

# **IPSCO CONNECTIONS RUNNING MANUAL**

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## TENARIS INTRODUCTION

Tenaris is a leading supplier of tubes and related services for the world's energy industry and certain other industrial applications. Our mission is to deliver value to our customers through product development, manufacturing excellence, supply chain integration, technical assistance and customer service, aiming to reduce risk and costs, increase flexibility and improve time-to-market.

Wherever we operate, we are committed to safety and minimizing our impact on the environment, providing opportunities for our people, and contributing to the sustainable development of our communities. Our employees seek constant improvement by sharing knowledge across a single global organization.

Tenaris acquired IPSCO on January 2, 2020 from PAO TMK. For any questions about these technologies, please contact your local commercial or technical sales representative.

# FIELD SERVICE SUPPORT

Please contact our Tenaris field service technical support group at [FieldServices@tenaris.com](mailto:FieldServices@tenaris.com).

# QUICK REFERENCE GUIDE

## QUICK REFERENCE GUIDE

This document sets forth the applicable guidelines for the running of casing and tubing with ULTRA™ connections. Connection specific instructions, such as thread compound application procedures, torque turn graphs, make-up RPM and downhole rotation can be found under their respective sections.

The rig crew with the supervision of a Field Service Technician certified by Tenaris should conduct all running operations in accordance to API Recommended Practice 5C1. Additionally, they should observe all generally accepted good running practices and handling procedures for premium casing and proprietary connections.

**References:** API 5C1 and API RP 5A3

### Equipment: (Page 10)

1. Calibrated power tongs
2. Calibrated CRTs
3. Circulating and/or cement sub
4. Handling plugs (lift nubbins)
5. Stabbing guide
6. Crossovers subs/joints as necessary
7. Latest revision data sheet of the appropriate connection
8. Thread compound and applicator “moustache” brushes
9. Any accessories to be used (float equipment, etc.)

### Preparation: (Page 16)

1. Verify that all equipment mentioned above is on hand, in serviceable condition, and is of the appropriate connection, size, weight and grade for the string being run.
2. Ensure that every component being run is drifted prior to cleaning and inspecting ULTRA™ connections.
3. Inspect rig alignment, power tongs snub line position, and torque turn unit calibration.
4. Verify that either collar type or slip type elevators are used. Never use bottleneck elevators.
5. Review all recommended running and handling procedures with the Customer Representative, Rig Personnel, and all other 3rd party personnel (casing crew, torque turn, etc.) prior to beginning operations.

### Handling Casing: (Page 19)

1. When moving casing, always ensure thread protectors are in place to prevent accidental damage to connections.
2. Handling plugs should be made up hand tight to ensure proper engagement for safe lifting.
3. Ensure handling plugs stay free of debris which can be transferred to the connection.
4. Use stabbing guides to minimize risk of damage to threads and seals.

### Connection Make-up: (Page 23)

1. Properly apply thread compound to connections per the connection specific thread compound application procedures.
2. Follow the connection's appropriate make-up torque values and make-up RPM.
3. Ensure pipe can spin freely during make-up to avoid anomalies in connection make-up.
4. If acceptable connection make-up is not achieved, the connection should be broken out, cleaned, and inspected. The connection can be made up again if it is in good condition.

# PRE-RUN CHECK LIST

## Pipe & Connection(s)

- Connection 1: \_\_\_\_\_  
Footage or Joints: \_\_\_\_\_
- Pipe Heat Treat #: \_\_\_\_\_
- Connection Stencil Information:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Connection 2: \_\_\_\_\_  
Footage or Joints: \_\_\_\_\_
- Pipe Heat Treat #: \_\_\_\_\_
- Connection Stencil Information:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Connections Cleaned & Inspected: Y / N
- Cleaned with: \_\_\_\_\_
- Cleaned when: \_\_\_\_\_
- Rejected on Rack: Y / N \_\_\_\_\_
- Drift: Y / N Drift Size: \_\_\_\_\_

- Connections Cleaned & Inspected: Y / N
- Cleaned with: \_\_\_\_\_
- Cleaned when: \_\_\_\_\_
- Rejected on Rack: Y / N \_\_\_\_\_
- Drift: Y / N Drift Size: \_\_\_\_\_

## Running Equipment

- Handling Plugs  
Connection: \_\_\_\_\_  
Size / Weight: \_\_\_\_\_  
Serial #'s: \_\_\_\_\_
- Stabbing Guides
- Circulating / Cement Sub
- Crossover sub(s)  
Pin: \_\_\_\_\_ Serial #'s: \_\_\_\_\_  
Box: \_\_\_\_\_ Serials #'s \_\_\_\_\_

- Thread Compound: \_\_\_\_\_
- Float Shoe: \_\_\_\_\_
- Float Collar: \_\_\_\_\_
- Connection Data Sheet  
Published / Printed Date: \_\_\_\_\_  
Min. Torque: \_\_\_\_\_ Opt. Torque: \_\_\_\_\_  
Max. Torque: \_\_\_\_\_  
Operating Torque: \_\_\_\_\_

## Casing Equipment

- Company: \_\_\_\_\_
- Single Joint Elevators
- CRT System
- Manufacturer: \_\_\_\_\_ Model #: \_\_\_\_\_
- Power Tongs
- Manufacturer: \_\_\_\_\_ Model #: \_\_\_\_\_

- Calibration: \_\_\_\_\_ Snub Line at 90°: Y / N
- Back-up tongs: Y / N
- Torque Turn
- Manufacturer: \_\_\_\_\_ Model #: \_\_\_\_\_
- Main Elevators
- Manufacturer: \_\_\_\_\_ Model #: \_\_\_\_\_

## HSE

- All Equipment in good condition
- Review all job specific running procedures with personnel involved in run

- Perform JSA
- Sign JSA (Job Safety Analysis)



Supplemental Information

- Rig Name: \_\_\_\_\_
- Well Name: \_\_\_\_\_
- AFE: \_\_\_\_\_
- Co. Man: \_\_\_\_\_
- Casing Crew Supervisor: \_\_\_\_\_
- Drilled Depth: \_\_\_\_\_

- Deviation: \_\_\_\_\_
- Build Rate: \_\_\_\_\_
- Hole Size: \_\_\_\_\_
- Mud Weight: \_\_\_\_\_
- Oil or Gas well: \_\_\_\_\_
- BHP: \_\_\_\_\_ psi / MPa    BHT: \_\_\_\_\_ °F / °C

# GENERAL GUIDELINES

# GENERAL GUIDELINES

## EQUIPMENT

### Tools

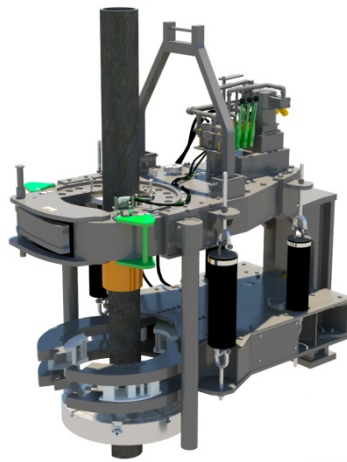
1. Circulating, cement, and crossover subs shall have pin and box ends inspected prior to each use and shall be verified they are compatible with the connections being run. TORQ® QXW™, TORQ® DQW™, ULTRA™ DQX DQX-HT DQX-SR, BPN, BPN-SR and ULTRA™ GX connections are interchangeable between different weights of the same connection and nominal OD. TORQ® SFW™, TORQ® SPWedge™, ULTRA™ SF SFII FJ FX QX connections require the use of a crossover when changing between weights.
2. Stabbing guides are essential in running ULTRA™ connections to help prevent damage to critical areas of the connection. Ensure that the stabbing guide is appropriate for the connection being run and in serviceable condition.
3. ***Handling plugs shall be inspected prior to use. Only authorized handling plugs that are manufactured by and received from certified Tenaris facilities or representatives shall be used.***

### Elevators

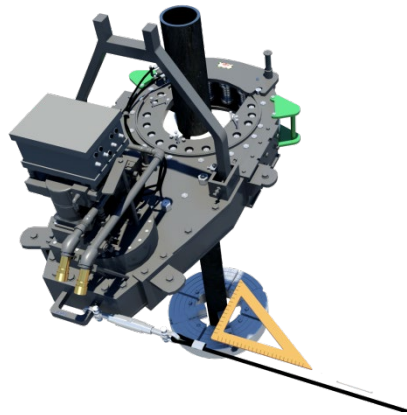
1. Single joint elevators of the appropriate size shall be used.
2. Slip type elevators shall be used on all ULTRA™ integral joint connections (TORQ® SFW™, TORQ® SPWedge™, ULTRA™ SF SFII FJ FX QX).
3. Collar type elevators may be used on non-special clearance threaded & coupled connections (TORQ® QXW™, ULTRA™ DQX DQX-HT DQX-SR, BPN, BPN-SR, BPN, BPN-SR and ULTRA™ GX).
4. Collar type elevators can only lift, up to the engaged coupling face cross-sectional area which in some cases may be less than the pipe body area.
5. ***Bottleneck elevators (Drill Pipe) shall not be used on any ULTRA™ connections.***

### Power Tongs

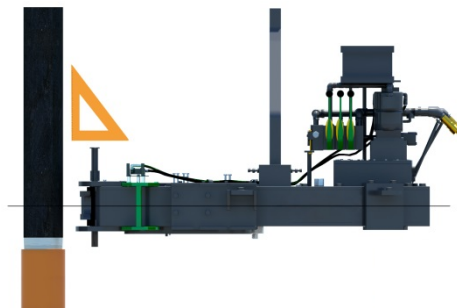
1. Power tongs are critical for properly making up a connection. They ensure that the connections are not over or under torqued and are properly aligned and gripped.
2. Power tongs shall be calibrated at least annually and be within the required torque range of the pipe size being run. It shall have the correct size jaws properly installed to prevent damage to the pipe.
3. Integrated back-up tongs are recommended for 7-5/8" casing and smaller. The back-up tongs shall be able to freely move vertically relative to the tongs while staying parallel to the tongs to avoid misalignment.
4. Back-up tongs are recommended for the first 20 joints to prevent the string from rotating.



1. Power tong grip pressure should be as low as possible and the gripping area should be as large as possible to prevent damage to the casing and to obtain undistorted accurate torque turn graphs.
2. Wraparound die configuration is recommended for 13-3/8" casing and larger to prevent damage to the casing and to obtain undistorted accurate torque turn graphs.
3. The snub line shall be at 90° to the power tongs arm and horizontal to ensure accurate torque readings.



1. The power tongs shall be perpendicular to the casing. A level may be used to ensure that the power tongs, back up tongs, and the snub line are horizontal.



1. The weight of the power tongs shall not rest on the casing as it will cause bending, misalignment and can damage the seal and thread areas. Improper torque turn graphs might also be obtained.




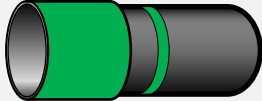
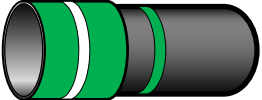
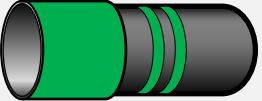
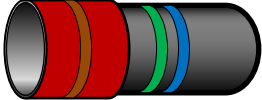
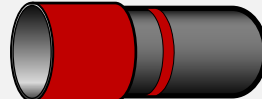
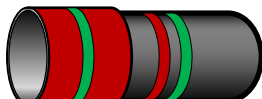

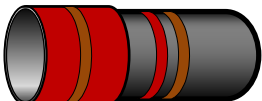

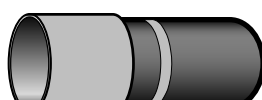
2. Torque turn monitoring equipment use is required to verify proper make-up of ULTRA™ connections. The unit should be capable of a minimum pulse rate of 500 samples per turn and with up-to-date calibration of no more than 1 year.
3. Improper equipment can result in poor make-up graphs and damage to the connection.
4. ***Review monitoring equipment settings to ensure RPM and Torque vs Turn will be obtained prior to start running pipe.***

#### Casing Running Tool

1. Care must be taken to ensure that the torque indicators and over-torque dump valves are accurate if equipment, such as a CRT (Casing Running Tool) or other method, is used to make-up the connection other than the preferable power tongs method.
2. Electronic interference is possible with remote torque monitoring equipment that might cause distortion in the Torque vs Turn graphs.
3. Ensure that the external grip segments are set at a proper position on the pipe body away from the connection to prevent gripping onto the connection and consequently dropping the string.
4. Ensure that the internal slip segments are set at a proper position within the pipe body away from the connection to prevent damaging the connection.
5. A flush mount spider and/or conventional rig rotary tongs are recommended for the first 20 joints to prevent the string from rotating.
6. ***Review monitoring equipment settings to ensure RPM and Torque vs Turn will be obtained prior to start running pipe.***

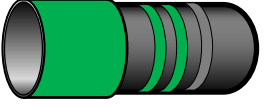
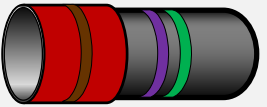
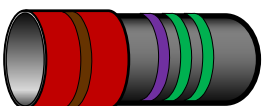



# PIPE

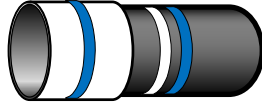
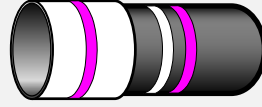
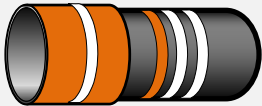
## API Color Codes

PIPE GRADE	PIPE (COLOR BANDS)	COUPLING		ILLUSTRATION
		ENTIRE COUPLING	BAND(S)	
H40	None or black band	None	None or Black	
J55 Tubing	1 Green	Green	None	
J55 Casing	1 Green	Green	1 White	
K55	2 Green	Green	None	
M65	1 Green 1 Blue	Uses L80 Type 1 Couplings		
N80 – 1	1 Red	Red	None	
N80 – Q	1 Red 1 Green	Red	1 Green	
R95	1 Brown	Brown	None	
L80 – 1	1 Red 1 Brown	Red	1 Brown	
C90	1 Purple	Purple	None	
T95	1 Silver	Silver	None	

PIPE GRADE	PIPE (COLOR BANDS)	COUPLING		ILLUSTRATION
		ENTIRE COUPLING	BAND(S)	
C110	1 White 2 Brown	White	2 Brown	
P110	1 White	White	None	
Q125	1 Orange	Orange	None	

### Proprietary Color Codes

PIPE GRADE	PIPE (COLOR BANDS)	COUPLING		ILLUSTRATION
		ENTIRE COUPLING	BAND(S)	
K55 HC	2 Green 1 Gray	Green	None	
I80	1 Purple 1 Green	Use L80 Type 1 Couplings		
I80 MS-1	1 Purple 2 Green	Use L80 Type 1 Couplings		
I95	1 Orange 1 Purple	Use P110 Couplings		
I110	1 Purple 1 White	Use P110 Couplings		
L80 HC	1 Red 1 Brown 1 Gray	Use L80 Type 1 Couplings		
L80 CYHP	1 Red 1 Brown 1 White	Red	1 Brown 1 White	

PIPE GRADE	PIPE (COLOR BANDS)	COUPLING		ILLUSTRATION
		ENTIRE COUPLING	BAND(S)	
P110 HC	1 White 1 Gray	White	None	
P110 MS-1	1 White 1 Blue	White C110 Couplings Accepted	1 Blue	
P110 MS-2	1 White 2 Blue	White C110 Couplings Accepted	2 Blue	
P110 CYHP	1 White 2 Orange	White	1 Orange	
P110 CY	1 White 1 Pink	White	1 Pink	
Q125HC	1 Orange, 1 Gray	Orange	None	
Q125 CYHP	1 Orange 2 White	Orange	1 White	



## Corrosion Resistant Alloys

1. Extra care must be taken when running CRA (Corrosion Resistant Alloy) grades to not mar or gouge the pipe to prevent premature failure of the casing or tubing.
2. Movement of pipe from the pipe rack to the rig should be done using nylon or other soft strap instead of a metal sling, unless the metal sling is padded.
3. After the pipe is stabbed, nylon or other soft strap wrenches should be used to make-up connections to hand tight position. The use of spinning chains should be avoided to prevent damage to the casing or tubing.
4. Only non-marking wraparound dies shall be used to make-up the connection.
5. Only non-marking dies should be used in the slips.
6. The make-up speed should not exceed 10 RPM for 8-5/8" casing and smaller or 5 RPM for 9-5/8" casing and bigger.
7. Avoid metal to metal contact in the pipe rack by using a plastic bump ring.
8. Avoid metal to metal contact between pipe and handling equipment.
9. Handling plugs are required on threaded & couple connections using CRA to protect the threads and seals.
10. Avoid long term contact between carbon steel and CRA.
11. Ensure adequate padding on forks of forklift and on pipe rack.
12. The Field Service Technician shall inspect all connections to ensure an even coat of Molybdenum Disulfide (dry moly) covers the entire pin and box.
13. The use of copper plating is recommended but copper plating shall be used only in the box end of the connection. Do not apply "dry moly" to the copper plated area.
14. Molybdenum Disulfide grease "Moly Paste" shall be applied instead of thread compound to both pin and box if the connection is not copper plated.

## PREPARATION

### Drift

1. Compressed air may be used if available prior to drifting. Each joint must be blasted from box end to pin end.
2. The pipe shall be drifted with the use of a drift mandrel of the appropriate size prior to cleaning and inspecting ULTRA™ connections.
3. It is a good practice to drift the casing or tubing while the pipe is on the rack.
4. Drift requirements:
  - Drift mandrel must meet the API 5CT dimensional requirements.
  - Special drift mandrel must be used for pipe with special drift requirements.
  - Drift mandrel must be clean.
  - Drift mandrel must not damage the connection.
  - Drift from box end to pin end.
  - Plastic or plastic-coated drift mandrels must be used on all internally coated and CRA pipe.
5. Any joints that do not drift shall be clearly marked red and segregated from the remaining prime joints.
6. Do not force the drift mandrel through the pipe.
7. Standard API Drift Dimensions:

PRODUCT	MIN. STANDARD DRIFT DIMENSIONS			
	LENGTH		DIAMETER	
<b>CASING</b>	in.	mm.	in.	mm.
< 9-5/8	6	152	$d - 1/8$	$d - 3.18$
$\geq 9-5/8$ to $\leq 13-3/8$	12	305	$d - 5/32$	$d - 3.97$
> 13-3/8	12	305	$d - 3/16$	$d - 4.76$
<b>TUBING</b>				
$\leq 2-7/8$	42	1,067	$d - 3/32$	$d - 2.38$
> 2-7/8 to $\leq 8-5/8$	42	1,067	$d - 1/8$	$d - 3.18$
> 8-5/8 to < 10-3/4	42	1,067	$d - 5/32$	$d - 3.97$

$d$  Nominal Inside Diameter

Verify with API 5CT table C.28 and E.28

## Cleaning

1. Thread protectors should only be removed, and cleaning conducted, immediately prior to running the casing or tubing. This will limit the exposure of the connections to the environmental conditions on location that could have adverse effects on the connections (e.g., water, dust, mud, etc.).
2. ULTRA™ connections shall be cleaned prior to make-up to remove the storage compound.
3. Compressed air shall be blasted from box end to pin end if available.
4. A pressure washer, steam cleaning with water or solvent, cleaning solvent and rags, or non-metallic bristle brushes that do not leave residues, can be used. Any residues must be wiped or blown out from the thread roots and any other entrapped areas of the connection. The pressure washer must not remove the “dry moly”.
5. Pipe should be able to be rolled a minimum of one turn to ensure that all areas of boxes and pins are cleaned of storage compound and debris.
6. Lubricating oil may be used as additional measurement to prevent surface corrosion in the connection.
7. The connection shall not be exposed after cleaning and before running the connection for more than 3 hours without lubricating oil or a corrosion inhibitor.
8. Spray the dried connection with an even coat of “dry moly” and allow it to dry on CRA grades.
9. Clean thread protectors with solvent and rags or non-metallic bristle brushes.
10. **Never use metal brushes, gasoline or diesel to clean ULTRA™ connections.**

## Inspection

1. Only Field Service Technicians certified by Tenaris are authorized to inspect and field repair ULTRA™ connections.
2. The stencil information on the pipe should be recorded. Photos of mill and threading stencils may be included in the reporting documents.
3. All ULTRA™ connections should be thoroughly cleaned and dried at the rig site prior to inspection.
4. A visual inspection of all pins and boxes on location shall be conducted prior to running the casing or tubing.

