	0.5	12.7	22,400	24,640	2,240	16,800
	49	0.557	14.15	26,300	28,930	2,630	19,725
	52	0.595	15.11	27,400	30,140	2,740	20,550
	54	0.625	15.88	29,400	32,340	2,940	22,050
	57.4	0.656	16.66	30,900	33,990	3,090	23,175
9 5/8	43.5	0.435	11.05	22,800	25,080	2,280	17,100
	47	0.472	11.99	24,100	26,510	2,410	18,075
	53.5	0.545	13.84	26,800	29,480	2,680	20,100
	58.4	0.595	15.11	30,100	33,110	3,010	22,575
	59.4	0.609	15.47	30,400	33,440	3,040	22,800
9 7/8	62.8	0.625	15.88	32,700	35,970	3,270	24,525
	65.3	0.65	16.51	34,500	37,950	3,450	25,875
	66.4	0.661	16.79	35,300	38,830	3,530	26,475
	66.9	0.668	16.97	35,800	39,380	3,580	26,850
	67.5	0.678	17.22	36,700	40,370	3,670	27,525
	68	0.694	17.63	37,600	41,360	3,760	28,200
	68.9	0.7	17.78	38,000	41,800	3,800	28,500

JFELION™ JFELION API

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90, 95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 7/8	6.4	0.217	2,330	2,520	2,710	252	2,142
	7.8	0.276	2,940	3,180	3,420	318	2,703
	8.6	0.308	3,190	3,450	3,710	345	2,933
	9.35	0.34	3,510	3,800	4,090	380	3,230
3 1/2	9.2	0.254	3,520	3,910	4,300	391	3,324
	10.2	0.289	4,000	4,440	4,880	444	3,774
	12.7	0.375	5,170	5,740	6,310	574	4,879
	14.3	0.43	5,920	6,570	7,230	657	5,585
	14.8	0.449	6,180	6,860	7,550	686	5,831
4 1/2	12.6	0.271	6,300	7,000	7,700	700	5,950
	13.5	0.29	6,470	7,190	7,910	719	6,112
	15.2	0.337	6,740	7,480	8,230	748	6,358
	17	0.38	7,020	7,800	8,580	780	6,630
	17.7	0.402	7,170	7,960	8,750	796	6,766
	18.9	0.43	7,350	8,160	8,980	816	6,936
	21.5	0.5	12,210	13,280	14,350	1328	11,288
	23.7	0.56	14,070	15,300	16,530	1,530	13,005
5	15	0.296	6,570	7,300	8,030	730	6,205
	18	0.362	8,080	9,000	9,920	900	7,650
	21.4	0.437	9,360	10,400	11,440	1,040	8,840
	23.2	0.478	10,220	11,300	12,380	1,130	9,605
	24.1	0.5	10,320	11,500	12,680	1,150	9,775
5 1/2	15.5	0.275	8,510	9,200	9,890	920	7,820
	17	0.304	9,690	10,480	11,270	1,048	8,908
	20	0.361	12,030	13,000	14,000	1,300	11,050
	23	0.415	14,060	15,200	16,340	1,520	12,920
	26	0.476	15,240	16,480	17,720	1,648	14,008
	26.8	0.5	15,240	16,480	17,720	1,648	14,008
	28.4	0.53	16,820	18,180	19,540	1,818	15,453
	29.7	0.562	18,050	19,510	20,970	1,951	16,584
6	22.8	0.375	12,330	13,700	15,070	1,370	11,645
	32	0.519	15,930	17,700	19,470	1,770	13,275
6.068	32.6	0.553	13,140	14,600	16,060	1,460	12,410
6 5/8	20	0.288	9,540	10,600	11,660	1,060	9,010
	24	0.352	13,240	14,310	15,380	1,431	12,163
	28	0.417	15,070	16,290	17,510	1,629	13,846
	32	0.475	17,760	19,200	20,640	1,920	16,320
	40.2	0.625	23,850	26,500	29,150	2,650	22,525
7	23	0.317	11,560	12,500	13,440	1,250	10,625
	26	0.362	13,410	14,500	15,590	1,450	12,325
	29	0.408	15,080	16,300	17,520	1,630	13,855
	32	0.453	15,360	16,600	17,850	1,660	14,110
	35	0.498	17,850	19,300	20,750	1,930	16,405
	38	0.54	20,350	22,000	23,650	2,200	18,700
	42.7	0.625	21,960	24,400	26,840	2,440	20,740
7 5/8	26.4	0.328	10,640	11,500	12,360	1,150	9,775
	29.7	0.375	12,030	13,000	13,980	1,300	11,050
	33.7	0.43	15,080	16,300	17,520	1,630	13,855
	35.8	0.46	16,930	18,300	19,670	1,830	15,555
	39	0.5	20,350	22,000	23,650	2,200	18,700
	42.8	0.562	22,940	24,800	26,660	2,480	21,080
8 5/8	36	0.4	15,930	17,700	19,470	1,770	13,275
	40	0.45	18,900	21,000	23,100	2,100	15,750
	44	0.5	21,690	24,100	26,510	2,410	18,075
	49	0.557	25,560	28,400	31,240	2,840	21,300
	52	0.595	26,550	29,500	32,450	2,950	22,125
	54	0.625	28,440	31,600	34,760	3,160	23,700
	57.4	0.656	29,790	33,100	36,410	3,310	24,825
9 5/8	43.5	0.435	21,600	24,000	26,400	2,400	18,000
	47	0.472	22,590	25,100	27,610	2,510	18,825
	53.5	0.545	25,380	28,200	31,020	2,820	21,150
	58.4	0.595	28,620	31,800	34,980	3,180	23,850
	59.4	0.609	28,980	32,200	35,420	3,220	24,150
9 7/8	62.8	0.625	31,770	35,300	38,830	3,530	26,475
	65.3	0.65	33,480	37,200	40,920	3,720	27,900
	66.4	0.661	34,290	38,100	41,910	3,810	28,575
	66.9	0.668	34,740	38,600	42,460	3,860	28,950
	67.5	0.678	35,640	39,600	43,560	3,960	29,700
	68	0.694	36,540	40,600	44,660	4,060	30,450
	68.9	0.7	36,900	41,000	45,100	4,100	30,750