1. Features that should be inspected if applicable include:
  - Seal surface
  - Thread form
  - Run-in and run-out threads
  - Torque shoulder
  - Connection face
  - Proper coupling installation
2. Potential damages that might occur include:
  - Scratches
  - Corrosion
  - Pitting
  - Dent
  - Galling
  - Discoloration
  - Burrs
3. The seal area must be free of the above-mentioned damages and may be buffed to remove only a minor blemish with the use of a heavy duty hand pad such as Scotch-Brite™ 7446 or 7440 with light pressures without the use of power tools. Molybdenum Disulfide must be applied on the buffed surface.
4. The entire connection except for ULTRA™ DQX, ULTRA DQX-SR, ULTRA DQX-HT, BPN and BPN-SR must be inspected to ensure full coverage of dry moly. Dry moly must be applied to any portion of the connections where dry moly is not present.
5. Refer to the specific connection Field Repair section of the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29 for field repair instructions.
6. If any areas of the threads or seals are found to be unserviceable, these connections and joints shall be clearly marked red and segregated from the remaining prime joints.
7. Install centralizers and any other tools attaching to the OD of the pipe if available per company representative directive.
8. Apply thread compound to the connection per the specific connection Thread Compound Application section of the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29.
9. Install cleaned and dried pin thread protectors at hand tight position.

## Gauging

1. The connection shall be cleaned, dried and visually inspected prior to gauging.
2. If available, only the following features are required to be gauged in the field:
3. Seal Diameter
4. Pitch Diameter
5. Shoulder Length
6. A "Soft Gauge" shall be used to verify MRP gauge settings. The soft gauge may be a calibrated standard or a threaded pup joint of known dimensions.
7. All dimensions shall be recorded using the appropriate tolerance sheets.

## HANDLING

API 5C1 shall be abided by in addition to these recommended procedures in the storage, loading, unloading and handling of all OCTG in the yard and on rig location.

### Thread Protectors

1. Thread protectors shall be installed whenever pipe is being moved.
2. Ensure that thread protectors are clean prior to installation.
3. Thread protectors for TORQ® QXW™, TORQ® DQW™, ULTRA™ DQX, ULTRA DQX-SR, ULTRA DQX-HT, BPN and BPN-SR connections are interchangeable between different weights of the same connection and nominal OD. All other connections require a specific thread protector for each size and weight.
4. Ensure the correct thread protectors are being used. Thread protectors are labeled with the connection name, size and weight. Thread protectors for TORQ® QXW™, TORQ® DQW™, ULTRA™ DQX, ULTRA DQX-SR, ULTRA DQX-HT, BPN and BPN-SR are labeled only with the connection name and size.
5. Wrong thread protectors can potentially damage the connection or become loose and falloff during handling or transportation.
6. Pin thread protectors shall remain in place until the pipe is hanging in the derrick and is ready to be stabbed. Quickie protectors may be used.
7. If tubing or casing is expected to sit on the rack for an extended period after cleaning, then a fresh coat of running compound shall be applied to the entire connection and clean thread protectors shall be reinstalled hand tight.
8. If tubing or casing will be returned to the storage yard, then a fresh coat of storage compound shall be applied to the entire connection and clean thread protectors shall be reinstalled with the use of a wrench or steel bar.
9. Do not over tighten the thread protectors.

### Handling Plugs

1. Handling plugs are required when running integral connections and recommended in threaded & coupled connections.
2. Handling plugs are required for threaded & coupled connections if tools will be run inside the coupling prior to make-up.
3. Handling plugs provide protection for the box threads and seals when the pipe is run.
4. All ULTRA™ handling plugs are specially made with modified dimensions which differ from the production connection design. Each ULTRA™ handling plug manufactured by Tenaris or a licensee has a unique serial number located on the “head diameter” area. The head diameter is the biggest outside diameter on the handling plug and it is the same as the API coupling outside diameter.
5. Handling plugs for TORQ® QXW™, TORQ® DQW™, ULTRA™ DQX, ULTRA™ DQX-SR, ULTRA™ DQX-HT, BPN and BPN-SR connections are interchangeable between different weights of the same connection and nominal OD. However, ensure that the Handling Plug meets any required drift. All other connections require a specific handling plug for each size and weight.
6. The characteristics of a proper ULTRA™ handling plug include:
  - Machined ID
  - Proper Head Diameter
  - Serialization

- Holes are located on the head diameter area

1. Handling plugs shall be cleaned, dried and inspected before each run and at any point they are dropped or come into contact with foreign debris.
2. The handling plug and the connection box end should be free of any debris to ensure proper thread engagement and prevent damage to the connection.
3. Handling plugs shall be installed to a firm, hand-tight position to ensure full engagement for safe handling with the use of a wrench or a steel bar through the holes provided in all Tenaris handling plugs.
4. Never use a hammer to tighten the handling plug or strike the box to loosen and remove the handling plug.
5. Handling plugs should remain in place in the box end until the string is set in the slips and the next pipe is ready to be stabbed. This will ensure that the connection box has protection during the lowering of the string and while the string is filled with mud if a fill up tool, CRT system or mud valve is being used.
6. All ULTRA™ handling plugs will shoulder with the coupling or box end face except for TORQ® SFW™, TORQ® SPWedge™, TORQ® DQW™ and TORQ® QXW™.
7. Handling plugs are designed to hold only up to 3 joints or 10,000 lbs and shall not be used to raise or lower the tubing or casing string.
8. The use of unapproved handling plugs may result in serious personal injury, improper thread engagement, reduced handling capacity, dropped pipe or damage to the threads and seals of ULTRA™ connections.
9. All handling plugs shall be properly maintained and periodically re-gauged. Using improperly maintained tools can lead to serious injuries.

### Thread Compound

1. The use of proper thread compound is critical to the performance and protection of the connection.
2. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
3. A specified dropping point of 450°F (232°C) or higher in the thread compound data sheet is recommended for elevated temperature.
4. A specified dropping point of 727°F (386°C) or higher in the thread compound data sheet is recommended for steam injection applications.
5. A specified dropping point in the thread compound data sheet of 150°F (66°C) or higher than the maximum well temperature is preferable.
6. Artic grade is recommended for applications where the outside temperature is below 32°F (0°C).
7. The thread compound expiration date must be reviewed to confirm that it is serviceable.
8. The thread compound shall be stirred immediately prior to its use and frequently throughout its use to prevent settling of heavy metals or large particles in metal free running compound.
9. The thread compound bucket should be covered to prevent the accumulation of water when raining. Discard thread compound with accumulated water as this may cause distorted torque turn graphs and corrosion in the connection.
10. Lubricating oil may be used between the connection cleaning and thread compound application as an additional measure to prevent corrosion in the connection.
11. Thread compound may be applied directly to the connections without removing the light oil base.

12. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.



1. Thread compound should be applied per the specific connection Thread Compound Application section of the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29.
2. Prior to stabbing, verify that the proper distribution of thread compound on both box and pin has been achieved.
3. Prevent the mud from covering the threaded and seal area of the box and wipe the box if the mud overflows. Overflowing the mud through the box can cause distorted graphs and may affect the thread compound performance.
4. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder or wedge lock must be clearly visible to ensure proper make-up. Apply the thread locking compound to the threads only and apply running compound to the seal area.
5. Do not dilute thread compounds with diesel, motor oil or any other substance.
6. The ULTRA™ Field Service Technician is responsible for the application of thread compound on all connections, either by training the rig personnel or the Field Service Technician performing the proper thread compound application his or herself.
7. Consult with the Tenaris field service technical support group for thread compound requirements.

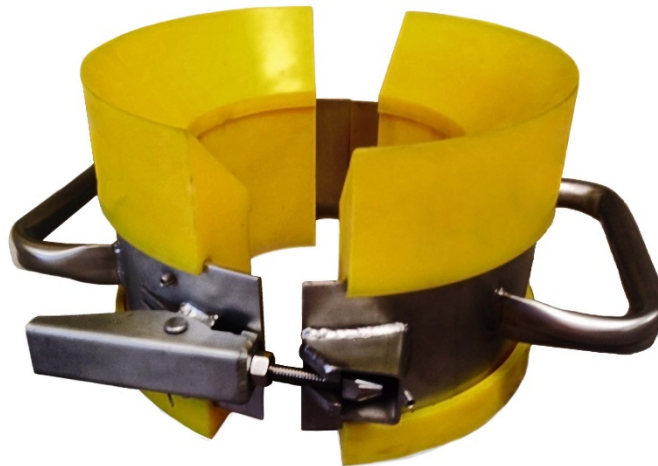
8. Direct contact with thread compound should be avoided. The use of gloves is recommended to prevent skin contacting the chemicals and heavy metals in the thread compound. The MSDS (Material Safety Data Sheet) shall be reviewed by anyone who may come into contact with thread compound. In addition, it is important to prevent the compound from spilling or dripping onto the ground which may cause environmental pollution.

### Storage Compound

1. Storage compound protects the connection prior to the connection make-up.
2. Storage compound shall be applied to the entire connection instead of thread compound if the connection will not be made-up within one month.
3. The connections are susceptible to corrosion, scratches and other damages without proper storage compound.
4. Storage compound is intended to prevent corrosive damage to the connection and is distinctly different from thread compound.
5. ***Storage or drilling compound shall not be used for the make-up of any ULTRA™ connections.***

### Stabbing Guide

1. The use of a stabbing guide is recommended for T&C connections and required for integral connections to ensure proper make-up of ULTRA™ connections.



2. The stabbing guide centralizes the pin in the box as the pin is lowered into the box. This prevents the pin face from contacting the box face and provides proper pin alignment into the box prior to thread engagement.
3. The stabbing guide reduces the risk of cross threading.
4. Damage to the connection face, threads and seals may occur if incorrect or improperly adjusted stabbing guides are used.
5. If the stabbing guide does not close easily on the box, the wrong or faulty stabbing guide may have been selected or a slight adjustment may be needed to ensure a proper fit.
6. Stabbing guides may or may not be interchangeable among different connections and among different weights within the same OD.

# CONNECTION MAKE-UP

## Connection Data Sheets

1. The most current Connection Data Sheets should be obtained from Tenaris prior to each run to ensure the most current information is available and applied to the running of ULTRA™ connections. Please visit our website at <http://www.tenaris.com/ipscodatasheets/index.html>, contact our Technical Sales department at [premiumconnections@tenaris.com](mailto:premiumconnections@tenaris.com), or contact our Field Service department at (866) PIPE-123 for this information.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection shall be assembled.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for best performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. The specified operating torque is the maximum allowable torque for downhole rotation.

## ULTRA™ Connections

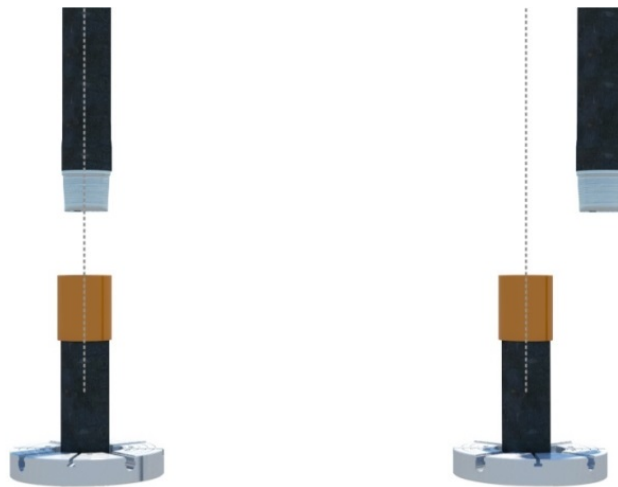
1. Connections require connection-specific considerations during make-up.
2. Refer to the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29 for applicable connection information; including thread compound application, make-up RPM, torque shoulder acceptable torque range, and downhole rotation capabilities for each connection:

- TORQ® SFW™
- TORQ® QXW™
- TORQ® DQW™
- TORQ® SPWedge™
- ULTRA™ SF & SFII
- ULTRA™ FJ
- ULTRA™ FX
- ULTRA™ QX
- ULTRA™ GX
- ULTRA™ DQX & DQX-HT
- ULTRA™ DQX-SR
- BPN
- BPN-SR

## Stabbing

1. Remove the pin thread protector once the joint is on the rig floor.
2. Alignment shall be checked by ensuring that the center line of the pin is suspended over the centerline of the box.





3. Affix the stabbing guide to the connection box.
4. Verify that thread compound is appropriately applied per the specific connection Thread Compound Application section of the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29.
5. A stabber, or a mechanical equivalent (i.e., PRS or CRT), in the derrick is recommended in order to maintain alignment of the connection during stabbing and to initiate make-up.
6. Slowly lower the pin into the box. Moving too quickly can cause loss of control of the pipe. If this happens, the pin threads and seal can be damaged and the joint may need to be laid down.
7. Remove the stabbing guide once the pin has been properly stabbed into the box. The elevators should be unlatched during make-up to allow the pipe to spin freely without interference.
8. Install a single joint compensator on 9-5/8" casing and larger for use during stabbing, make-up and break out. This will allow for the joint of pipe to be set down or removed slowly in a controlled manner.
9. A single joint compensator is recommended for 5" CRA pipe and larger.
10. If a connection is improperly stabbed, hoist the joint, re-inspect and stab again.

#### Make-up

1. Check that the power tongs will not contact the pin threads when moved into place before setting the jaws on the pipe.
2. The power tong's jaws should preferably be placed 6" or more above the end of pin.
3. For threaded & coupled connections, the back-up tongs should preferably be placed 6" or more below the box or alternatively on the lower half of the coupling for connections with a torque stop.
4. For integral connections, the back-up tongs should be placed 6" or more below the end of the box.
5. Initial rotation shall start in high gear with a low torque and high RPM. If the power tongs stall, back out the connection as that can be a sign of cross threading.
6. Strap wrenches or chain tongs can be used to assist in achieving initial thread engagement.
7. Once threads engage, high gear may be used at no higher RPM than the specified for that connection and nominal OD size on the Make-up RPM section of the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29.
8. If the threads do not properly engage, reverse the tong direction and slowly (0.5 RPM) rotate the pipe until the connection properly drops into place.
9. The joint shall be backed out completely if there is difficulty in achieving thread engagement.

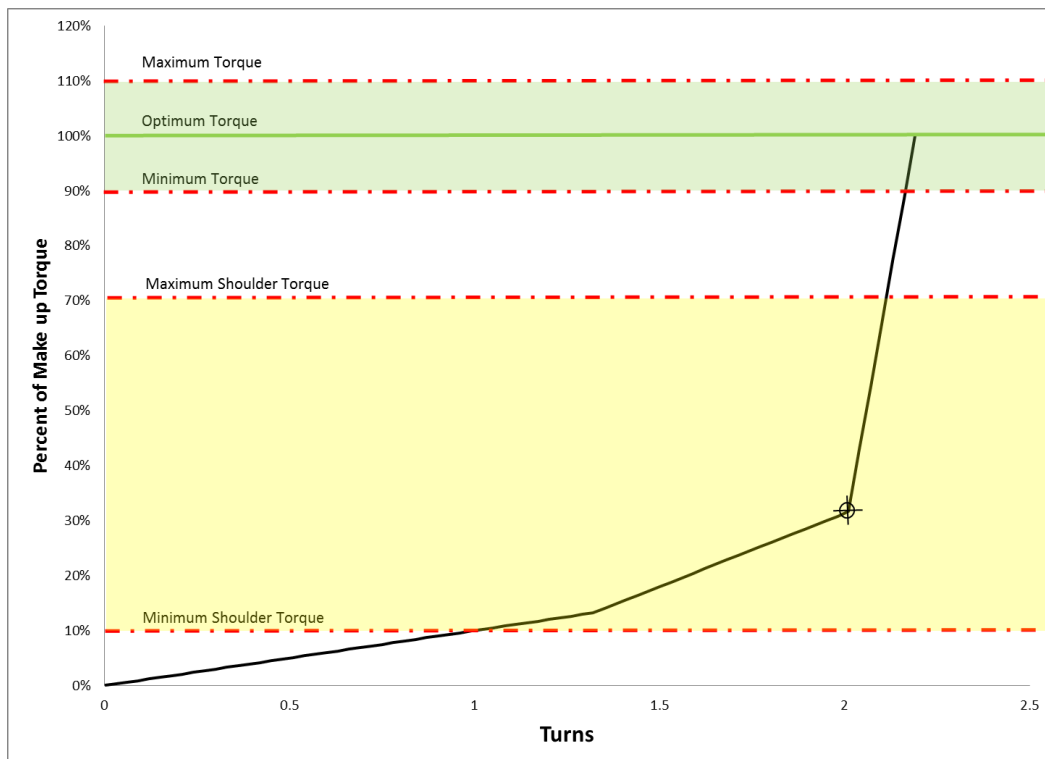
10. Switch to low gear at approximately 1,000 ft-lbs, before the seal engagement appears in the torque turn graph. Stopping and starting the connection should be avoided when the connection is near final position because static friction effects could lead to a misinterpretation of the final torque.
11. Refer to the Torque Shoulder section of the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29 for proper torque turn graph.
12. Power tongs should remain in low gear and at a constant RPM once the seal engages.
13. Ensure that proper alignment is maintained during the make-up operation.
14. Monitor the torque turn system throughout the entire connection make-up. If there are any unexpected features on the torque turn graph, the make-up process should immediately be terminated, the connection broken out, cleaned and inspected.
15. After the make-up is complete, the graph should be reviewed to ensure that it has a clear torque shoulder, all required torque parameters are met and no unexpected features or anomalies are present.
16. The joint shall be laid down and replaced after a maximum of three unsuccessful attempts are made to make-up a connection. The box end on which the three make-up attempts were made shall be cleaned and inspected. The joint shall be pulled out and laid down if any damage to the thread or seal area is visible.

#### Break out

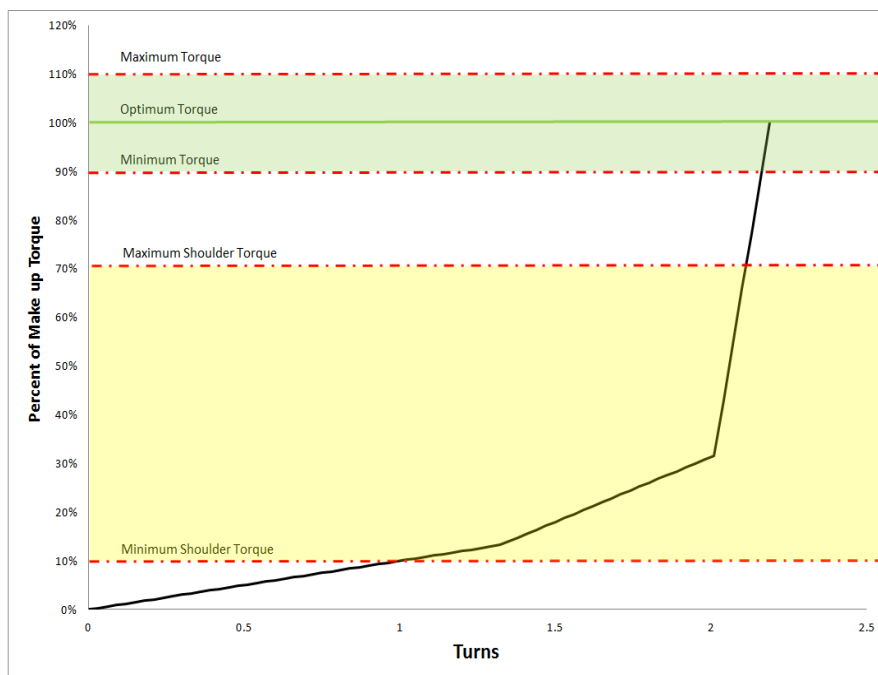
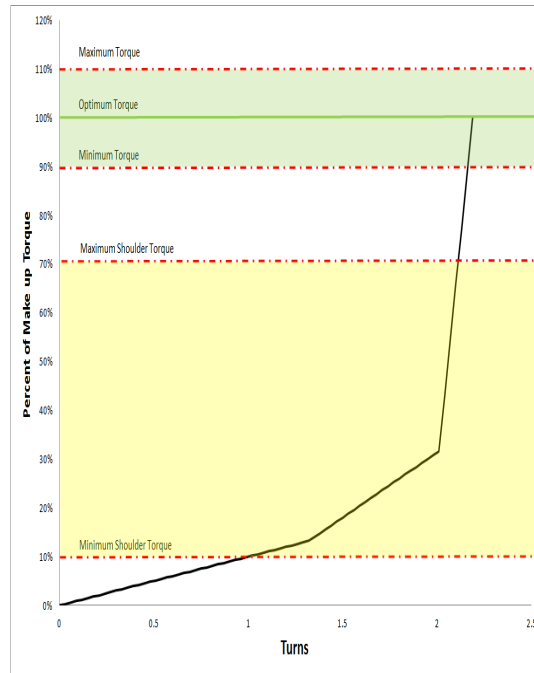
1. Ensure that the back-up tongs of appropriate size are used if disassembly of a connection is required.
2. Place the back-up tongs preferably in the lower half of the coupling and not on the pipe body for threaded & couple connections to ensure breaking out the field end pin.
3. If the back-up tongs are placed on the pipe body and the coupling starts to spin during break out, the break out process should be stopped and the back-up tongs of the appropriate size shall be placed on the lower half of the coupling.
4. Power tongs must be in low gear for break out. It is common for the break out torque to be higher than the make-up torque.
5. Slowly increase the torque until the connection begins to rotate counter clockwise.
6. The connection shall not be hammered to assist in the break out.
7. Continue rotating slowly at no higher than 8 RPM until the pin slightly “jumps” from the last engaged thread. This indicates that pin and box are no longer engaged and may be separated.
8. Stop rotating the pin once the pin “jump” occurs.
9. Install the stabbing guide prior to the “jump” of the pin when separating the two joints to prevent damage to pin and box.
10. Ensure that proper alignment is maintained during the break out operation.
11. In case of a re-run, clean, inspect, and apply an even coat of “dry moly” to the pin and box and allow it to dry. Otherwise, apply storage compound and clean thread protectors to box and pin.
12. Refer to the specific connection Field Repair section of the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29 for field repair instructions.

## Torque Turn

1. Torque turn monitoring is required for assessing a proper make-up of ULTRA™ connections except for BPN and TORQ® DQW™.
2. Torque turn equipment provides evidence and enables the verification and recording of each connection make-up. It also aids in the recognition of any issues that may take place during the running of tubing or casing.
3. The initial turns of the makeup will have low torque due to thread interference starting to build up. The torque will increase at a faster rate when the seal engages. The torque will spike quickly when the torque shoulder is engaged causing the final torque to be reached.
4. Each connection will have a different graph and final make-up torque. The final make-up torque should be between the minimum and maximum make-up torque specified on the connection data sheet.
5. Different graphs are obtained due to threading tolerances, material properties, thread compound and other variables.
6. The graph requires showing the last section of the thread interference, transition to seal interference, torque shoulder and final torque.
7. A torque shoulder must be clearly visible for proper make-up.
8. The torque shoulder must be properly marked in the graph from proper calculation of delta turn and delta torque.
9. The operator must confirm the correct placement of the torque shoulder marking if the torque turn system uses automatic shoulder detection.
10. If any graph does not meet the requirements specified in the Torque Shoulder section of the ULTRA™ RECOMMENDED FIELD PRACTICES section starting on page 29, the connection should be broken out, cleaned and inspected prior to a further make-up attempt.



11. The torque turn graph should provide the well name, connection name, size, weight, material grade, date, time, joint number, RPM, total turns, delta turn, shoulder torque, final torque and delta torque.
12. The delta turn is defined as the amount of turns past the torque shoulder contact.
13. The delta torque is defined as the amount of torque past the torque shoulder contact.
14. The scale of the graph can cause the make-up graph to look different. If it is stretched, it will look like more turns were made. If it is shortened, it will look like fewer turns were made.



15. In case of a re-run, each joint shall be labeled with the same tally number as the previous make-up attempt following by a hyphen or a period and the make-up attempt number to indicate that it is subsequent make-up of the same joint.

16. *Only competent personnel such as Field Service Technicians certified by Tenaris can validate acceptable torque turn graphs.*

# ULTRA™ RECOMMENDED FIELD PRACTICES



In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of TORQ® SFW™ Connections.

## Interchangeability

TORQ® SFW™ is not interchangeable between different weights of the same nominal OD. A crossover is needed if running a mixed weight string or accessories.

## Features

1. TORQ® SFW™ utilizes a tapered wedge thread form on both steps of the connection.
2. A fully made up TORQ® SFW™ connection may have up to two exposed threads on the pin OD.
3. TORQ® SFW™ can be distinguished by its unique spherical seal configuration in between the two thread steps and a thread dope relief adjacent to the seal on both pin and box.

## Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush or a paintbrush is recommended to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound on both steps and seal of the pin as demonstrated in the graphic below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.





## Make-up Torque

1. TORQ® SFW™ connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A wedge lock must be visible for proper make-up. Apply the thread locking compound to the threads only and apply running compound to the seal area.

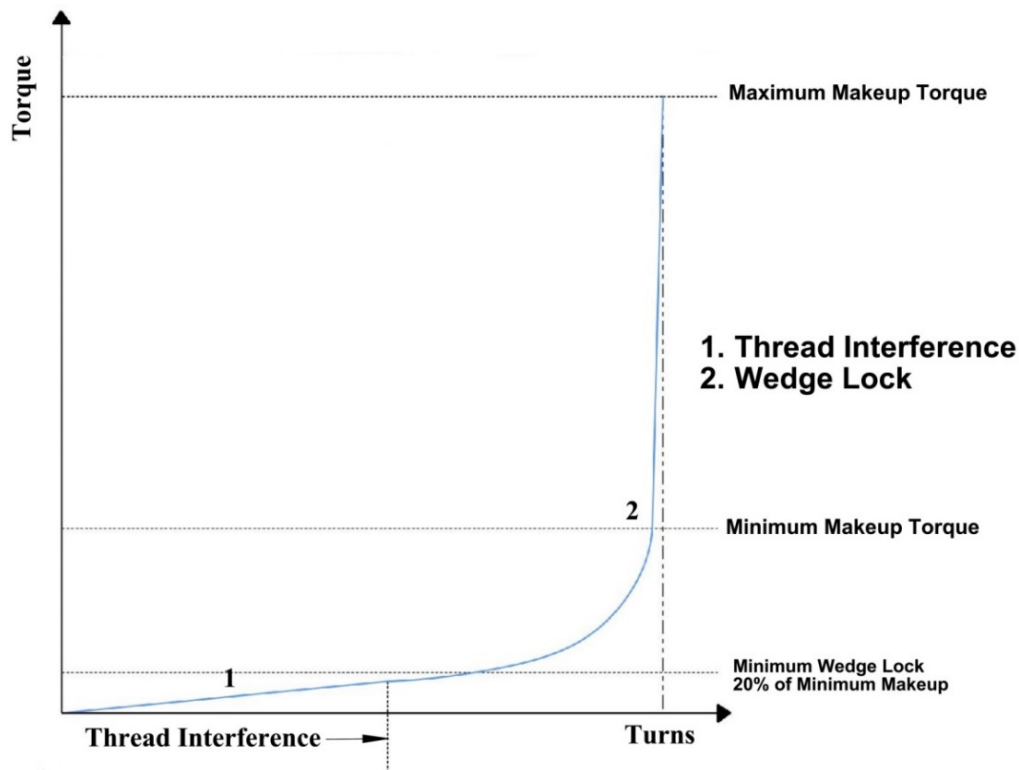
## Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the seal engagement appears in the torque turn graph.
3. Power tongs should remain in low gear and at a constant RPM once the seal engages.
4. The below table lists the approximate recommended make-up RPM for the TORQ® SFW™ connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 – 5 ½	35	15
6 ⅝ – 7 ⅝	20	10
8 ⅝ – 9 ⅝	10	5
10 ¾ – 13 ⅝	6	3

## Wedge Lock Torque

1. The wedge lock shall be clearly visible at a minimum of 20% of minimum make-up torque and at a maximum of 90% of minimum make-up torque.
2. If the wedge lock is outside of these specifications, break out and inspect the pin and box.
3. A large torque increase prior to 1 turn from the wedge lock may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for TORQ® SFW™ connections.



### Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The TORQ® SFW™ connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

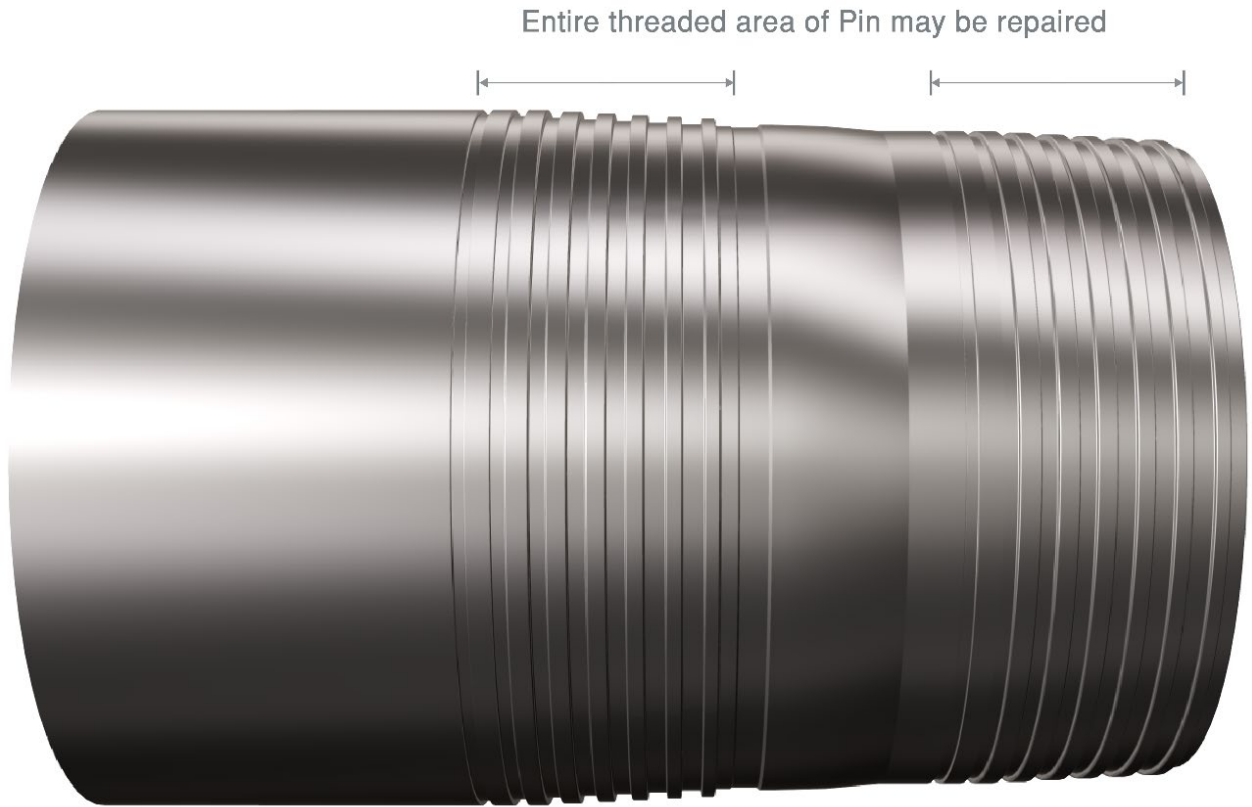
### Re-run

1. The pin and box must be thoroughly cleaned and visually inspected for any damage after each break out.
2. Apply an even coat of “dry moly” to the pin and box and allow it to dry.
3. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
4. The TORQ® SFW™ connections shall not be used as work strings.

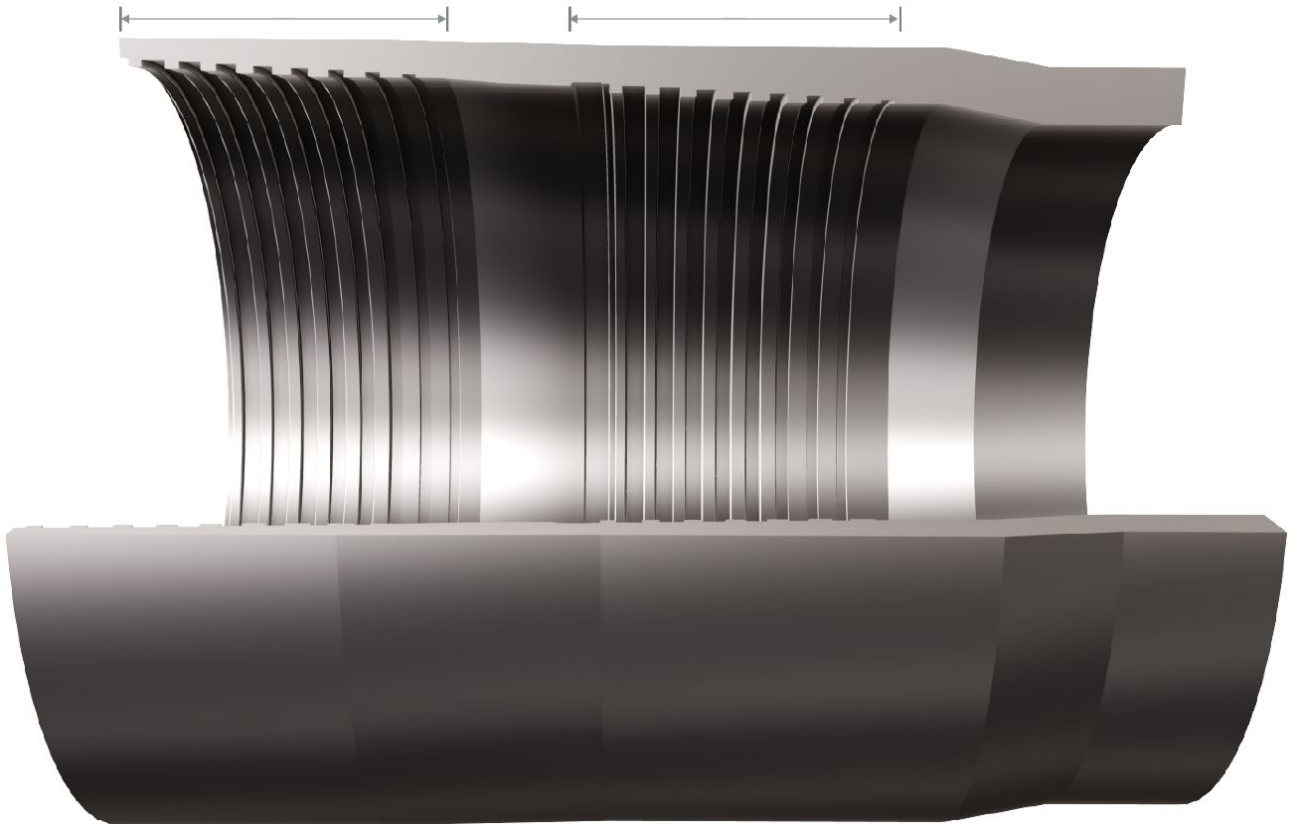
### Field Repair

1. Field repair of TORQ® SFW™ connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Small scratches and dents on the pin and box face may be permissible or repaired.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.

5. Spray the connection with an even coat of “dry moly” and allow it to dry.
6. Only qualified personnel may make the decision regarding the serviceability of a given connection.
7. ***Seal areas cannot be repaired in the field and must be free of any damages.***
8. ***Loose burrs and sharp raised edges must be removed or rounded down.***



Entire threaded area of Box may be repaired





In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of TORQ® QXW™ connections.

## Interchangeability

1. TORQ® QXW™ is not interchangeable between different weights of every nominal OD. A crossover might be needed if running a mixed weight string or accessories.
2. Interchanging pins between weights will not provide an internally flush connection.

## Features

1. TORQ® QXW™ utilizes a tapered wedge thread form.
2. A fully made up TORQ® QXW™ connection may have up to two exposed threads on the pin OD.

## Thread Compound Application

3. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
4. The use of an applicator “moustache” brush or a paintbrush is recommended to best control the application and quantity of thread compound.
5. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
6. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
7. Apply an evenly distributed light coat of thread compound to the pin face, seal and all threads as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.





## Make-up

1. TORQ® QXW™ connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A wedge lock must be visible for proper make-up. Apply the thread locking compound to the threads only and apply running compound to the seal area.
6. The connection may be made up by holding or floating the coupling. Back-up tongs should be placed on the mill end side if holding the coupling.
7. Tenaris allows coupling movement of no more than ¼ turn on the mill end during make-up.