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	105, 110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 7/8	6.4	0.217	2,370	2,570	2,760	257	2,185
	7.8	0.276	3,110	3,360	3,610	336	2,856
	8.6	0.308	3,430	3,710	3,990	371	3,154
	9.35	0.34	3,770	4,070	4,370	407	3,460
3 1/2	9.2	0.254	3,960	4,390	4,830	439	3,732
	10.2	0.289	4,480	4,960	5,460	496	4,216
	12.7	0.375	5,750	6,380	7,020	638	5,423
	14.3	0.43	6,560	7,280	8,010	728	6,188
	14.8	0.449	6,840	7,590	8,350	759	6,452
4 1/2	12.6	0.271	7,110	7,900	8,690	790	6,715
	13.5	0.29	7,280	8,090	8,900	809	6,877
	15.2	0.337	7,550	8,390	9,230	839	7,132
	17	0.38	7,840	8,710	9,580	871	7,404
	17.7	0.402	7,990	8,870	9,750	887	7,539
	18.9	0.43	8,180	9,080	9,990	908	7,718
	21.5	0.5	13,110	14,250	15,390	1425	12,113
	23.7	0.56	15,500	16,850	18,200	1,685	14,323
5	15	0.296	7,620	8,500	9,380	850	7,225
	18	0.362	9,490	10,500	11,510	1,050	8,925
	21.4	0.437	10,940	12,100	13,260	1,210	10,285
	23.2	0.478	11,680	13,000	14,320	1,300	11,050
	24.1	0.5	12,040	13,400	14,760	1,340	11,390
5 1/2	15.5	0.275	8,780	9,750	10,730	975	8,287
	17	0.304	9,940	11,040	12,140	1,104	9,384
	20	0.361	12,090	13,430	14,770	1,343	11,415
	23	0.415	14,230	15,810	17,390	1,581	13,438
	26	0.476	15,340	17,040	18,740	1,704	14,484
	26.8	0.5	15,340	17,040	18,740	1,704	14,484
	28.4	0.53	17,320	19,240	21,160	1,924	16,354
	29.7	0.562	18,540	20,600	22,660	2,060	17,510
6	22.8	0.375	13,510	15,010	16,510	1,501	12,759
	32	0.519	16,280	18,080	19,880	1,808	14,464
6.068	32.6	0.553	14,040	15,600	17,160	1,560	13,260
6 5/8	20	0.288	11,430	12,700	13,970	1,270	10,795
	24	0.352	13,730	15,260	16,790	1,526	12,971
	28	0.417	15,490	17,210	18,930	1,721	14,628
	32	0.475	17,930	19,920	21,910	1,992	16,932
	40.2	0.625	27,090	30,100	33,110	3,010	25,585
7	23	0.317	12,420	13,800	15,180	1,380	11,730
	26	0.362	13,950	15,500	17,050	1,550	13,175
	29	0.408	15,660	17,400	19,140	1,740	14,790
	32	0.453	15,840	17,600	19,360	1,760	14,960
	35	0.498	18,050	20,050	22,060	2,005	17,042
	38	0.54	20,250	22,500	24,750	2,250	19,125
	42.7	0.625	23,400	26,000	28,600	2,600	22,100
7 5/8	26.4	0.328	10,890	12,100	13,310	1,210	9,075
	29.7	0.375	12,420	13,800	15,180	1,380	10,350
	33.7	0.43	15,210	16,900	18,590	1,690	12,675
	35.8	0.46	17,280	19,200	21,120	1,920	14,400
	39	0.5	20,610	22,900	25,190	2,290	17,175
	42.8	0.562	23,130	25,700	28,270	2,570	19,275
8 5/8	36	0.4	17,730	19,700	21,670	1,970	14,775
	40	0.45	20,700	23,000	25,300	2,300	17,250
	44	0.5	23,670	26,300	28,930	2,630	19,725
	49	0.557	27,540	30,600	33,660	3,060	22,950
	52	0.595	28,890	32,100	35,310	3,210	24,075
	54	0.625	30,780	34,200	37,620	3,420	25,650
	57.4	0.656	32,220	35,800	39,380	3,580	26,850
9 5/8	43.5	0.435	24,570	27,300	30,030	2,730	20,475
	47	0.472	25,920	28,800	31,680	2,880	21,600
	53.5	0.545	28,800	32,000	35,200	3,200	24,000
	58.4	0.595	31,500	35,000	38,500	3,500	26,250
	59.4	0.609	31,590	35,100	38,610	3,510	26,325
9 7/8	62.8	0.625	34,830	38,700	42,570	3,870	29,025
	65.3	0.65	36,630	40,700	44,770	4,070	30,525
	66.4	0.661	38,790	43,100	47,410	4,310	32,325
	66.9	0.668	39,240	43,600	47,960	4,360	32,700
	67.5	0.678	40,950	45,500	50,000	4,550	34,125
	68	0.694	40,950	45,500	50,000	4,550	34,125
	68.9	0.7	40,950	45,500	50,000	4,550	34,125