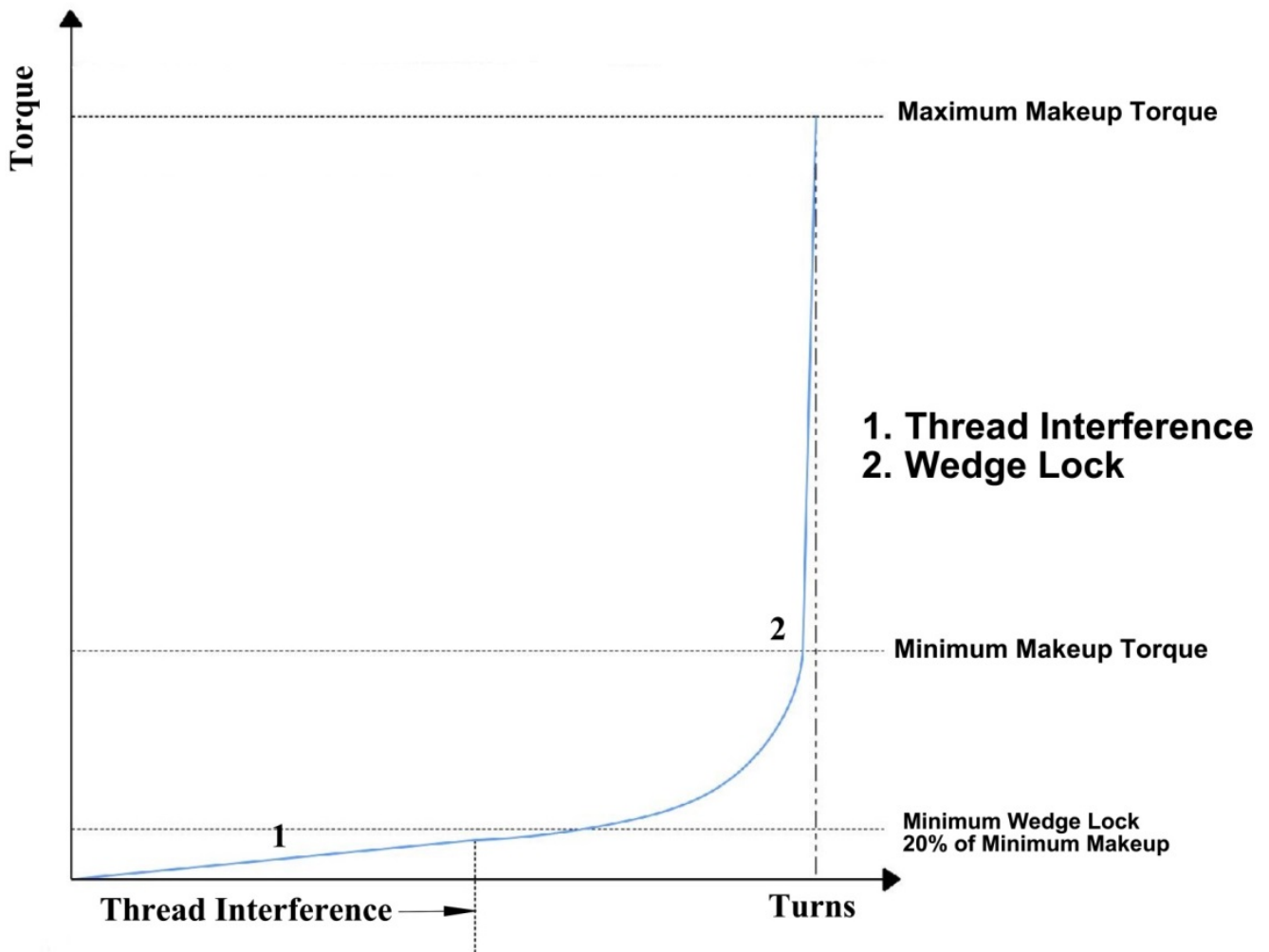
## Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the wedge lock engagement appears in the torque turn graph.
3. The below table lists the approximate recommended make-up RPM for the TORQ® QXW™ connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 ½ – 5 ½	35	15
6 ⅝ – 7 ⅝	20	10
8 ⅝ – 9 ⅝	10	5
10 ¾ – 13 ⅝	6	3

## Wedge Lock Torque

1. The wedge lock shall be clearly visible at a minimum of 20% of minimum make-up torque and at a maximum of 90% of minimum make-up torque when using torque turn monitoring system.
2. If the wedge lock is outside of these specifications, break out and inspect the pin and box.
3. A large torque increase prior to 1 turn from the wedge lock may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for TORQ® QXW™ connections.



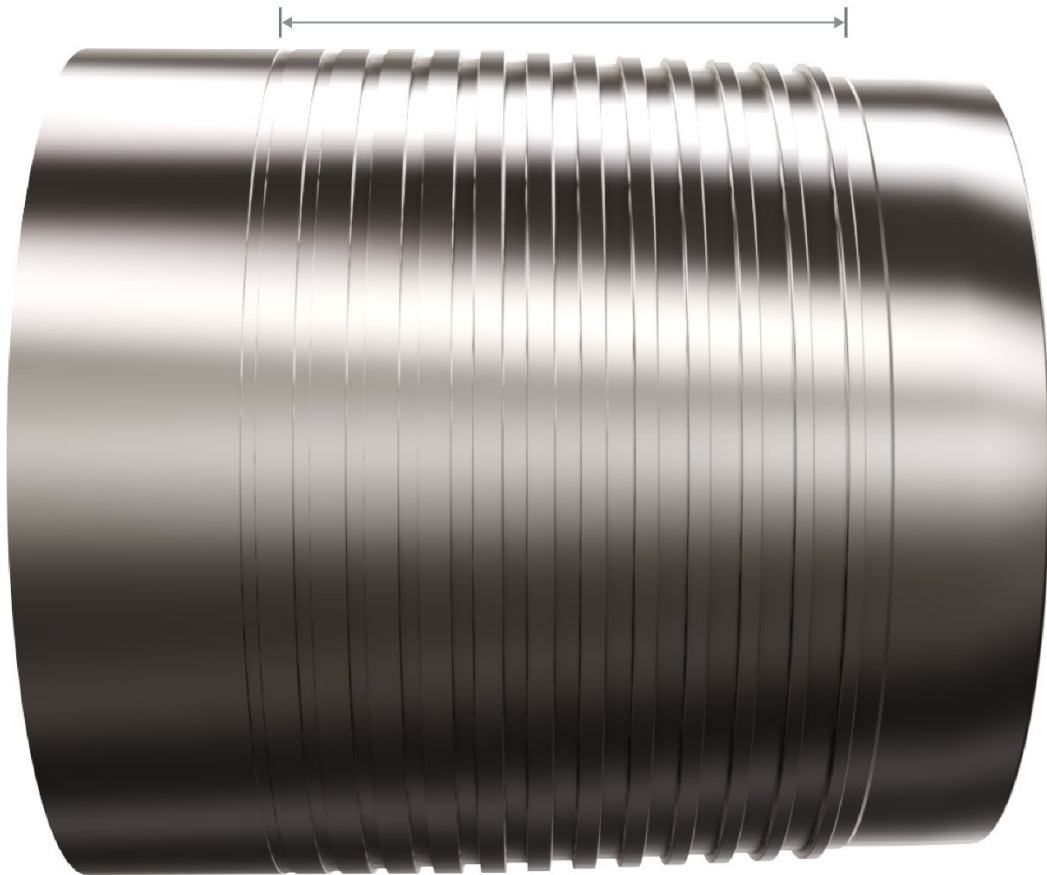
### Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The TORQ® QXW™ connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.
5. Re-run
6. It is recommended to apply the backup tongs on the lower half of the coupling during pin field end break out to prevent backing out the coupling.
7. The pin and coupling must be thoroughly cleaned and visually inspected for any damage after each break out.
8. The joint must be laid down if for any reason it is determined that a coupling must be bucked-off.
9. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
10. ***The TORQ® QXW™ connections shall not be used as work strings.***

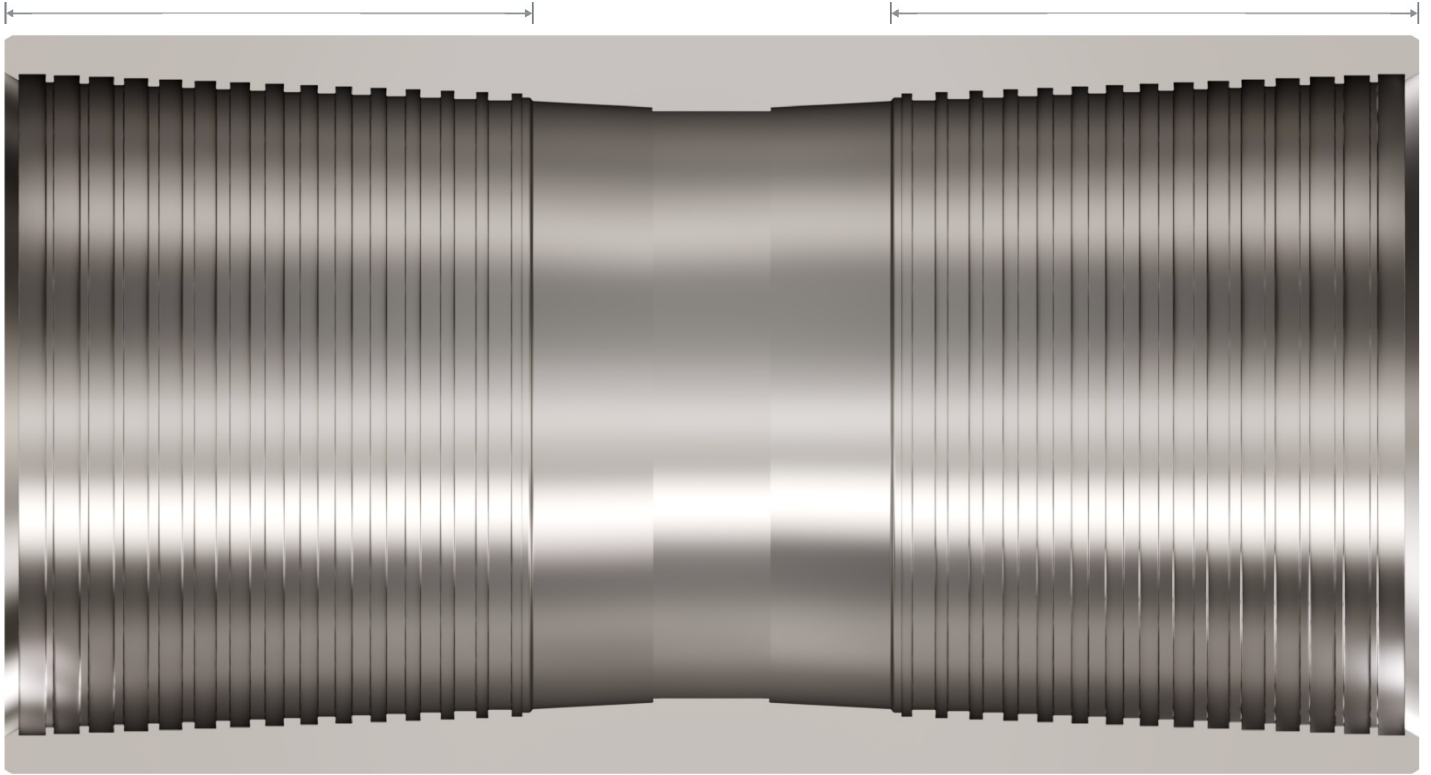
## Field Repair

1. Field repair of TORQ® QXW™ connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Small scratches and dents on the pin and box face may be permissible or repaired.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Spray the connection with an even coat of “dry moly” and allow it to dry.
6. Only qualified personnel may make the decision regarding the serviceability of a given connection.
7. ***Loose burrs and sharp raised edges must be removed or rounded down.***
8. ***Seal areas cannot be repaired in the field and must be free of any damages.***

Entire threaded area of Pin may be repaired



Entire threaded area of the Coupling may be repaired





In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of TORQ® DQW™ connections.

## Interchangeability

1. TORQ® DQW™ pins are interchangeable between different weights of the same nominal OD. However, the connection is limited to all the mechanical properties of the weakest pin including the make-up torque and downhole rotation.
2. Interchanging pins between weights will not provide an internally flush connection.

## Features

1. TORQ® DQW™ utilizes a tapered wedge thread form.
2. A fully made up TORQ® DQW™ connection may have up to two exposed threads on the pin OD.
3. TORQ® DQW™ can be distinguished by its unique stamp on the pins.

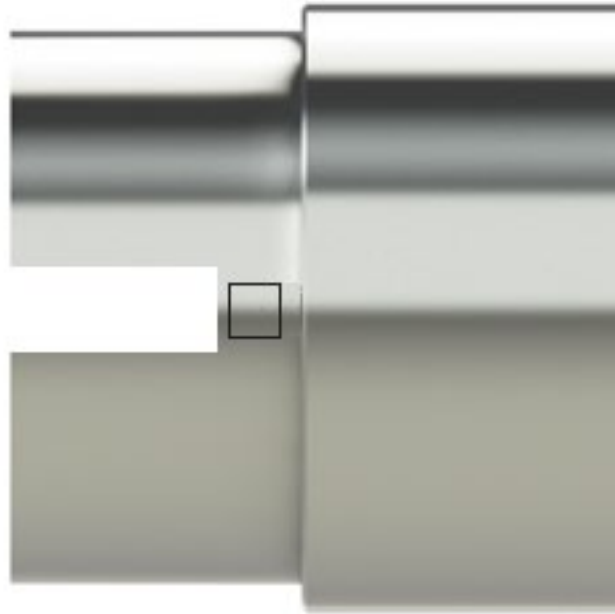
## Thread Compound Application

1. Tenaris recommends the use of BestOLife 2000® or equivalent copper-based thread compound with particle size less than 450 microns that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush or a paintbrush is recommended to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the pin face and all threads as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.



#### Make-up

1. The TORQ® DQW™ connections may be made up without the preferred method of a torque turn graph.
2. The connection should be made up by floating the coupling to allow the coupling self-center itself.
3. For make-up without a torque turn graph, the wedge lock is indicated when the torque gauge needle spikes.
4. Two  $\frac{3}{8}$  inch squares axially spaced from each other along the axis of the pipe are stamped on both pins.
5. A 1 inch by 24-inch white stripe aligned with the squares is painted on the field end pin to aid in locating the squares.
6. All make-ups without the use of torque turn graph must be visually verified with the stamp. The coupling must be positioned between the two squares edges.



1. TORQ® DQW™ connection should be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A wedge lock must be visible for proper make-up. Apply the thread locking compound to all the pin threads.

#### Make-up RPM

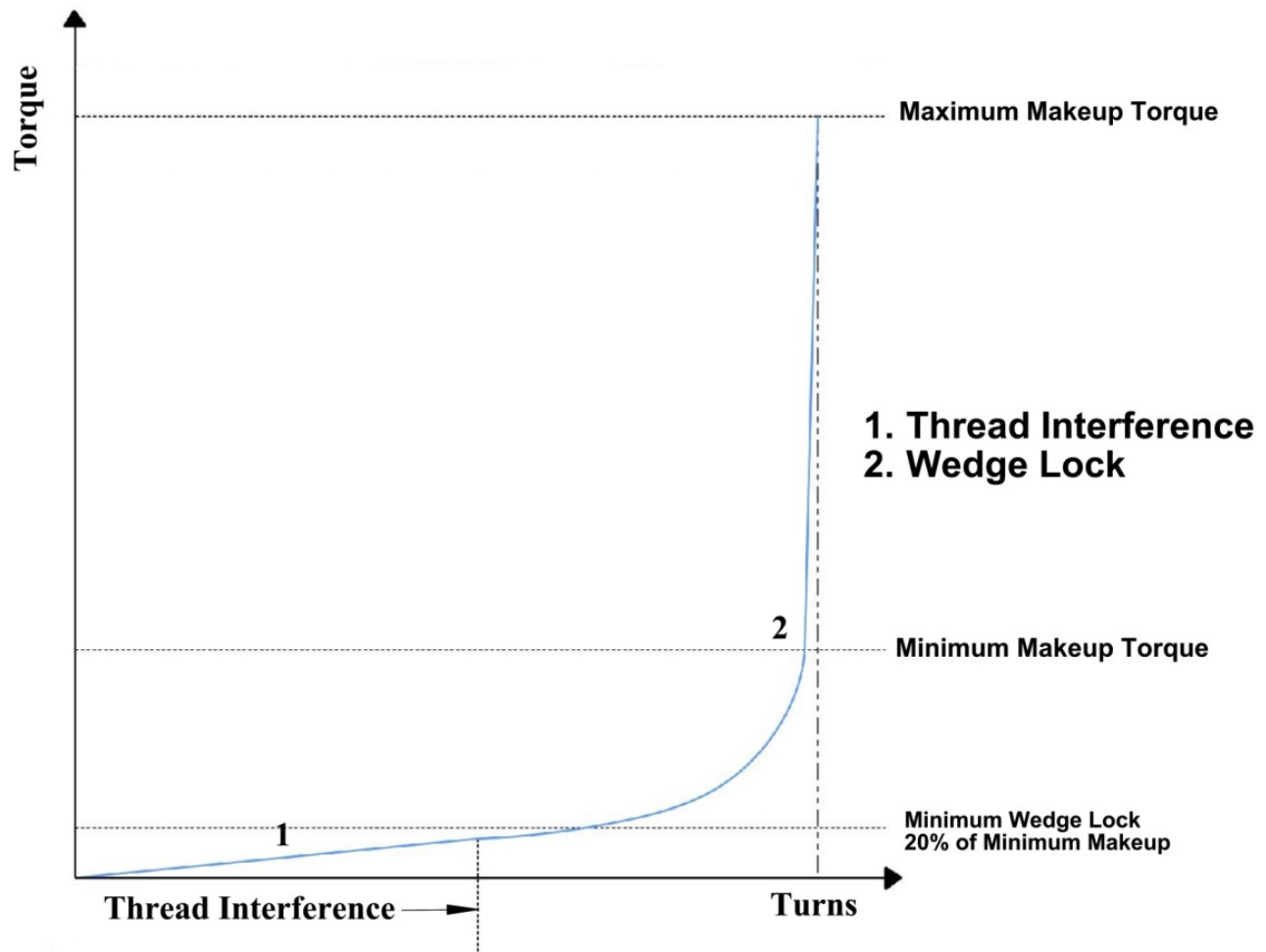
1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the wedge lock engagement appears in the torque turn graph.
3. The below table lists the approximate recommended make-up RPM for the TORQ® DQW™ connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 ½ – 5 ½	35	15
6 ⅝ – 7 ⅝	20	10

#### Wedge Lock Torque

1. The wedge lock shall be clearly visible at a minimum of 20% of minimum make-up torque and at a maximum of 90% of minimum make-up torque when using torque turn monitoring system.
2. If the wedge lock is outside of these specifications, break out and inspect the pin and box.
3. A large torque increase prior to 1 turn from the wedge lock may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for TORQ® DQW™ connections.





### Spinning Coupling

1. Tenaris allows coupling movement of no more than ½ turn on the mill end during make-up.
2. Back-up tongs should **not** be placed on the coupling to avoid coupling spinning. Spinning of the coupling allows the coupling to self-center in preparation for downhole extreme torque rotating.
3. Mill end make-up can be visually verified for proper position with the squares stamp. The coupling must be positioned between the two squares edges.

## Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The TORQ® DQW™ connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

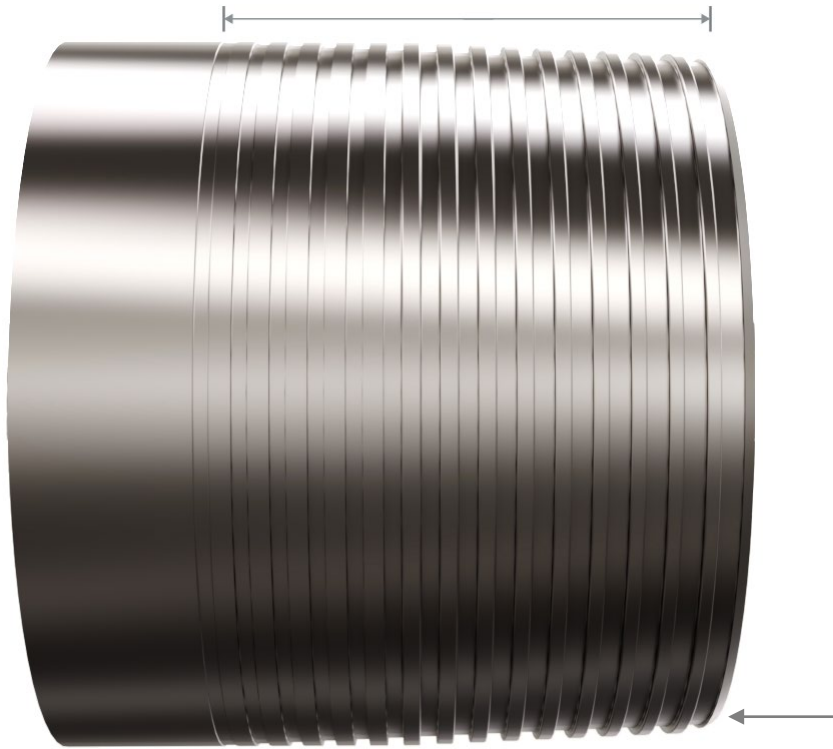
## Re-run

1. The TORQ® DQW™ connections may be used as work strings.
2. It is recommended to apply the backup tongs to the lower half of the coupling during pin field end break out to prevent backing out the coupling.
3. The pin and coupling must be thoroughly cleaned and visually inspected for any damage after each break out.
4. The joint must be laid down if for any reason it is determined that a coupling must be bucked-off.
5. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.

## Field Repair

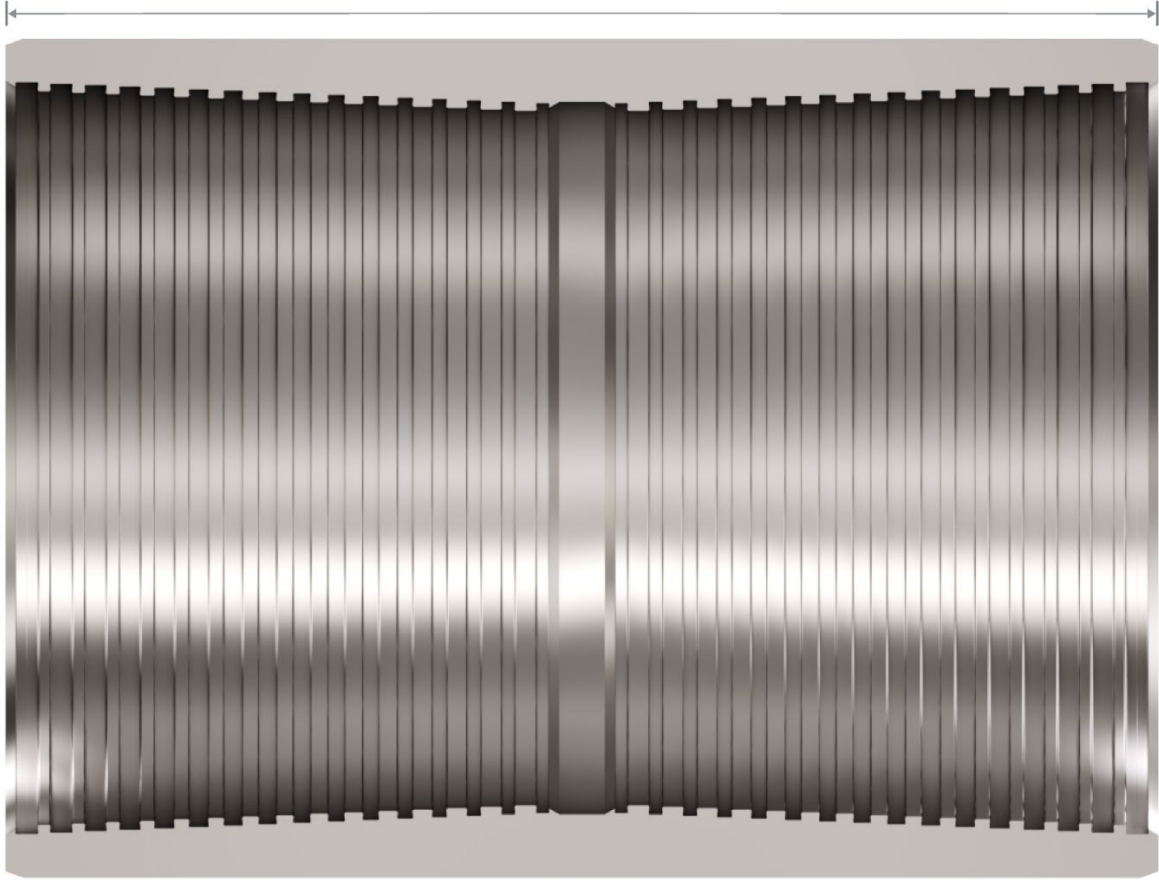
1. Field repair of TORQ® DQW™ connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Galling on pin face may be repaired if it does not exceed 25% of the pipe circumference. The repair shall fully remove any protrusions which may cause galling on subsequent make-up.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Only qualified personnel may make the decision regarding the serviceability of a given connection.
6. ***Loose burrs and sharp raised edges must be removed or rounded down.***

Entire threaded area of Pin may be repaired



Minor tearing and galling in the pin face may be repaired

Repairs may be made to the entire coupling



## TORQ® SPWedge™



In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of TORQ® SPWedge™ Connections.

## Interchangeability

TORQ® SPWedge™ is not interchangeable between different weights of the same nominal OD. A crossover is needed if running a mixed weight string or accessories.

## Features

1. TORQ® SPWedge™ utilizes a tapered wedge thread form.
2. A fully made up TORQ® SPWedge™ connection may have up to three exposed threads on the pin OD.

## Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush or paintbrush is recommended to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to all the threads of the box as demonstrated in the graphic below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.



### Make-up Torque

1. TORQ® SPWedge™ connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A wedge lock must be visible for proper make-up. Apply the thread locking compound to all the box threads.

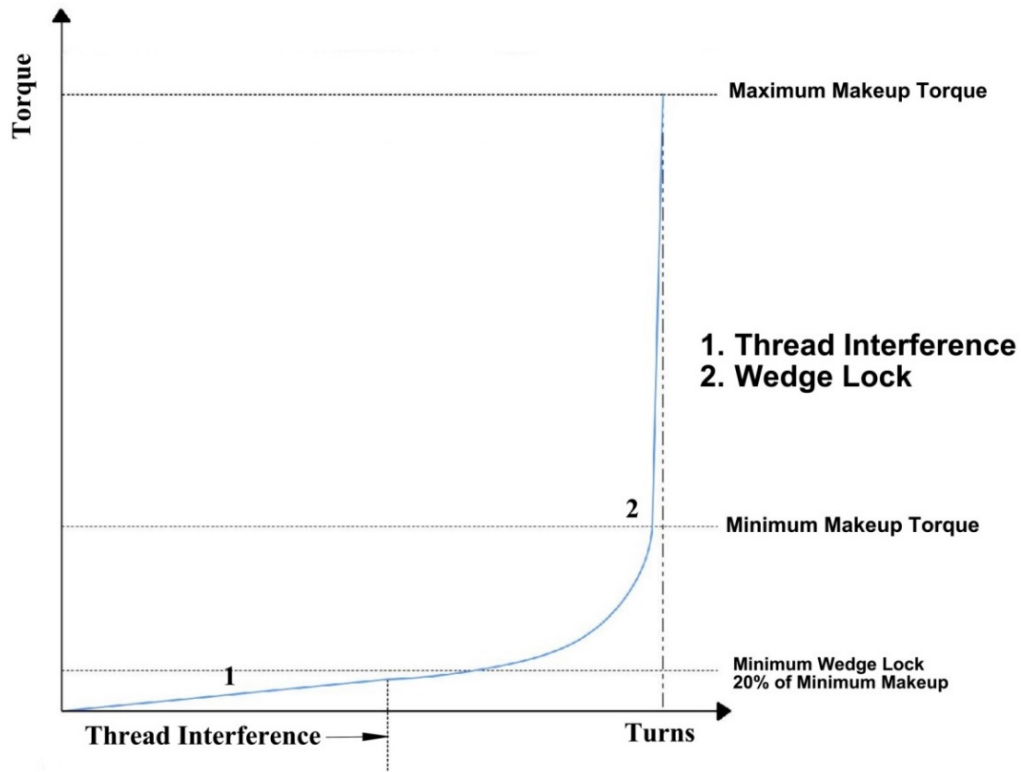
### Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the wedge lock engagement appears in the torque turn graph.
3. The below table lists the approximate recommended make-up RPM for the TORQ® SPWedge™ connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
3 ½ – 5 ½	35	15
6 ⅝ – 7 ⅝	20	10
8 ⅝ – 9 ⅝	10	5
10 ¾ – 13 ⅝	6	3

### Wedge Lock Torque

1. The wedge lock shall be clearly visible at a minimum of 20% of minimum make-up torque and at a maximum of 90% of minimum make-up torque.
2. If the wedge lock is outside of these specifications, break out and inspect the pin and box.
3. A large torque increase prior to 1 turn from the wedge lock may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for TORQ® SPWedge™ connections.



### Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The TORQ® SPWedge™ connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

### Re-run

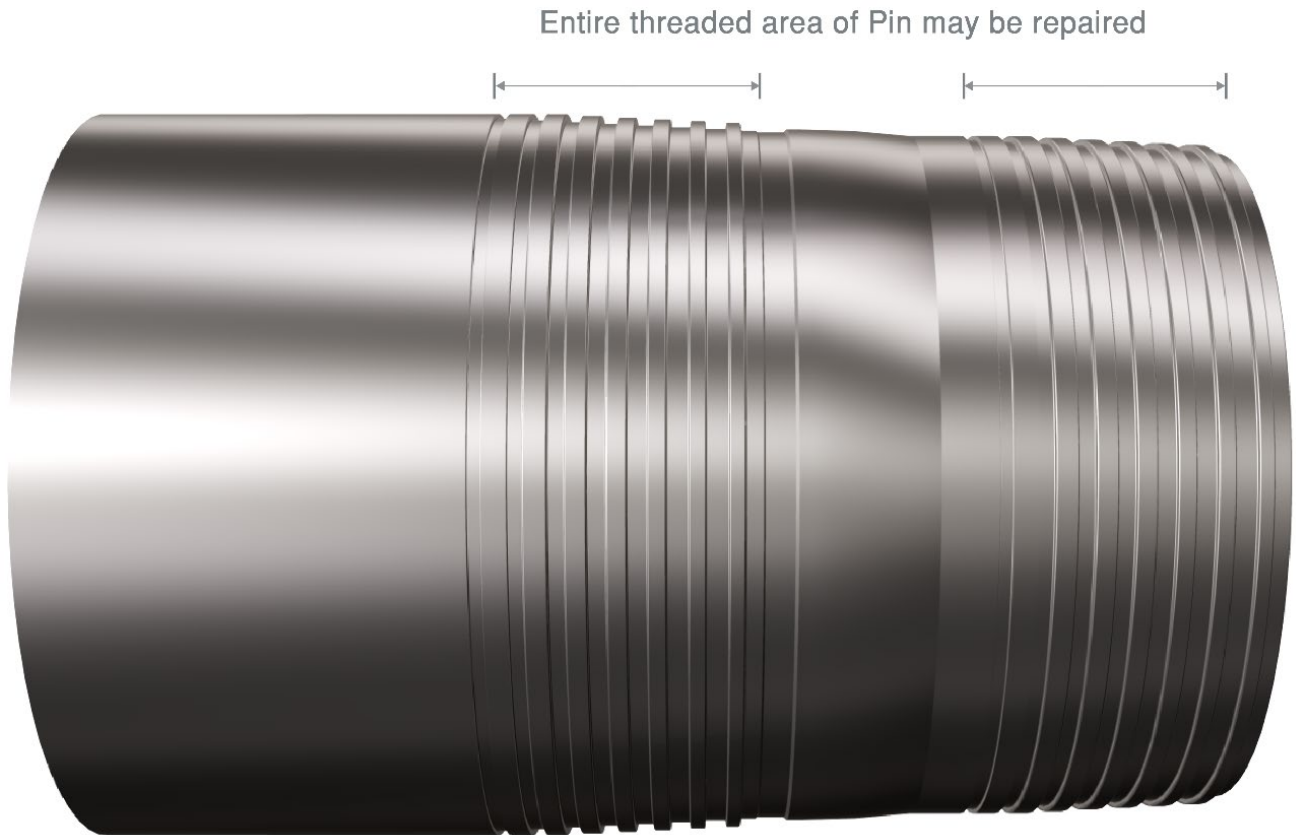
5. The TORQ® SPWedge™ connections may be used as work strings.
6. The pin and box must be thoroughly cleaned and visually inspected for any damage after each break out.
7. Apply an even coat of “dry moly” to the pin and box and allow it to dry.
8. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.

### Field Repair

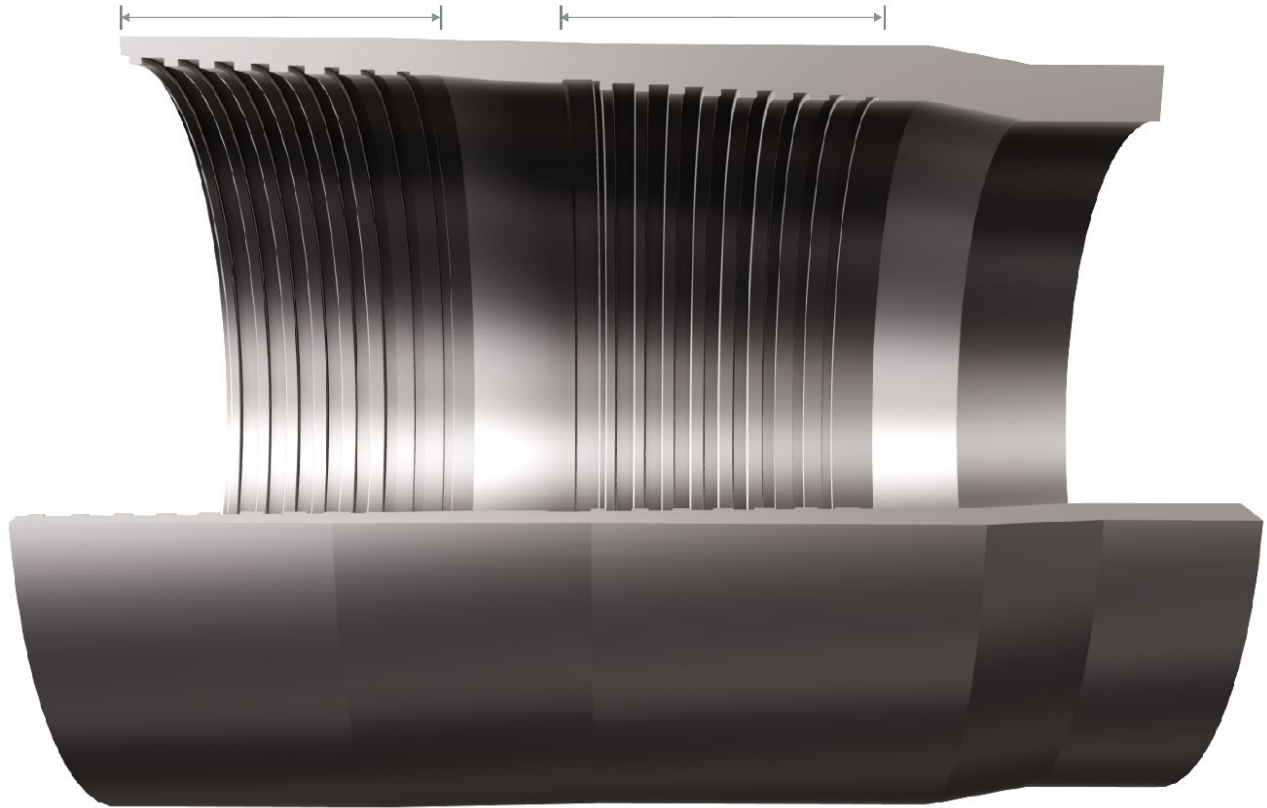
1. Field repair of TORQ® SPWedge™ connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Small scratches and dents on the pin and box face may be permissible or repaired.