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	125 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
2 7/8	6.4	0.217	2,350	2,620	2,880	262	2,227
	7.8	0.276	3,270	3,630	3,990	363	3,086
	8.6	0.308	3,650	4,060	4,470	406	3,451
	9.35	0.34	3,970	4,410	4,850	441	3,749
3 1/2	9.2	0.254	4,320	4,800	5,280	480	4,080
	10.2	0.289	4,880	5,420	5,960	542	4,607
	12.7	0.375	6,260	6,950	7,650	695	5,908
	14.3	0.43	7,140	7,930	8,720	793	6,741
	14.8	0.449	7,440	8,270	9,090	827	7,030
4 1/2	12.6	0.271	7,860	8,730	9,600	873	7,421
	13.5	0.29	8,030	8,920	9,810	892	7,582
	15.2	0.337	8,300	9,220	10,140	922	7,837
	17	0.38	8,590	9,550	10,500	955	8,118
	17.7	0.402	8,730	9,710	10,670	971	8,253
	18.9	0.43	8,930	9,920	10,910	992	8,432
	21.5	0.5	14,170	15,400	16,630	1540	13,090
	23.7	0.56	16,190	17,600	19,010	1,760	14,960
5	15	0.296	8,600	9,500	10,400	950	8,075
	18	0.362	10,350	11,500	12,650	1,150	9,775
	21.4	0.437	11,740	13,100	14,460	1,310	11,135
	23.2	0.478	12,790	14,200	15,610	1,420	12,070
	24.1	0.5	13,190	14,600	16,010	1,460	12,410
5 1/2	15.5	0.275	9,270	10,300	11,330	1030	8,755
	17	0.304	10,440	11,600	12,760	1,160	9,860
	20	0.361	12,800	14,220	15,640	1,422	12,087
	23	0.415	14,790	16,430	18,070	1,643	13,965
	26	0.476	15,840	17,600	19,360	1,760	14,960
	26.8	0.5	15,840	17,600	19,360	1,760	14,960
	28.4	0.53	17,550	19,500	21,450	1,950	16,575
	29.7	0.562	21,330	23,700	26,070	2,370	20,145
6	22.8	0.375	14,580	16,200	17,820	1,620	13,770
	32	0.519	20,700	23,000	25,300	2,300	18,975
6.068	32.6	0.553	14,850	16,500	18,150	1,650	14,025
6 5/8	20	0.288	12,240	13,600	14,960	1,360	11,560
	24	0.352	14,950	16,610	18,270	1,661	14,118
	28	0.417	16,910	18,790	20,670	1,879	15,971
	32	0.475	19,040	21,150	23,270	2,115	17,977
	40.2	0.625	29,070	32,300	35,530	3,230	27,455
7	23	0.317	13,950	15,500	17,050	1,550	13,175
	26	0.362	15,300	17,000	18,700	1,700	14,450
	29	0.408	17,280	19,200	21,120	1,920	16,320
	32	0.453	17,460	19,400	21,340	1,940	16,490
	35	0.498	19,350	21,500	23,650	2,150	18,275
	38	0.54	20,610	22,900	25,190	2,290	19,465
	42.7	0.625	24,930	27,700	30,470	2,770	23,545
7 5/8	26.4	0.328	11,520	12,800	14,080	1,280	9,600
	29.7	0.375	13,140	14,600	16,060	1,460	10,950
	33.7	0.43	16,110	17,900	19,690	1,790	13,425
	35.8	0.46	18,360	20,400	22,440	2,040	15,300
	39	0.5	21,960	24,400	26,840	2,440	18,300
	42.8	0.562	24,570	27,300	30,030	2,730	20,475
8 5/8	36	0.4	19,080	21,200	23,320	2,120	15,900
	40	0.45	22,500	25,000	27,500	2,500	18,750
	44	0.5	25,290	28,100	30,910	2,810	21,075
	49	0.557	29,610	32,900	36,190	3,290	24,675
	52	0.595	30,960	34,400	37,840	3,440	25,800
	54	0.625	32,940	36,600	40,260	3,660	27,450
	57.4	0.656	34,470	38,300	42,130	3,830	28,725
9 5/8	43.5	0.435	25,110	27,900	30,690	2,790	20,925
	47	0.472	29,340	32,600	35,860	3,260	24,450
	53.5	0.545	31,680	35,200	38,720	3,520	26,400
	58.4	0.595	34,650	38,500	42,350	3,850	28,875
	59.4	0.609	34,920	38,800	42,680	3,880	29,100
9 7/8	62.8	0.625	37,440	41,600	45,760	4,160	31,200
	65.3	0.65	39,330	43,700	48,070	4,370	32,775
	66.4	0.661	40,950	45,500	50,000	4,550	34,125
	66.9	0.668	40,950	45,500	50,000	4,550	34,125
	67.5	0.678	40,950	45,500	50,000	4,550	34,125
	68	0.694	40,950	45,500	50,000	4,550	34,125
	68.9	0.7	40,950	45,500	50,000	4,550	34,125

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	55 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
5 ½	17	0.304	8,930	9,400	9,870	940	8,695
9 ⅝	40	0.395	16,200	18,000	19,800	1,800	15,300

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80, 85 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
10 ¾	45.5	0.400	18,900	21,000	23,100	2,100	15,750
	51	0.450	22,050	24,500	26,950	2,450	18,375
	55.5	0.495	23,760	26,400	29,040	2,640	19,800
	60.7	0.545	26,550	29,500	32,450	2,950	22,125
	65.7	0.595	30,780	34,200	37,620	3,420	25,650
	73.2	0.672	36,990	41,100	45,210	4,110	30,825
10 ⅞	72	0.656	36,540	40,600	44,660	4060	30,450
11 ¾	60	0.489	24,660	27,400	30,140	2,740	20,550
	65	0.534	29,430	32,700	35,970	3,270	24,525
	71	0.582	34,470	38,300	42,130	3,830	28,725
11 ⅞	62	0.500	25,920	28,800	31,680	2,880	21,600
	71.8	0.582	34,560	38,400	42,240	3,840	28,800
13 ⅜	68	0.480	28,170	31,300	34,430	3,130	23,475
	72	0.514	32,580	36,200	39,820	3,620	27,150
	77	0.550	38,430	42,700	46,970	4,270	32,025
	80.7	0.580	39,150	43,500	47,850	4,350	32,625
	85	0.608	40,950	45,500	50,000	4,550	34,125
	86	0.625	40,950	45,500	50,000	4,550	34,125
	92	0.672	48,150	53,500	58,850	5350	45,475
13 ⅝	88.2	0.625	40,950	45,500	50,000	4,550	34,125
14	93	0.650	45,000	50,000	55,000	5,000	37,500
	100	0.700	49,500	55,000	60,500	5500	46,750
	114	0.800	53,940	58,000	62,060	5800	50,750
	115	0.812	54,410	58,500	62,600	5850	51,188

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90, 95 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
10 ¾	45.5	0.400	20,700	23,000	25,300	2,300	17,250
	51	0.450	23,670	26,300	28,930	2,630	19,725
	55.5	0.495	25,560	28,400	31,240	2,840	21,300
	60.7	0.545	28,980	32,200	35,420	3,220	24,150
	65.7	0.595	33,750	37,500	41,250	3,750	28,125
	73.2	0.672	40,950	45,500	50,000	4,550	34,125
10 ⅞	72	0.656	40,500	45,000	49,500	4500	33,750
11 ¾	60	0.489	26,910	29,900	32,890	2,990	22,425
	65	0.534	32,220	35,800	39,380	3,580	26,850
	71	0.582	38,250	42,500	46,750	4,250	31,875
11 ⅞	62	0.500	28,710	31,900	35,090	3,190	23,925
	71.8	0.582	38,520	42,800	47,080	4,280	32,100
13 ⅜	68	0.480	30,600	34,000	37,400	3,400	25,500
	72	0.514	35,730	39,700	43,670	3,970	29,775
	77	0.550	40,950	45,500	50,000	4,550	34,125
	80.7	0.580	40,950	45,500	50,000	4,550	34,125
	85	0.608	40,950	45,500	50,000	4,550	34,125
	86	0.625	40,950	45,500	50,000	4,550	34,125
	92	0.672	48,150	53,500	58,850	5350	45,475
13 ⅝	88.2	0.625	40,950	45,500	50,000	4,550	34,125
14	93	0.650	45,000	50,000	55,000	5,000	37,500
	100	0.700	49,500	55,000	60,500	5500	46,750
	114	0.800	53,940	58,000	62,060	5800	50,750
	115	0.812	54,410	58,500	62,600	5850	51,188

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	105, 110 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
10 ¾	45.5	0.400	22,500	25,000	27,500	2,500	18,750
	51	0.450	25,020	27,800	30,580	2,780	20,850
	55.5	0.495	27,540	30,600	33,660	3,060	22,950
	60.7	0.545	32,310	35,900	39,490	3,590	26,925
	65.7	0.595	37,800	42,000	46,200	4,200	31,500
	73.2	0.672	40,950	45,500	50,000	4,550	34,125
10 ⅞	72	0.656	40,950	45,500	50,000	4550	34,125
11 ¾	60	0.489	29,160	32,400	35,640	3,240	24,300
	65	0.534	35,100	39,000	42,900	3,900	29,250
	71	0.582	40,050	44,500	48,950	4,450	33,375
11 ⅞	62	0.500	31,500	35,000	38,500	3,500	26,250
	71.8	0.582	40,770	45,300	49,830	4,530	33,975
13 ⅜	68	0.480	34,380	38,200	42,020	3,820	28,650
	72	0.514	40,140	44,600	49,060	4,460	33,450
	77	0.550	40,950	45,500	50,000	4,550	34,125
	80.7	0.580	40,950	45,500	50,000	4,550	34,125
	85	0.608	40,950	45,500	50,000	4,550	34,125
	86	0.625	40,950	45,500	50,000	4,550	34,125
	92	0.672	48,150	53,500	58,850	5350	45,475
13 ⅝	88.2	0.625	40,950	45,500	50,000	4,550	34,125
14	93	0.650	45,000	50,000	55,000	5,000	37,500
	100	0.700	49,500	55,000	60,500	5500	46,750
	114	0.800	53,940	58,000	62,060	5800	50,750
	115	0.812	54,410	58,500	62,600	5850	51,188

Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	125 ksi Grade Torque (ft-lb)				
			Final Torque			Shoulder Torque	
			Minimum	Optimum	Maximum	Minimum	Maximum
10 ¾	45.5	0.400	24,300	27,000	29,700	2,700	20,250
	51	0.450	26,730	29,700	32,670	2,970	22,275
	55.5	0.495	29,340	32,600	35,860	3,260	24,450
	60.7	0.545	35,730	39,700	43,670	3,970	29,775
	65.7	0.595	40,950	45,500	50,000	4,550	34,125
	73.2	0.672	40,950	45,500	50,000	4,550	34,125
10 ⅞	72	0.656	40,950	45,500	50,000	4550	34,125
11 ¾	60	0.489	32,130	35,700	39,270	3,570	26,775
	65	0.534	38,880	43,200	47,520	4,320	32,400
	71	0.582	40,950	45,500	50,000	4,550	34,125
11 ⅞	62	0.500	34,290	38,100	41,910	3,810	28,575
	71.8	0.582	40,950	45,500	50,000	4,550	34,125
13 ⅜	68	0.480	38,160	42,400	46,640	4,240	31,800
	72	0.514	40,950	45,500	50,000	4,550	34,125
	77	0.550	40,950	45,500	50,000	4,550	34,125
	80.7	0.580	40,950	45,500	50,000	4,550	34,125
	85	0.608	40,950	45,500	50,000	4,550	34,125
	86	0.625	40,950	45,500	50,000	4,550	34,125
	92	0.672	48,150	53,500	58,850	5350	45,475
13 ⅝	88.2	0.625	40,950	45,500	50,000	4,550	34,125
14	93	0.650	45,000	50,000	55,000	5,000	37,500
	100	0.700	49,500	55,000	60,500	5500	46,750
	114	0.800	53,940	58,000	62,060	5800	50,750
	115	0.812	54,410	58,500	62,600	5850	51,188

JFELION - OTHER CONNECTIONS

Connection	Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	80, 85 ksi Grade Torque (ft-lb)				
				Final Torque			Shoulder Torque	
				Min	Opt	Max	Min	Max
JFELION CBR	9⅝	53.5	0.545	-	-	-	-	-
JFELION DR ASM	10¾	85.3	0.797	42,390	47,100	51,810	4,710	35,325
JFELION DR SS	10⅛	79.3	0.795	44,100	49,000	53,900	4,900	36,740

Connection	Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	90, 95 ksi Grade Torque (ft-lb)				
				Final Torque			Shoulder Torque	
				Min	Opt	Max	Min	Max
JFELION CBR	9⅝	53.5	0.545	-	-	-	-	-
JFELION DR ASM	10¾	85.3	0.797	47,070	52,300	57,530	5,230	39,225
JFELION DR SS	10⅛	79.3	0.795	45,000	50,000	55,000	5,000	37,500

Connection	Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	100, 105 ksi Grade Torque (ft-lb)				
				Final Torque			Shoulder Torque	
				Min	Opt	Max	Min	Max
JFELION CBR	9⅝	53.5	0.545	26,300	29,220	32,140	2,922	21,915
JFELION DR ASM	10¾	85.3	0.797	51,210	56,900	62,590	5,690	42,675
JFELION DR SS	10⅛	79.3	0.795	45,000	50,000	55,000	5,000	37,500

Connection	Size (inch)	Weight (lb/ft)	Pipe Body Wall (inch)	125 ksi Grade Torque (ft-lb)				
				Final Torque			Shoulder Torque	
				Min	Opt	Max	Min	Max
JFELION CBR	9⅝	53.5	0.545	-	-	-	-	-
JFELION DR ASM	10¾	85.3	0.797	57,280	63,640	70,000	6,360	47,730
JFELION DR SS	10⅛	79.3	0.795	45,000	50,000	55,000	5,000	37,500