4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Spray the connection with an even coat of “dry moly” and allow it to dry.
6. Only qualified personnel may make the decision regarding the serviceability of a given connection.
7. ***Loose burrs and sharp raised edges must be removed or rounded down.***



Entire threaded area of Box may be repaired



## ULTRA™ SF & SFII



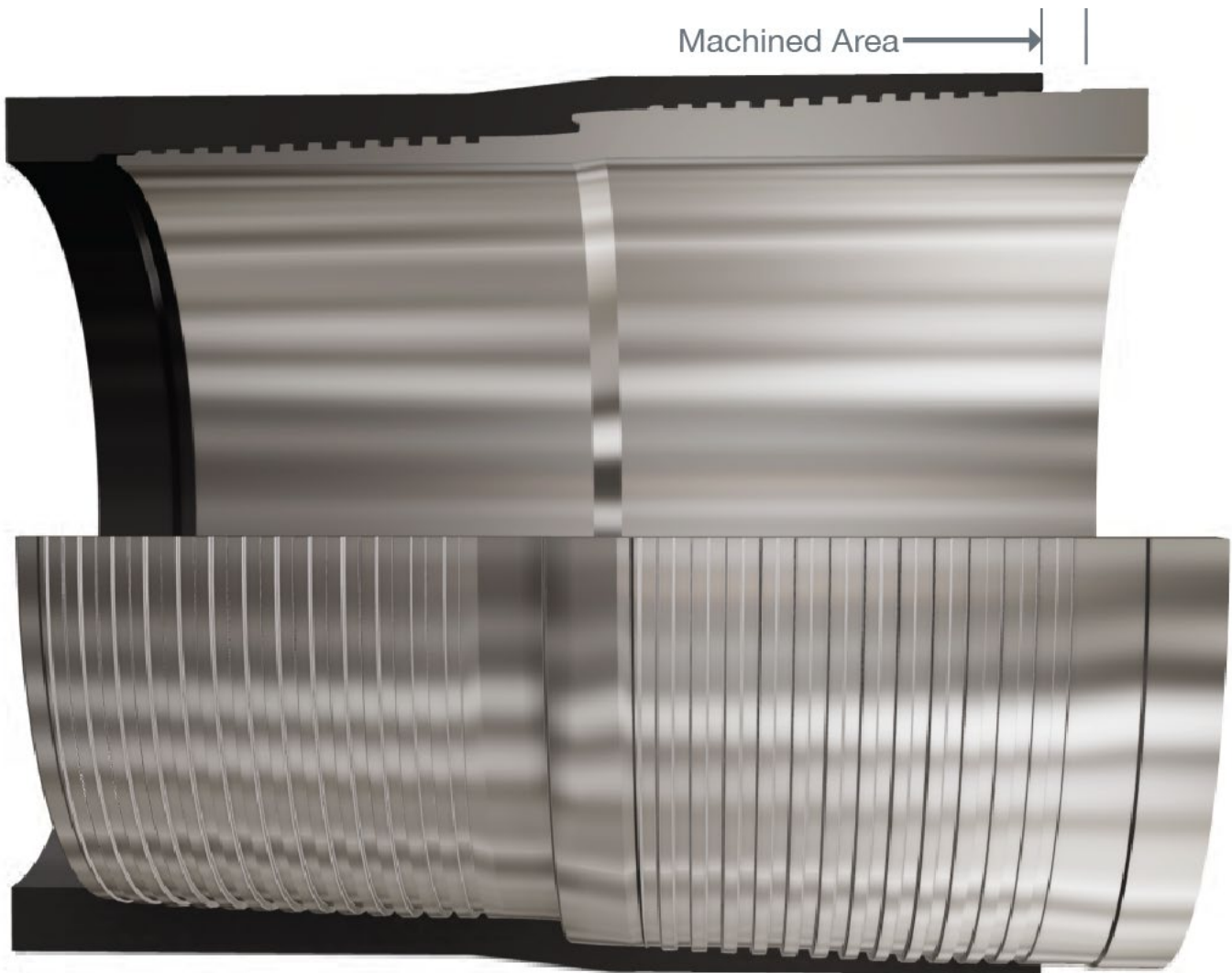
In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of ULTRA™ SF & SFII connections.

## Interchangeability

ULTRA™ SF and SFII are neither compatible between both connections nor interchangeable between different weights of the same connection and nominal OD. A crossover is needed if running a mixed weight string or accessories.

## Features

1. ULTRA™ SF and SFII connections have unique run-in and run-out threads on the pin and box:
  - A run-in thread is an imperfect thread, in the first few starting threads, formed as an insert cuts on a cylindrical path into a previously blanked cone. The threads start from zero thread height and become taller with each thread until they become full in height.
  - A run-out thread (e.g. Buttress pin) is an imperfect thread, in the back-end threads, formed as an insert cuts on a taper path and intersects a cylinder. The threads start full in height and shorten with each thread until they disappear.
2. A fully ULTRA™ SF and SFII shouldered connection will have a machined area on the pin OD that extends 0.250" from the box face.



3. This area may or may not be prominent depending on the actual pipe diameter on which the connection is threaded.
4. This area will decrease in length as delta torque is applied.
5. This feature is there to allow the box to make up over the machined surface and it is not intended as a make-up indicator.
6. ULTRA™ SF and SFII can be distinguished by their unique center shoulder seal configuration on the pin and box. A conical seal configuration on ULTRA™ SF and spherical seal configuration on UP ULTRA™ SFII as shown on the next page.



ULTRA™ SF



ULTRA™ SFII

## Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the box seal and back step threads and to the pin seal and back step threads as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.



6. Care is to be taken to prevent thread compound from going into the pin and box center shoulder seal groove to avoid dope squeeze and anomalies in the torque turn graph.



### Make-up Torque

1. ULTRA™ SF and SFII connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled the first time.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up. Apply the thread locking compound to the threads only and apply running compound to the seal area.

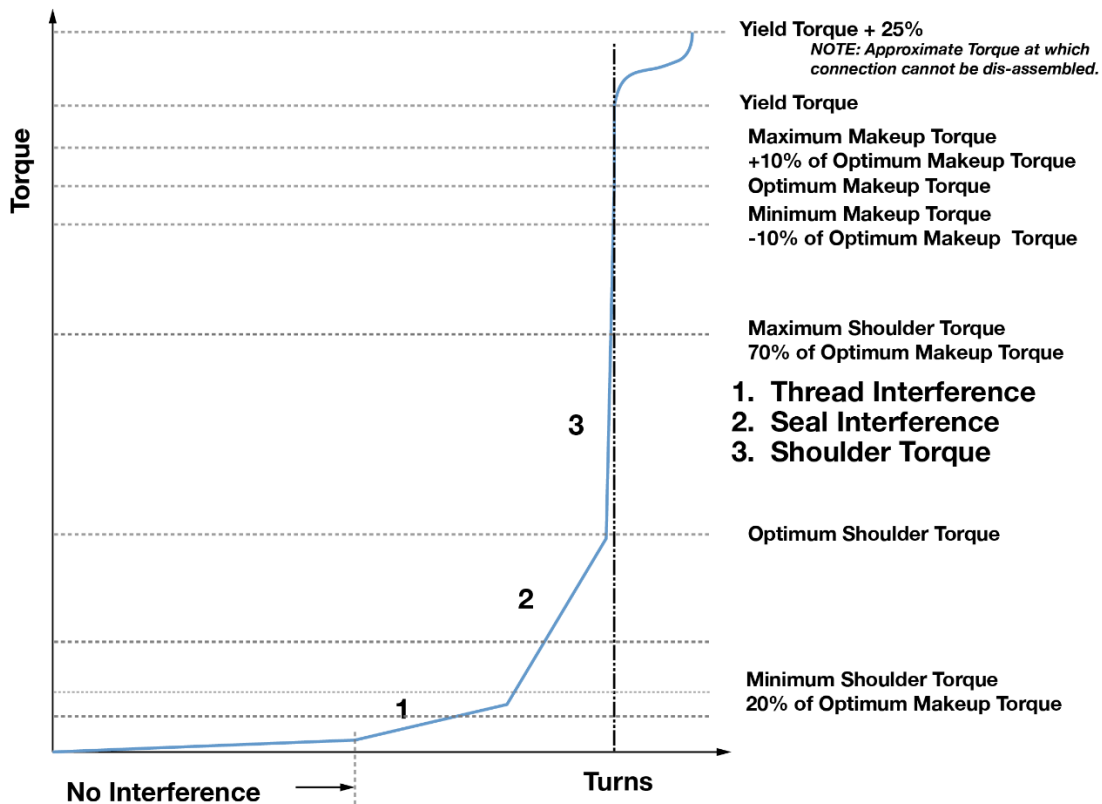
### Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the seal engagement appears in the torque turn graph.
3. Power tongs should remain in low gear and at a constant RPM once the seal engages.
4. The below table lists the approximate recommended make-up RPM for the ULTRA™ SF and SFII connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
3 ½	30	15
4 – 5 ½	20	10
6 ⅝ – 7 ⅝	15	7
8 ⅝ – 9 ⅝	10	5
10 ¾ – 14	6	3
16 ≥	4	2

## Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 20% of optimum make-up torque and at a maximum of 70% of optimum make-up torque and with a 0.020 – 0.200 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and box.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for ULTRA™ SF and SFII connections.



## Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The minimum make-up torque is the safest downhole rotating torque. This will ensure that the connection can be broken out and made up again.
3. The ULTRA™ SF and SFII connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
4. The seals will swell and the connection may not disassemble beyond the operating torque.
5. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
6. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

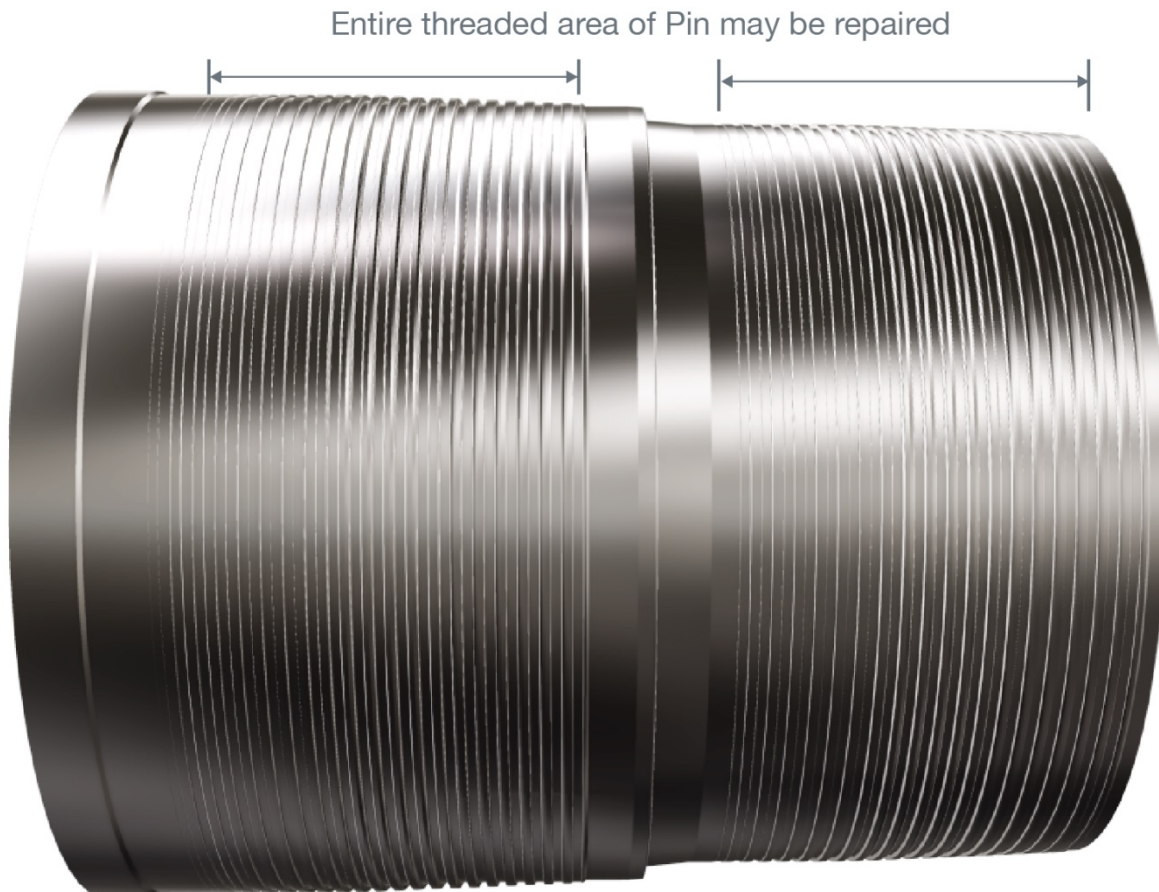


## Re-run

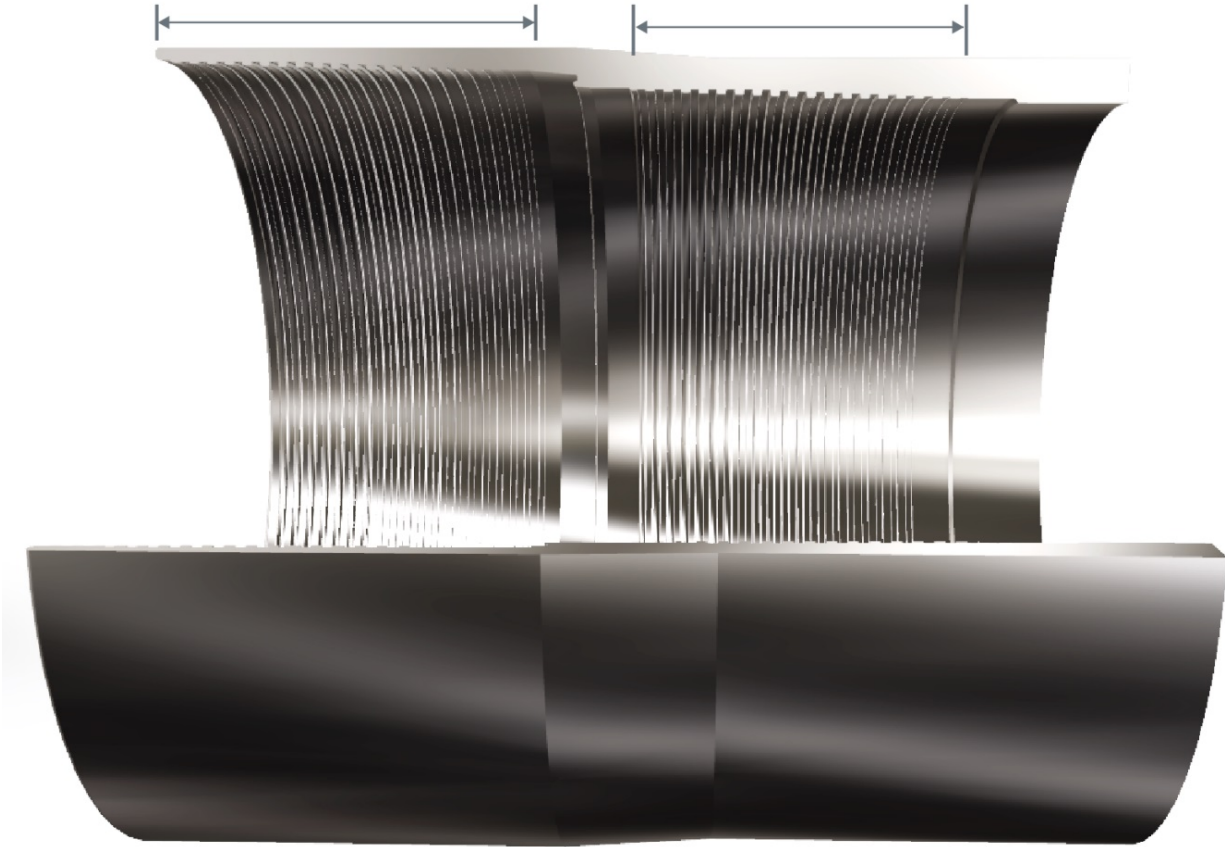
1. The pin and box must be thoroughly cleaned and visually inspected for any damage after each break out.
2. Apply an even coat of “dry moly” to the pin and box and allow it to dry.
3. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
4. ***The ULTRA™ SF and SFII connections shall not be used as work strings.***

## Field Repair

1. Field repair of ULTRA™ SF and SFII connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Small scratches and dents on the pin and box face may be permissible or repaired.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Spray the connection with an even coat of “dry moly” and allow it to dry.
6. Only qualified personnel may make the decision regarding the serviceability of a given connection.
7. ***Seal areas cannot be repaired in the field and must be free of any damages.***
8. ***Loose burrs and sharp raised edges must be removed or rounded down.***



Entire threaded area of Box may be repaired



## ULTRA™ FJ



In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of ULTRA™ FJ connections.

## Interchangeability

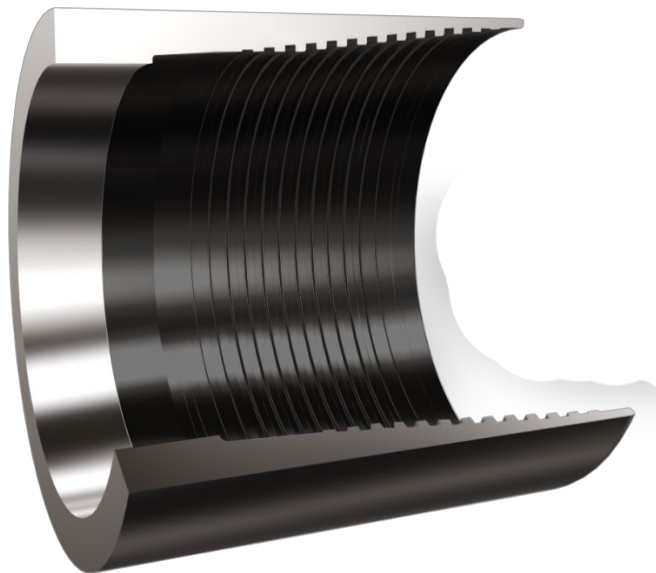
ULTRA™ FJ is not interchangeable between different weights of the same nominal OD. A crossover is needed if running a mixed weight string or accessories.

## Features

1. ULTRA™ FJ connections have unique run-in and run-out threads on the pin and box:
  - A run-in thread is an imperfect thread, in the first few starting threads, formed as an insert cuts on a cylindrical path into a previously blanked cone. The threads start from zero thread height and become taller with each thread until they become full in height.
  - A run-out thread (e.g. Buttress pin) is an imperfect thread, in the back-end threads, formed as an insert cuts on a taper path and intersects a cylinder. The threads start full in height and shorten with each thread until they disappear.

## Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the entire box and to the pin face and seal area as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.





### Make-up Torque

1. ULTRA™ FJ connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled the first time.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up. Apply the thread locking compound to the threads only and apply running compound to the seal area.

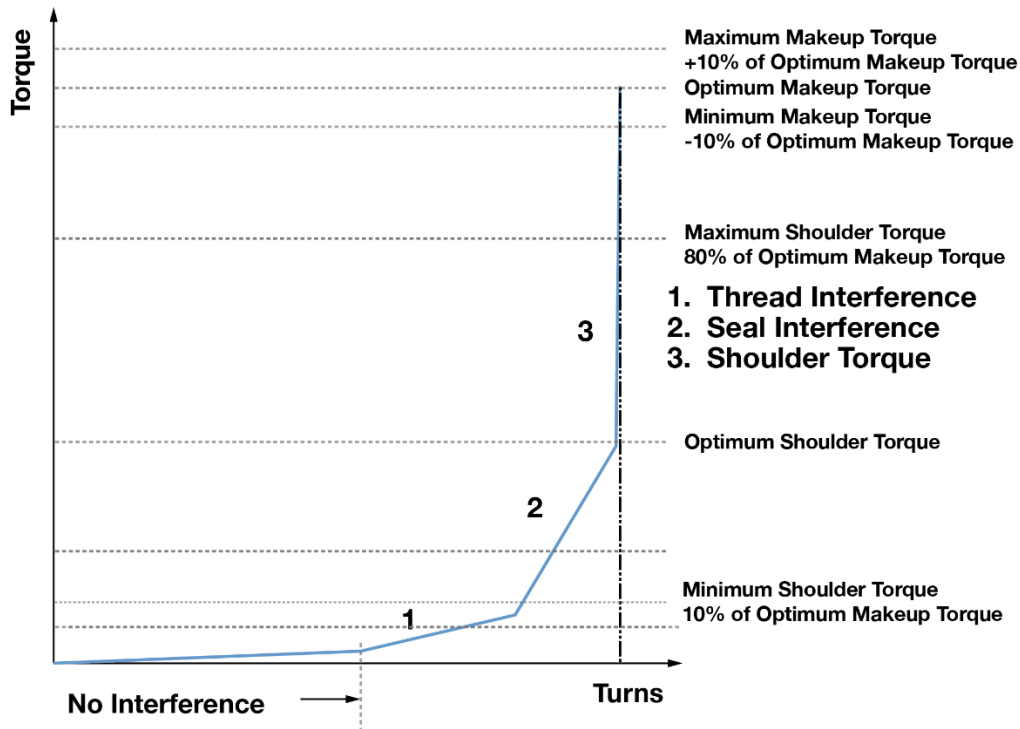
### Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the seal engagement appears in the torque turn graph.
3. Power tongs should remain in low gear and at a constant RPM once the seal engages.
4. The below table lists the approximate recommended make-up RPM for the ULTRA™ FJ connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
2 7/8 – 3 1/2	30	15
4 – 5 1/2	20	10
6 5/8 – 7 5/8	15	7
8 5/8 – 9 5/8	10	5
10 3/4 – 14	6	3
16 ≥	4	2

## Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 10% of optimum make-up torque and at a maximum of 80% of optimum make-up torque and with a 0.020 – 0.100 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and box.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for ULTRA™ FJ connections.



## Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The ULTRA™ FJ connection should not be rotated beyond the specified operating torque and RPM should be limited to 30 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

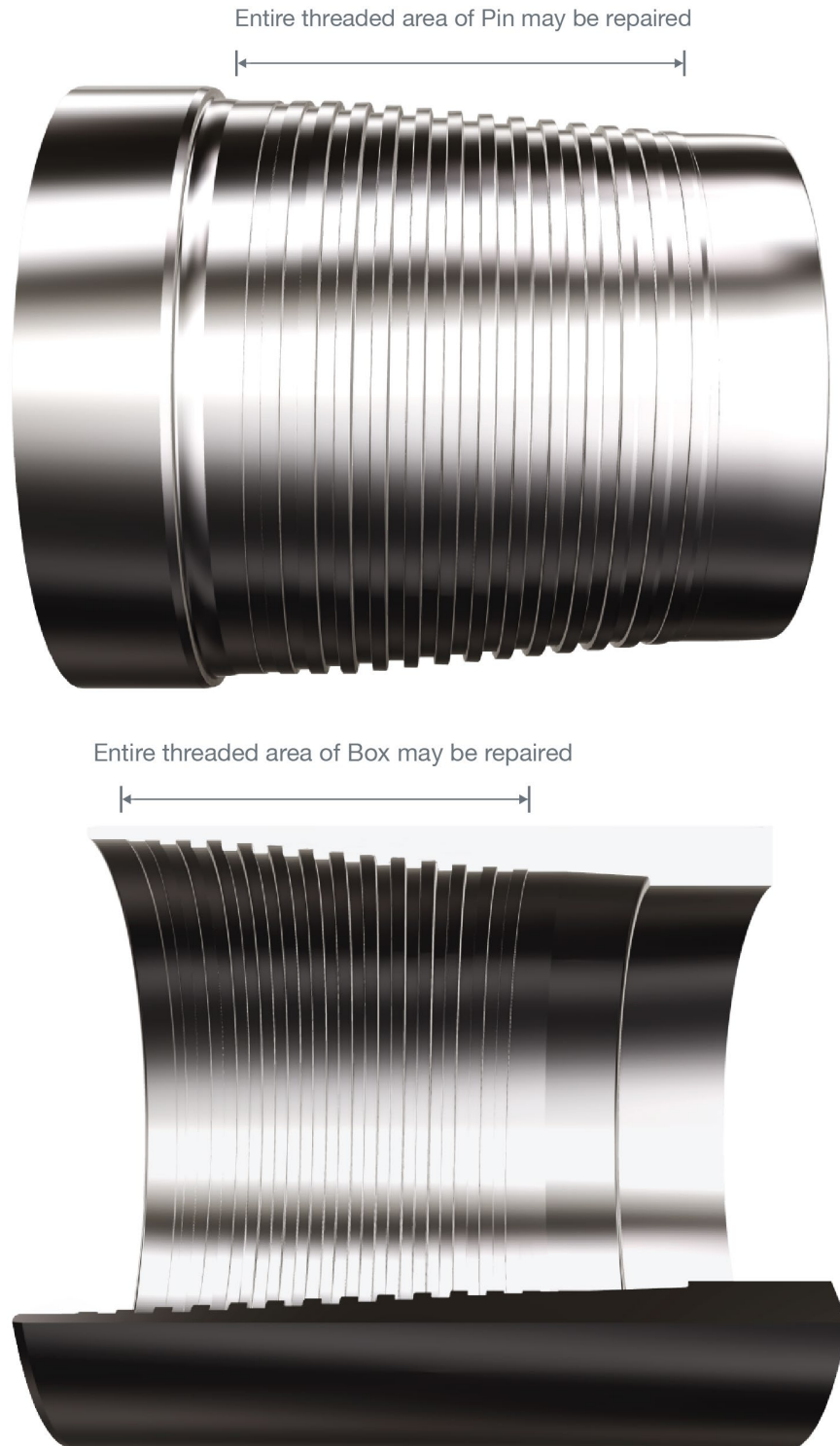
## Re-run

1. The pin and box must be thoroughly cleaned and visually inspected for any damage after each break out.
2. Apply an even coat of "dry moly" to the pin and box and allow it to dry.
3. ***The ULTRA™ FJ connections shall not be used as work strings.***

## Field Repair

1. Field repair of ULTRA™ FJ connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Minor tears and scratches on the pin and box face may be repaired.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.

1. Spray the connection with an even coat of “dry moly” and allow it to dry.
2. Only qualified personnel may make the decision regarding the serviceability of a given connection.
3. ***Seal areas cannot be repaired in the field and must be free of any damages.***
4. ***Loose burrs and sharp raised edges must be removed or rounded down.***





## ULTRA™ FX



In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of ULTRA™ FX connections.

## Interchangeability

ULTRA™ FX is not interchangeable between different weights of the same nominal OD. A crossover is needed if running a mixed weight string or accessories.

## Features

1. ULTRA™ FX connections have unique run-in and run-out threads on the pin and box:
  - A run-in thread is an imperfect thread, in the first few starting threads, formed as an insert cuts on a cylindrical path into a previously blanked cone. The threads start from zero thread height and become taller with each thread until they become full in height.
  - A run-out thread (e.g. Buttress pin) is an imperfect thread, in the back-end threads, formed as an insert cuts on a taper path and intersects a cylinder. The threads start full in height and shorten with each thread until they disappear.

## Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound only to the entire pin including the pin face and shoulder as demonstrated in the graphic below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.



## Make-up Torque

1. ULTRA™ FX connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled the first time.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up. Apply the thread locking compound to the threads only and apply running compound to the seal area.

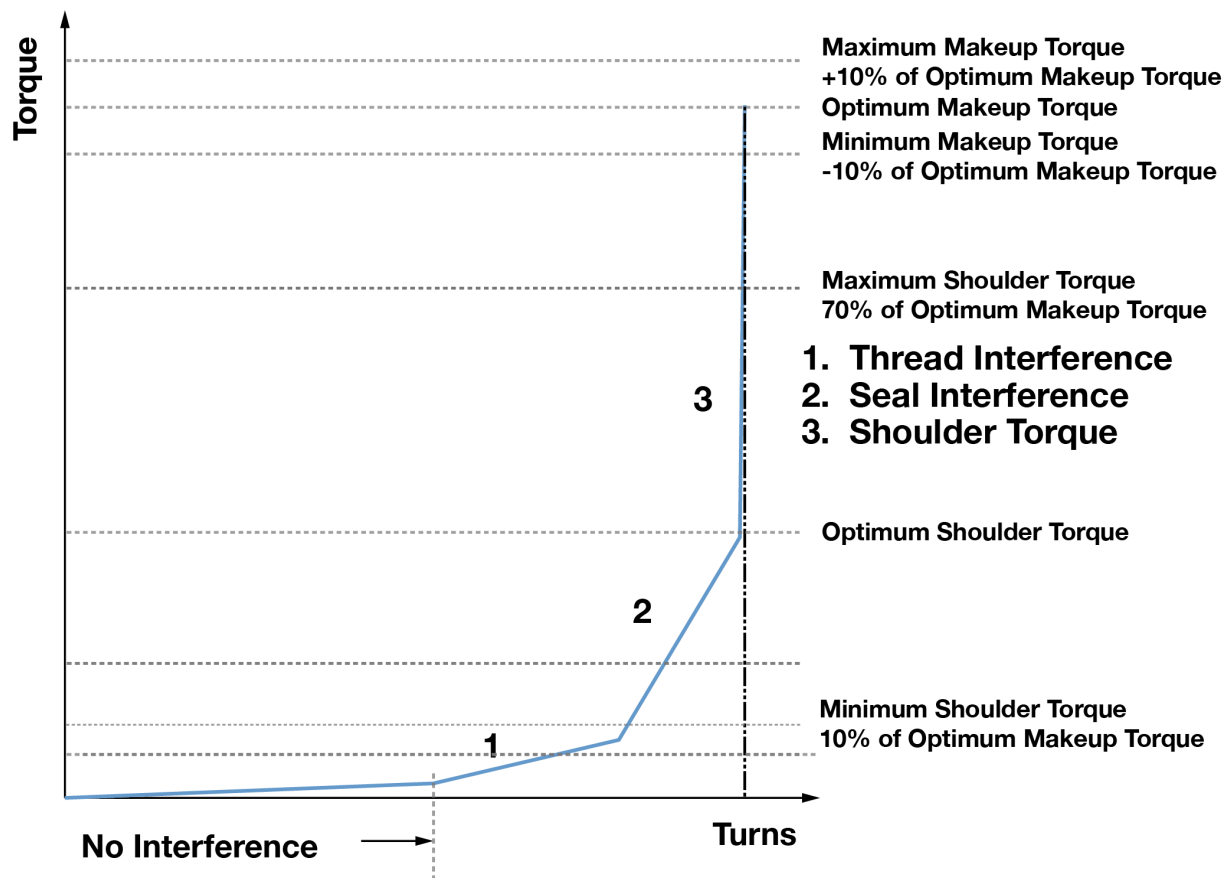
## Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the seal engagement appears in the torque turn graph.
3. Power tongs should remain in low gear and at a constant RPM once the seal engages.
4. The below table lists the approximate recommended make-up RPM for the ULTRA™ FX connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
2 3/8 – 3 1/2	30	15
4 – 5 1/2	20	10

## Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 10% of optimum make-up torque and at a maximum of 70% of optimum make-up torque and with a 0.020 – 0.100 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and box.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for ULTRA™ FX connections.



### Downhole Rotation

1. TENARIS recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The ULTRA™ FX connection should not be rotated beyond the specified operating torque and RPM should be limited to 30 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. TENARIS advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

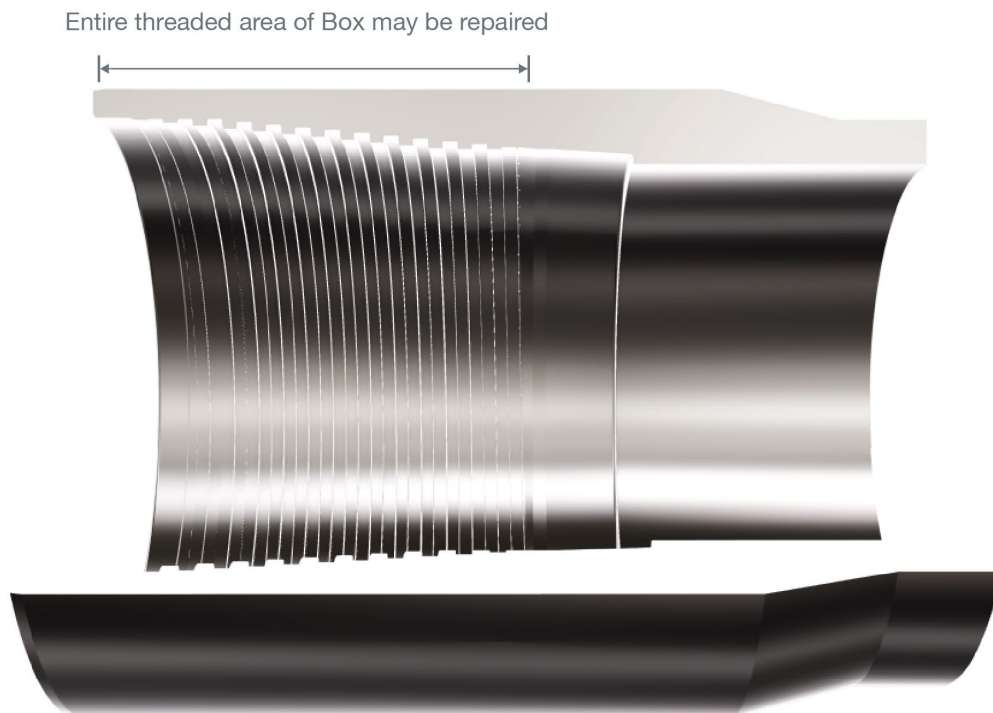
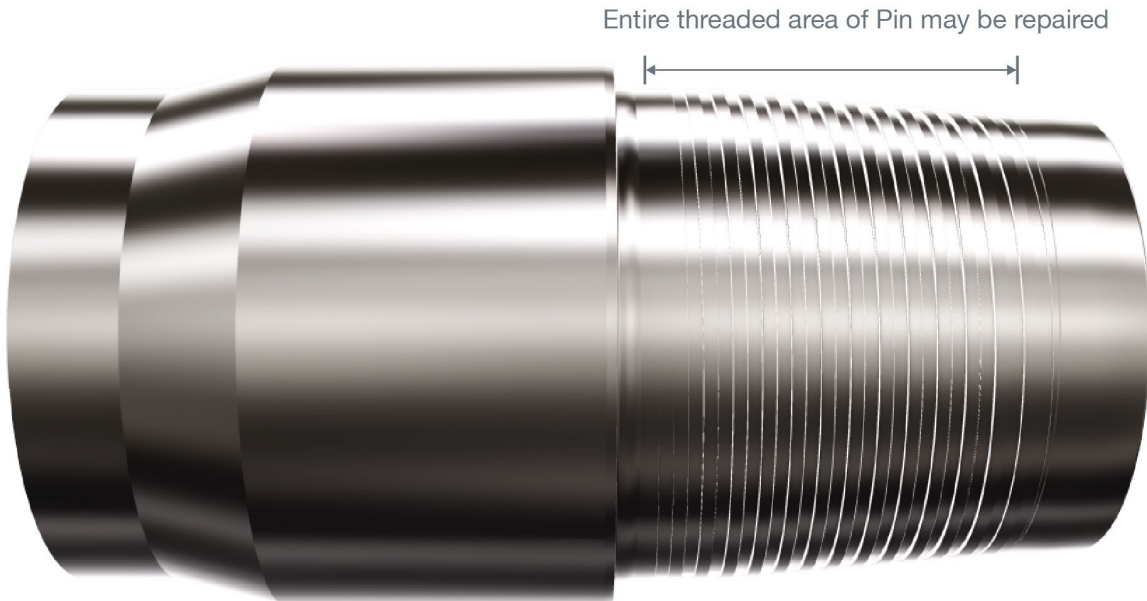
### Re-run

1. The pin and box must be thoroughly cleaned and visually inspected for any damage after each break out.
2. Apply an even coat of "dry moly" to the pin and box and allow it to dry.
3. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
4. ***The ULTRA™ FX connections shall not be used as work strings.***

### Field Repair

1. Field repair of ULTRA™ FX connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.

3. Minor tears and scratches on the pin and box face may be repaired.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Spray the connection with an even coat of “dry moly” and allow it to dry.
6. Only qualified personnel may make the decision regarding the serviceability of a given connection.
7. ***Seal areas cannot be repaired in the field and must be free of any damages.***
8. ***Loose burrs and sharp raised edges must be removed or rounded down.***



## ULTRA™ QX



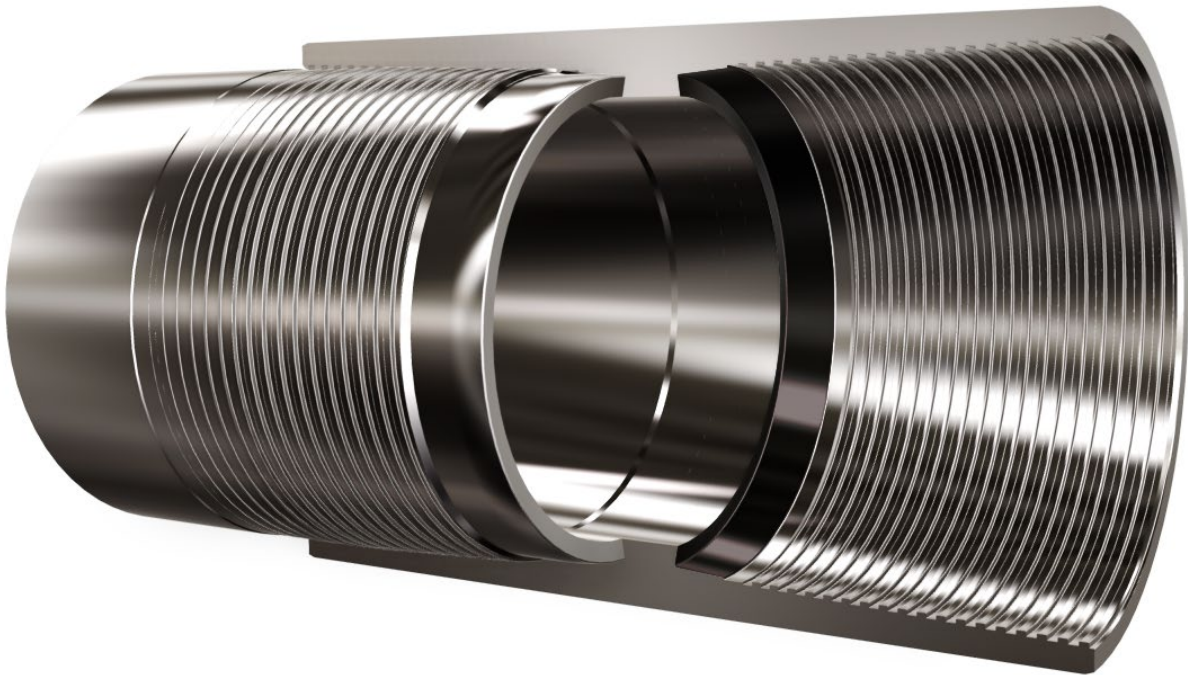
In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of ULTRA™ QX connections.