13.8 End Finishing Requirements

OD (inch)	Classification	Weight (lb/ft)		End Finish				
		Lower	Upper	High Chrome Steel Pin	9 to 13% Chrome Box	15% Chrome and above Box	Carbon Steel Pin	Carbon Steel Box
2 7/8	SD26	6.40	6.40	Bead Blast Mill & Field End	Copper-Plate Or Clear-Plate	Copper-Plate Or Clear-Plate	Bead Blast Mill & Field End	Manganese Phosphate Or Copper-Plate Or Clear-Plate
	SD30	7.80	9.35					
3 1/2	SD29	9.20	10.20					
	SD35	12.70	14.80					
4	SD35	11.60	16.10					
4 1/2	SD29	11.60	12.60					
	SD32	13.50	15.20					
	SD35	17.00	18.90					
	SD51	21.50	23.70					
5	SD30	15.00	15.00					
	SD36	18.00	21.40					
	SD38	23.20	24.10					
5 1/2	SD41	15.50	17.00					
	SD46	20.00	23.00					
	SD49	26.00	26.80					
	SD51	28.40	29.70		Clear-Plate™			
6	SD45	22.80	22.80		Copper-Plate Or Clear-Plate			
	SD50	32.00	32.00					
6.068	SD61	32.60	32.60		Clear-Plate™ (If Clear-Plate is not available, please contact JFETC)	Clear-Plate™ (If Clear-Plate is not available, please contact JFETC)		
6 5/8	SD41	20.00	20.00					
	SD49	24.00	32.00					
	SD54	40.20	40.20					
7	SD49	23.00	29.00				As-machined Or Bead Blast Or Zinc Phosphate	
	SD52	32.00	35.00					
	SD54	38.00	42.70					
7 5/8	SD47	26.40	29.70					
	SD52	33.70	39.00					
	SD57	42.80	42.80					
8 5/8	SD50	36.00	44.00					
	SD57	49.00	52.00					
	SD62	54.00	57.40					
9 5/8	SD51	40.00	43.50					
	SD57	47.00	59.40					
9 7/8	SD68	62.80	68.90					
10 3/4	SD56	45.50	51.00				Bead Blast Mill & Field End	
	SD65	55.50	73.20					
10 7/8	SD65	72.00	72.00					
11 3/4	SD62	60.00	71.00					
11 7/8	SD62	62.00	71.80					
13 3/8	SD63	68.00	77.00					
	SD65	80.70	86.00					
	SD68	92.00	92.00					
13 5/8	SD65	88.20	88.20					
14	SD66	93.00	93.00					
	SD68	100.00	115.0					
9 5/8	CBR	53.50	53.5				As-machined Or Bead Blast Or Zinc Phosphate	
10 1/8	DR SS	-	-				Bead Blast Mill & Field End	
10 3/4	DR ASM	-	-				As-machined Or Bead Blast Or Zinc Phosphate	
6 5/8	DRPB	-	-				Bead Blast Mill & Field End	
7 5/8	DRPB						As-machined Or Bead Blast Or Zinc Phosphate	

13.8.1 Clear Run End Finishing Requirements

OD (inch)	High Chrome[1] Steel Pin End Finish	High Chrome[1] Steel Box End Finish	Carbon Steel Pin End Finish	Carbon Steel Box End Finish
2 7/8" to 3 1/2"	Bead blast mill and field end	Clear-Plate	Bead blast mill and field end	Manganese phosphate
4 1/2" (up to 18.9#) to 5"	None			
4 1/2" (21.5 & 23.7#) to 5 1/2"	None		None	Clear-Plate
7" (29 & 32#)	Not applicable	Not applicable	Bead blast mill and field end	

Note[1] - Definition of high chrome steel: Containing ≥ 9%Cr

13.9 Molybdenum Disulphide Application

This table should be referenced when copper-plate has been applied to the JFELION box connection to confirm if Molybdenum Disulphide (MoS2) shall be applied to the pin & box seal and shoulder area prior to dope application.

OD (inch)	SD No.	Weight (lb/ft)		Apply MoS2	
		Lower	Upper	9-13%Cr	≥15%Cr
5	SD30	15	15	Not Applicable	Apply to pin and box seal and shoulder area
	SD36	18	21.4		
	SD38	23.2	24.1		
5 1/2	SD41	15.5	17		
	SD46	20	23		
	SD49	26	26.8		
	SD51	28.4	29.7		
6	SD45	22.8	22.8		
	SD50	32	32		
6.068	SD61	32.6	32.6		
6 5/8	SD41	20	20		
	SD49	24	32		
	SD54	40.2	40.2		
7	SD49	23	29	Apply to pin and box seal and shoulder area	
	SD52	32	35		
	SD54	38	42.7		
7 5/8	SD47	26.4	29.7		
	SD52	33.7	39		
	SD57	42.8	42.8		
8 5/8	SD50	36	44		
	SD57	49	52		
	SD62	54	57.4		
9 5/8	SD51	40	43.5		
	SD57	47	59.4		
9 7/8	SD68	62.8	68.9		
10 3/4	SD56	51	51		
	SD65	55.5	73.2		
10 7/8	SD65	72	72		
11 3/4	SD62	60	71		
11 7/8	SD62	62	71.8		
13 3/8	SD63	68	77		
	SD65	80.7	86		
	SD68	92	92		
13 5/8	SD65	88.2	88.2		
14	SD66	93	93		
	SD68	100	115		
9 5/8	CBR	53.5	53.5		

13.10 Hydrostatic Test Fixtures

The JFELION hydrostatic test plug and cap design prevents metal to metal seal contact with accessory components due to the inclusion of an O-ring. The test cap and plug are also low torque designs. This section provides details for O-ring dimensions, assembly and inspection of the fixture.

The following points shall be noted when manufacturing JFELION Test Caps and Plugs:

- The following information shall be low stress stamped on all test fixtures. Size, Weight, SD number or special design designation and Maximum Working Pressure, the maximum pressure shall not exceed 10,000psi.

  Example: 7” 29# JFELION SD49 P110 MWP: 10,000psi

  Note: If the test cap or plug requires increased working pressure above 10,000psi, contact your local JFE-TC office.

- Test caps and plugs shall be manufactured from low alloy steel with a minimum yield strength of 110ksi and maximum yield strength of 140ksi.
- Higher rated Autoclave connections can be used instead of ½” NPT. But the maximum working pressure will remain limited to 10,000psi unless otherwise specified by the controlling center.

13.10.1 O-Ring Details

The following grade and dimensions of O-Ring material shall be used.

Designation	O-ring Size		O-ring Material
	Nominal	Actual	
Tubing	0.0625”	0.070" +/-0.003" (1.78mm)	NBR or Viton (90 Durometer)
Casing	0.125”	0.139" +/-0.004" (3.53mm)	

Note:

- Reference Parker O-Ring handbook guide for design, table 4-2.
- It is recommended that the O-Rings are moulded or spliced and vulcanized.
- It is recommended to discard the O-ring after single use.

13.10.2 O-ring Groove Diameters

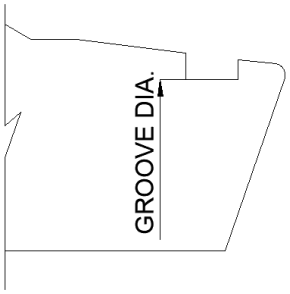


Figure 13.10.2.1 – Test plug groove detail

13.10.3 Tubing test plug groove diameter

Size	Classification	Weight (lb/ft)		Groove Diameter
		Min	Max	
2 ⅞"	SD26	6.4#	6.4#	2.6087
	SD30	7.8#	9.35#	2.5796
3 ½"	SD29	9.2#	10.2#	3.2111
	SD35	12.7#	14.8#	3.1766
4"	SD35	11.6#	16.1#	3.6736
4 ½"	SD29	11.6#	12.6#	4.2071
	SD32	13.5#	15.2#	4.1896
	SD35	17.0#	18.9#	4.1671
5”	SD30	15.0#	15.0#	4.6980
	SD36	18.0#	21.4#	4.6621
	SD38	23.2#	24.1#	4.6466

13.10.4 Casing test plug groove diameter

Size	Classification	Weight (lb/ft)		Groove Diameter
		Min	Max	
4 ½”	SD51	21.5	23.7	3.9795
5 ½"	SD41	15.5#	17.0#	5.0327
	SD46	20.0#	23.0#	5.0037
	SD49	26.0#	26.8#	4.9839
	SD51	28.4#	29.7#	4.9711
6”	SD45	22.8#	22.8#	5.5109
	SD50	32.0#	32.0#	5.4808
6.068”	SD61	32.6#	32.6#	5.4793
6 ⅝”	SD41	20.0#	20.0#	6.1625
	SD49	24.0#	32.0#	6.1049
	SD54	40.2#	40.2#	6.0807
7"	SD49	23.0#	29.0#	6.4859
	SD52	32.0#	35.0#	6.4627
	SD54	38.0#	42.7#	6.4474
7 ⅝"	SD47	26.4#	29.7#	7.1155
	SD52	33.7#	39.0#	7.0832
	SD57	42.8#	42.8#	7.0510
8 ⅝"	SD50	36.0#	44.0#	8.0971
	SD57	49.0#	52.0#	8.0546
	SD62	54.0#	57.4#	8.0255
9 ⅝"	SD51	40.0#	43.5#	9.0862
	SD57	47.0#	59.4#	9.0505
9 ⅞"	SD68	62.8#	68.9#	9.2362
10 ¾"	SD56	51.0#	51.0#	10.1849
	SD65	55.5#	73.2#	10.1308
10 ⅞”	SD65	72.0#	72.0#	10.2558

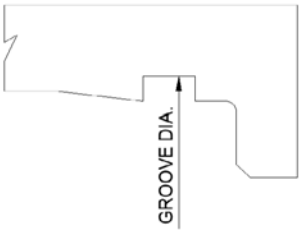


Figure 13.10.4.1 – Test cap groove detail

13.10.5 Tubing test cap groove diameter

Size	Classification	Weight (lb/ft)		Groove Diameter
		Min	Max	
2 7/8"	SD26	6.4#	6.4#	2.8346
	SD30	7.8#	9.35#	2.8056
3 1/2"	SD29	9.2#	10.2#	3.4371
	SD35	12.7#	14.8#	3.4016
4"	SD35	11.6#	16.1#	3.9016
4 1/2"	SD29	11.6#	12.6#	4.4371
	SD32	13.5#	15.2#	4.4196
	SD35	17.0#	18.9#	4.3971
5"	SD30	15.0#	15.0#	4.9300
	SD36	18.0#	21.4#	4.8941
	SD38	23.2#	24.1#	4.8786

13.10.6 Casing test cap groove diameter

Size	Classification	Weight (lb/ft)		Groove Diameter
		Min	Max	
4 1/2"	SD51	21.5	23.7	4.4409
5 1/2"	SD41	15.5#	17.0#	5.5021
	SD46	20.0#	23.0#	5.4731
	SD49	26.0#	26.8#	5.4538
	SD51	28.4#	29.7#	5.4376
6"	SD45	22.8#	22.8#	5.9783
	SD50	32.0#	32.0#	5.9467
6.068"	SD61	32.6#	32.6#	5.9467
6 5/8"	SD41	20.0#	20.0#	6.6329
	SD49	24.0#	32.0#	6.5813
	SD54	40.2#	40.2#	6.5491
7"	SD49	23.0#	29.0#	6.9583
	SD52	32.0#	35.0#	6.9351
	SD54	38.0#	42.7#	6.9198
7 5/8"	SD47	26.4#	29.7#	7.5904
	SD52	33.7#	39.0#	7.5581
	SD57	42.8#	42.8#	7.5259
8 5/8"	SD50	36.0#	44.0#	8.5710
	SD57	49.0#	52.0#	8.5285
	SD62	54.0#	57.4#	8.4994
9 5/8"	SD51	40.0#	43.5#	9.5646
	SD57	47.0#	59.4#	9.5259
9 7/8"	SD68	62.8#	68.9#	9.7136
10 3/4"	SD56	51.0#	51.0#	10.6638
	SD65	55.5#	73.2#	10.6057
10 7/8"	SD65	72.0#	72.0#	10.7307

13.10.7 Installation of O-ring

Prior to installation of the O-ring, use a non-metallic brush with a liquid solvent to remove any storage compound. The connection and body of the fixtures should be visually inspected for signs of any impact damage, corrosion etc.

1 Place the respective O-rings into the cap and plug grooves using suitable O-ring grease such as Parker O-Lube, see figures below.

Figure 13.10.7.1 – O-ring fitted (Plug)

Figure 13.10.7.2 – O-ring fitted (Cap)

2 API Modified or suitable thread compound shall be applied to all other areas except for the O-ring area, however it should be applied to the corresponding surface where the O-ring will contact once assembled, see figures below.

Figure 13.10.7.3 – Thread Compound (Plug)

Figure 13.10.7.4 – O-ring fitted (Cap)

13.10.8 Storage and Maintenance

After use, the fixtures should be thoroughly cleaned, dried and a suitable storage compound such as Kendex applied prior to installation of thread protectors. It is recommended that the fixtures be stored indoors and are not subjected to outdoor weather conditions.

It is recommended to perform NDE on the entire body of the fixture annually to check for any surface breaking and or sub-surface defects such as cracks.

13.10.9 Disclaimer

The users of these test caps and plugs are liable for the maintenance, use and safe operation. In no event shall JFE be liable for any damages, costs and expenses incurred in connection with the use of these test fixtures.

13.11 Special clearance OD dimensions

JFELION Special Clearance Coupling OD's					
Size (inch)	Weight (lb/ft)	Wall Thickness (inch)	SC80 (inch)	SC90 (inch)	Tolerance (inch)
2 7/8	6.40	0.217	3.203	3.242	
	7.80	0.276	3.255	3.303	
	8.60	0.308	3.295	3.347	
	9.35	0.340	3.333	3.389	
3 1/2	9.20	0.254	3.867	3.913	
	10.20	0.289	3.914	3.966	
	12.70	0.375	3.993	4.057	
	14.30	0.430	4.058	4.129	
	14.80	0.449	4.080	4.153	
4 1/2	12.60	0.271	4.900	4.952	
	13.50	0.290	4.912	4.967	
	15.20	0.337	4.977	5.039	
	17.00	0.380	5.016	5.084	
	17.70	0.402	5.044	5.116	
	18.90	0.430	5.080	5.155	
	21.50	0.500	5.151	5.236	
	23.70	0.560	5.221	5.313	
5	15.00	0.296	5.434	5.490	
	18.00	0.362	5.496	5.563	
	21.40	0.437	5.596	5.674	
	23.20	0.478	5.636	5.719	
	24.10	0.500	5.663	5.749	
5 1/2	15.50	0.275	5.916	5.970	+ 0.020 / - 0
	17.00	0.304	5.959	6.017	
	20.00	0.361	6.015	6.082	
	23.00	0.415	6.089	6.165	
	26.00	0.476	6.154	6.239	
	26.80	0.500	6.185	6.273	
	28.40	0.530	6.210	6.302	
	29.70	0.562	6.250	6.346	
6	22.80	0.375	6.544	6.614	
	32.00	0.519	6.712	6.805	
6.068	32.60	0.553	6.770	6.868	
6 5/8	20.00	0.288	7.072	7.128	
	24.00	0.352	7.122	7.190	
	28.00	0.417	7.215	7.294	
	32.00	0.475	7.296	7.383	
	40.20	0.625	7.467	7.576	
7	23.00	0.317	7.465	7.527	
	26.00	0.362	7.532	7.601	
	29.00	0.408	7.598	7.676	
	32.00	0.453	7.642	7.727	
	35.00	0.498	7.705	7.797	
	38.00	0.540	7.749	7.847	
	42.70	0.625	7.861	7.971	

JFELION Special Clearance Coupling OD's					
Size (inch)	Weight (lb/ft)	Wall Thickness (inch)	SC80 (inch)	SC90 (inch)	Tolerance (inch)
7 5/8	26.40	0.328	8.115	8.180	
	29.70	0.375	8.186	8.258	
	33.70	0.430	8.238	8.320	
	35.80	0.465	8.288	8.376	
	39.00	0.500	8.338	8.431	
	42.80	0.562	8.396	8.499	
8 5/8	36.00	0.400	9.212	9.290	
	40.00	0.450	9.286	9.372	
	44.00	0.500	9.358	9.453	
	49.00	0.557	9.403	9.507	
	52.00	0.595	9.456	9.566	
	54.00	0.625	9.472	9.588	
	57.40	0.656	9.515	9.635	
9 5/8	40.00	0.395	10.203	10.281	
	43.50	0.435	10.263	10.349	
	47.00	0.472	10.285	10.377	
	53.50	0.545	10.392	10.496	
	58.40	0.595	10.464	10.576	
	59.40	0.609	10.483	10.598	
9 7/8	62.80	0.625	10.735	10.852	
	65.30	0.650	10.770	10.892	
	66.40	0.661	10.785	10.909	
	66.90	0.668	10.795	10.920	
	67.50	0.678	10.809	10.935	
	68.00	0.694	10.831	10.960	+ 0.020 / - 0
	68.90	0.700	10.839	10.969	
10 3/4	51.00	0.450	11.424	11.513	
	55.50	0.495	11.441	11.538	
	60.70	0.545	11.516	11.621	
	65.70	0.595	11.589	11.703	
	73.20	0.672	11.699	11.826	
10 7/8	72.00	0.656	11.803	11.927	
11 3/4	60.00	0.489	12.455	12.522	
	65.00	0.534	12.523	12.628	
	71.00	0.582	12.595	12.708	
11 7/8	62.00	0.500	12.597	12.696	
	71.80	0.582	12.720	12.833	
13 3/8	68.00	0.480	14.067	14.163	
	72.00	0.514	14.120	14.222	
	77.00	0.550	14.175	14.284	
	80.70	0.580	14.206	14.321	
	85.00	0.608	14.248	14.368	
	86.00	0.625	14.274	14.396	
	92.00	0.672	14.330	14.460	
13 5/8	88.20	0.625	14.525	14.648	
14	93.00	0.650	14.937	15.065	
	100.00	0.700	14.998	15.134	
	114.00	0.800	15.144	15.296	
	115.00	0.812	15.161	15.315	

14 Valuable Information

14.1 Pipe Calculations

14.1.1 Plain end weight

$$W_{pe} = K_m \times K_{wpe} \times (D - t)t$$

Where:

D = specified pipe outside diameter in millimetres or inches

K_m = mass correction factor, 1.000 for carbon steel; 0.989 for martensitic chromium steel

K_{wpe} = mass per unit length conversion factor, 0.0246615 for SI units; 10.69 for USC units

t = specified pipe wall thickness

W_{pe} = calculated plan end mass per unit length, in kilograms per metre or pounds per foot

14.1.2 Maximum internal yield pressure (MIYP) 'burst pressure'

$$MIYP = \frac{2 \times SMYS \times t}{D} \times f$$

Where:

MIYP = Maximum internal yield pressure (psi)

SMYS = Specified minimum yield stress (psi)

t = specified pipe wall thickness (inch)

D = specified pipe outside diameter (inch)

f = factor for minimum allowed wall thickness (usually 0.875 = 87.5%)

14.1.3 Pipe body yield strength (PBYS)

$$PBYS = SMYS \times Area_{pipe}$$

Where:

SMYS = Specified minimum yield stress (psi)

Areapipe = cross section area of pipe body (inch), calculated as $\pi/4\ (OD^2 - ID^2)$

OD = specified pipe outside diameter (inch)

ID = specified pipe inside diameter (inch)

14.1.4 Coupling bearing face load for JFE connections

$$Load\ bearing\ face = 0.9 \times SMYS \times (\pi/4\ (CBD^2 - CED^2))$$

Where:

SMYS = Specified minimum yield stress (psi)

CBD = Coupling diameter at base of bevel (20deg) or chamfer (45deg) (inch)

ID = Coupling entry diameter (inch)

14.2 Field Calculations

14.2.1 Buoyed weight

$$W_{bouyed} = W_{air} \times \left(1 - \frac{\rho mud}{65.5}\right)$$

Where:

W_{air} = string weight in air, calculated as length × linear mass (inch)

ρmud = density of mud (ppg)

14.2.2 Downhole hydrostatic pressure

$$P = 0.052 \times TVD \times W_{mud}$$

Where:

P = downhole hydrostatic pressure, external or internal (psi)

TVD = downhole vertical depth of interest (ft)

W_{mud} = density of mud (ppg)

14.2.3 Change in axial stress due to bending

$$\Delta\sigma_{bending} = 218.166 \times \alpha \times OD$$

Where:

$\Delta\sigma_{bending}$ = change in axial stress (psi), (+) on outside and (–) on inside

α = bending dogleg in degrees per 100ft

OD = outside diameter of pipe body (inch)

14.2.4 Additional load due to bending

$$\Delta\sigma_{bending} = \sigma_{bending} \times Area_{pipe}$$

Where:

$\Delta F_{bending}$ = Actual load applied due to bending (lbs)

$\sigma_{bending}$ = bending stress

$Area_{pipe}$ = cross section area of pipe body (inch), calculated as $\pi/4\ (OD^2 - ID^2)$

OD = specified pipe outside diameter (inch)

ID = specified pipe inside diameter (inch)

14.2.5 Change in axial load due to internal pressure ('ballooning')

$$\Delta F_{axial} = P_{internal} \times \pi/4 \times d2$$

Where:

ΔF_{axial} = Change in axial load applied due to internal pressure (lbs)

$P_{internal}$ = Internal pressure applied (psi)

d = specified pipe inside diameter (inch)

14.2.6 Pipe stretch

$$\Delta L = \frac{P_{load} \times L_{free}}{E \times Area_{pipe}}$$

Where:

ΔL = Change in string length (ft)

P_{load} = Force applied (lbs) i.e. string weight

L_{free} = Free length of pipe (ft)

E = Young's modulus ($30x10^6$)

$Area_{pipe}$ = cross section area of pipe body (inch), calculated as $\pi/4 (OD^2 - ID^2)$

OD = specified pipe outside diameter (inch)

ID = specified pipe inside diameter (inch)

14.2.7 Pipe displacement

$$Displacement_{pipe} = Area_{pipe} \times 0.001237$$

Where:

$Displacement_{pipe}$ = displacement of pipe (bbl/ft)

$Area_{pipe}$ = cross section area of pipe body (inch), calculated as $\pi/4 (OD^2 - ID^2)$

OD = specified pipe outside diameter (inch)

ID = specified pipe inside diameter (inch)

14.2.8 Pipe capacity

$$Capacity_{pipe} = (ID_{pipe})^2 \times 0.000971439$$

Where:

$Capacity_{pipe}$ = capacity of pipe string (bbl/ft)

ID_{pipe} = ID = specified pipe inside diameter (inch)

14.2.9 Pipe capacity

$$Capacity_{pipe} = (Area_{pipeID})^2 \times 0.001237$$

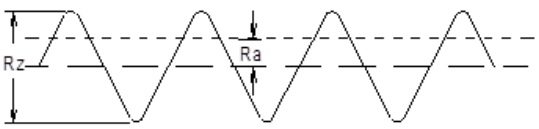
Where:

$Capacity_{pipe}$ = capacity of pipe string (bbl/ft)

$Area_{pipeID}$ = calculated as $\pi \times (ID_{pipe}/2)^2$ (inch)

14.3 Other

14.3.1 Calculating surface finish values



Where:

R_z = maximum peak to valley variation on surface substrate, i.e. max value – min value

R_a = arithmetic average deviation from nominal surface, i.e. **$Ra = R_z / 7.2$**

14.4 Common conversion factors

Mass	1	lb_m	=	0.4536	kg
		kg	=	2.2046	lb
		Short ton	=	2000	lbs
		Short ton	=	0.9072	MT
		MT	=	1.1023	Short Ton
		lb/ft	=	1.4882	kg/m
		kg/m	=	0.672	lb/ft
Area	1	in^2	=	645.16	mm^2
		mm^2	=	0.00155	in^2
		ft^2		0.0929	m^2
		m^2		10.7639	ft^2
Volume	1	gallon	=	231	in^3
		gallon	=	0.0038	m^3
		gallon	=	3.7854	litre
		bbl	=	42	gal
		bbl	=	158.987	litre
		litre	=	61.0237	in^3
		litre	=	0.2642	gal
		m^3	=	6.2899	bbl
		m^3	=	264.172	gal
		in^3	=	0.0164	litre
		ft^3	=	1728	in^3
		ft^3	=	28.317	litre
		ft^3	=	0.0283	m^3
		ft^3	=	7.4805	gal
Length	1	in	=	25.4	mm
		mm	=	0.03937	in
		cm	=	0.3937	in
		ft	=	0.3048	m
		m	=	39.37	in
		m	=	3.2808	ft
Force	1	lb_f	=	4.4482	N
		N	=	0.2248	lb_f
		ton_f	=	8.896	kN
		kN	=	224.81	lb_f
Torque	1	ft·lb	=	1.3558	N·m
		ft·lb	=	0.13826	Kg·m
Pressure	1	atm	=	14.696	psi
		atm	=	101.325	kPa
		MPa	=	10	bar
		MPa	=	145.038	psi
		kPa	=	0.145	psi
		psi	=	6.8948	kPa
		psi	=	0.0069	MPa
		psi	=	0.0689	bar
		bar	=	14.5038	psi
		bar	=	0.1	MPa
		bar	=	100	kPa
Density	1	lb/gal	=	0.1198	kg/l
		lb/gal	=	119.826	kg/m^3
		lb/ft^3	=	16.018	kg/m^3
		kg/l	=	8.3454	lb/gal
		kg/m^3	=	0.0083	lb/gal
		kg/m^3	=	0.0624	lb/ft^3