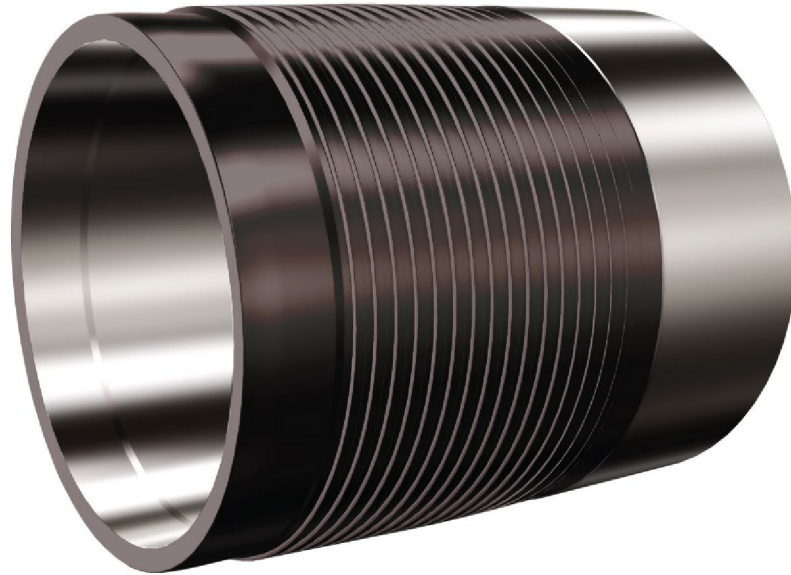
## Interchangeability

ULTRA™ QX pins are not interchangeable between different weights of the same nominal OD. A crossover is needed if running a mixed weight string or accessories.

## Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the entire pin and to the coupling seal area as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.





### Make-up Torque

1. ULTRA™ QX connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled the first time.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up. Apply the thread locking compound to the threads only and apply running compound to the seal area.

### Make-up RPM

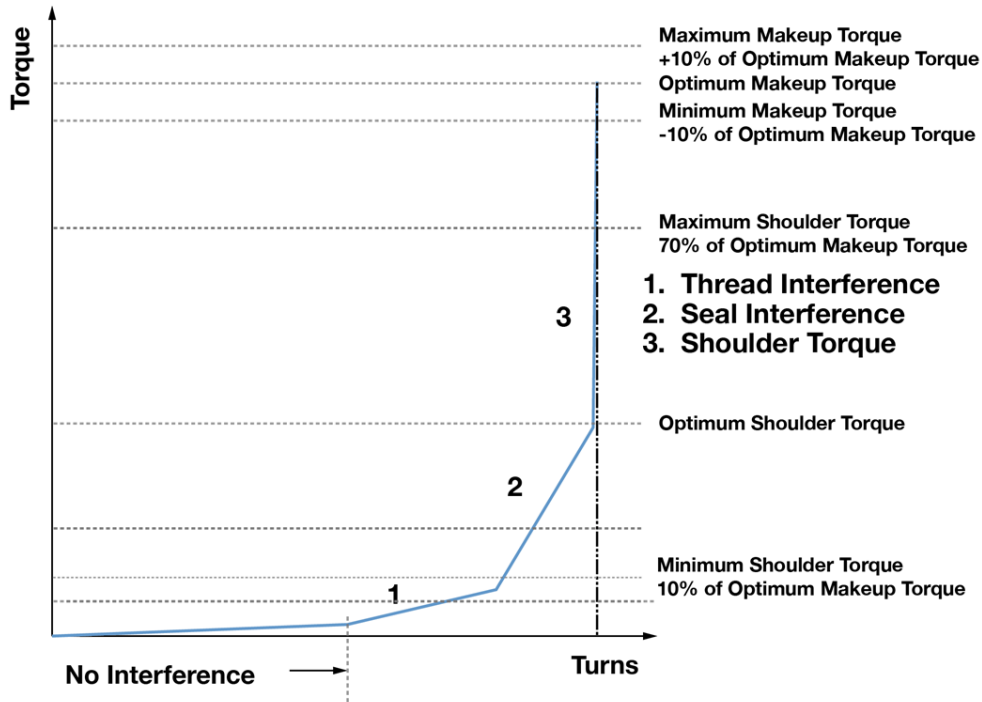
1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the seal engagement appears in the torque turn graph.
3. Power tongs should remain in low gear and at a constant RPM once the seal engages.
4. The below table lists the approximate recommended make-up RPM for the ULTRA™ QX connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 ½ – 5 ½	20	10
6 ⅝ – 7 ⅝	15	7
8 ⅝ – 9 ⅝	10	5
10 ¾ – 14	6	3
16 ≥	4	2



## Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 10% of optimum make-up torque and at a maximum of 70% of optimum make-up torque and with a 0.020 – 0.100 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and coupling.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for ULTRA™ QX connections.



## Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The ULTRA™ QX connection should not be rotated beyond specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

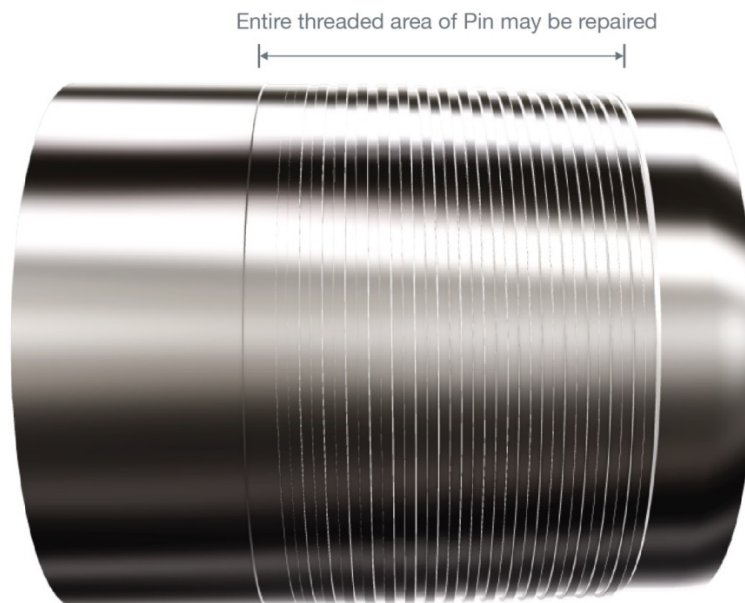
## Re-run

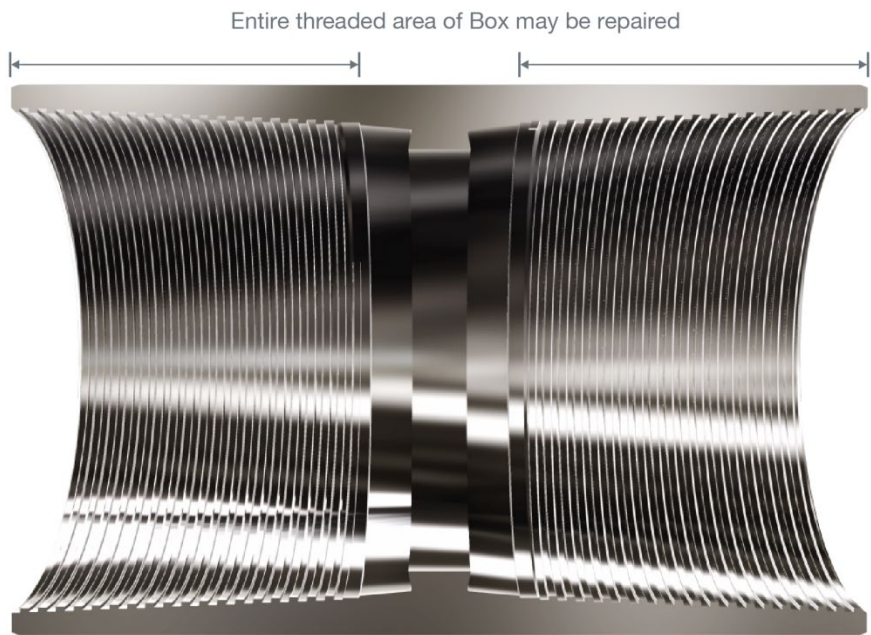
1. It is recommended to apply the backup tongs to the lower half of the coupling or make a paint mark that extends from the mill side of the coupling to the mill end pin to help monitor any movement of the coupling on the mill end during pin field end break out.
2. The pin and coupling must be thoroughly cleaned and visually inspected for any damage after each break out.
3. Apply an even coat of "dry moly" to the pin and allow it to dry.

4. Any subsequent make-up of the connection must be performed to a torque equal or greater than the previous torque to which the connection has experienced. If a different pin is made up into a coupling, the make-up torque must be greater than that which either pin or coupling member has previously experienced.
5. The joint must be laid down if for any reason it is determined that a coupling must be bucked-off.
6. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
7. ***The ULTRA™ QX connections shall not be used as work strings.***

#### Field Repair

1. Field repair of ULTRA™ QX connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Minor tears and scratches on the pin face may be repaired.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Spray the connection with an even coat of “dry moly” and allow it to dry.
6. Only qualified personnel may make the decision regarding the serviceability of a given connection.
7. ***Seal areas cannot be repaired in the field and must be free of any damages.***
8. ***Loose burrs and sharp raised edges must be removed or rounded down.***





## ULTRA™ GX



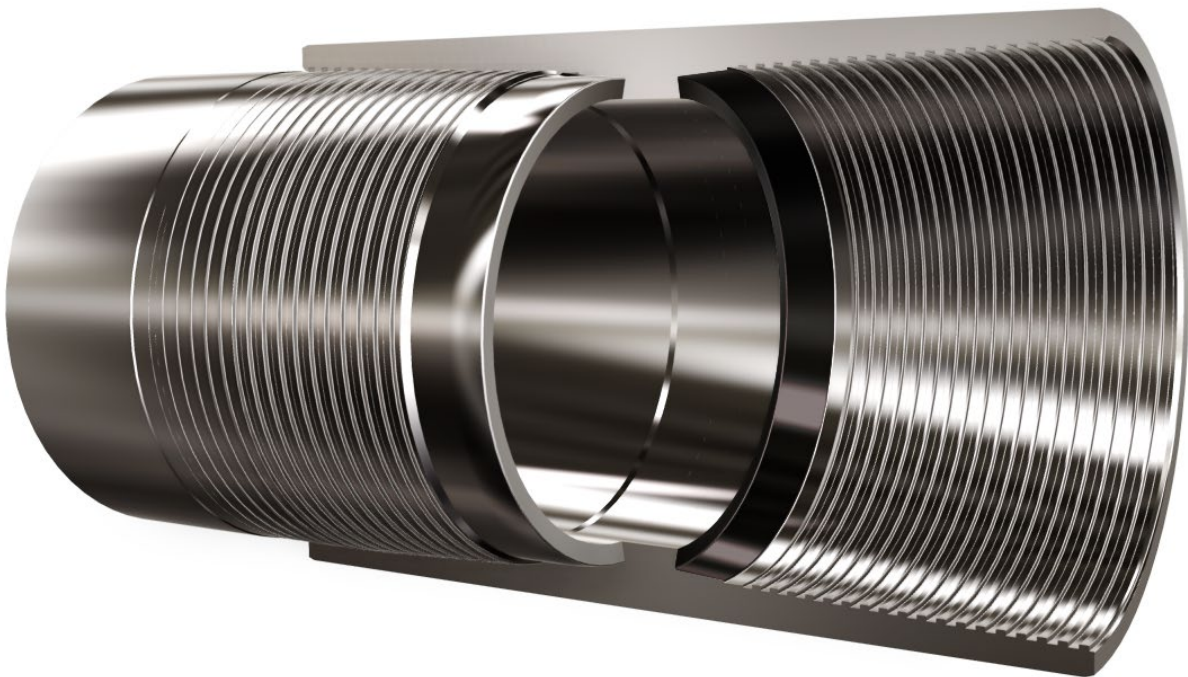
In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of ULTRA™ GX connections.

## Interchangeability

ULTRA™ GX pins are not interchangeable between different weights of the same nominal OD. A crossover is needed if running a mixed weight string or accessories.

## Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the entire pin and to the coupling seal area as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound.





### Make-up Torque

1. ULTRA™ GX connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled the first time.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up. Apply the thread locking compound to the threads only and apply running compound to the seal area.

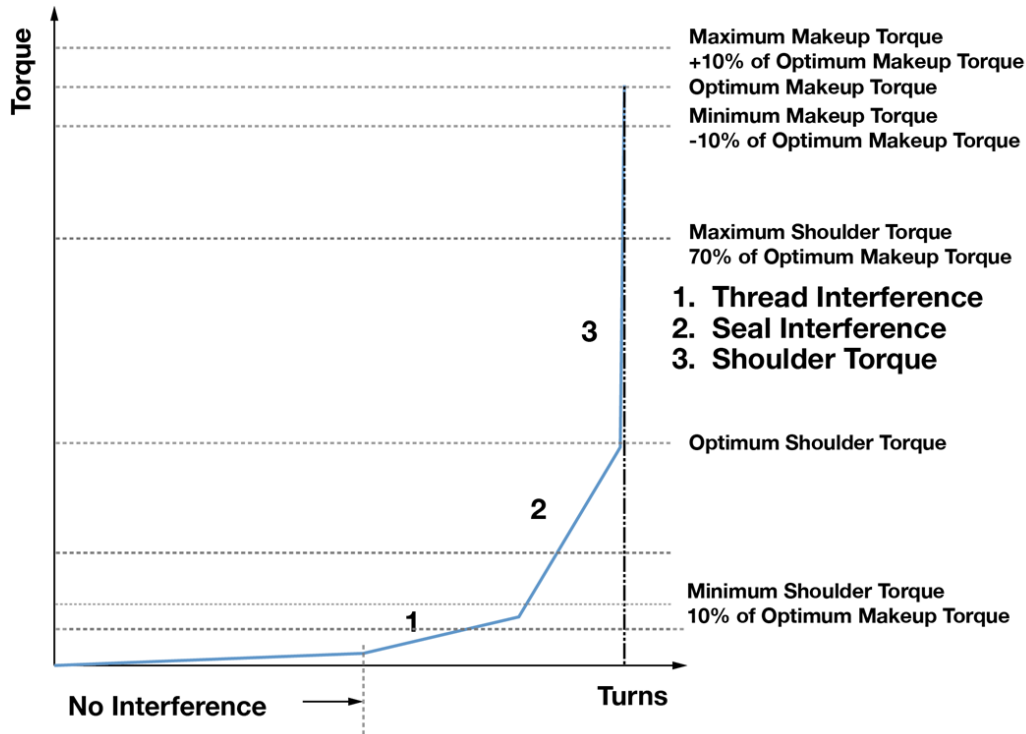
### Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the seal engagement appears in the torque turn graph.
3. Power tongs should remain in low gear and at a constant RPM once the seal engages.
4. The below table lists the approximate recommended make-up RPM for the ULTRA™ GX connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 ½ – 5 ½	20	10
6 ⅝ – 7 ⅝	15	7
8 ⅝ – 9 ⅝	10	5
10 ¾ – 14	6	3

## Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 10% of optimum make-up torque and at a maximum of 70% of optimum make-up torque and with a 0.020 – 0.100 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and coupling.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. See the example graph below that demonstrates the make-up limits for ULTRA™ GX connections.



## Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The ULTRA™ GX connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

## Re-run

1. It is recommended to apply the backup tongs to the lower half of the coupling or make a paint mark that extends from the mill side of the coupling to the mill end pin to help monitor any movement of the coupling on the mill end during pin field end break out.
2. The pin and coupling must be thoroughly cleaned and visually inspected for any damage after each break out.
3. Apply an even coat of "dry moly" to the pin and allow it to dry.
4. Any subsequent make-up of the connection must be performed to a torque equal or greater than the previous torque to which the connection has experienced. If a different pin is made up into a

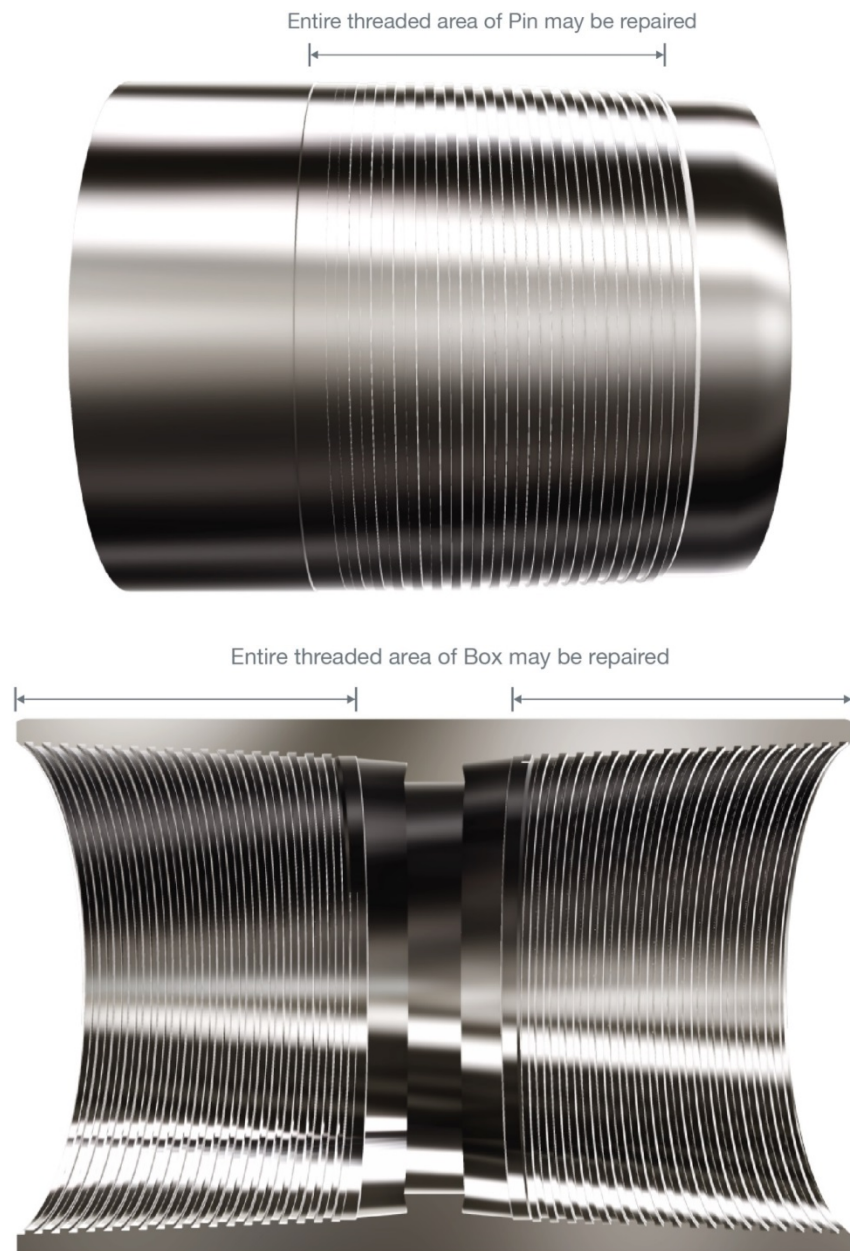
coupling, the make-up torque must be greater than that which either pin or coupling member has previously experienced.

5. The joint must be laid down if for any reason it is determined that a coupling must be bucked-off.
6. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
7. ***The ULTRA™ GX connections shall not be used as work strings.***



## Field Repair

1. Field repair of ULTRA™ GX connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Minor tears and scratches on the pin face may be repaired.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Spray the connection with an even coat of “dry moly” and allow it to dry.
6. Only qualified personnel may make the decision regarding the serviceability of a given connection.
7. **Seal areas cannot be repaired in the field and must be free of any damages.**
8. **Loose burrs and sharp raised edges must be removed or rounded down.**



## ULTRA™ DQX & DQX-HT

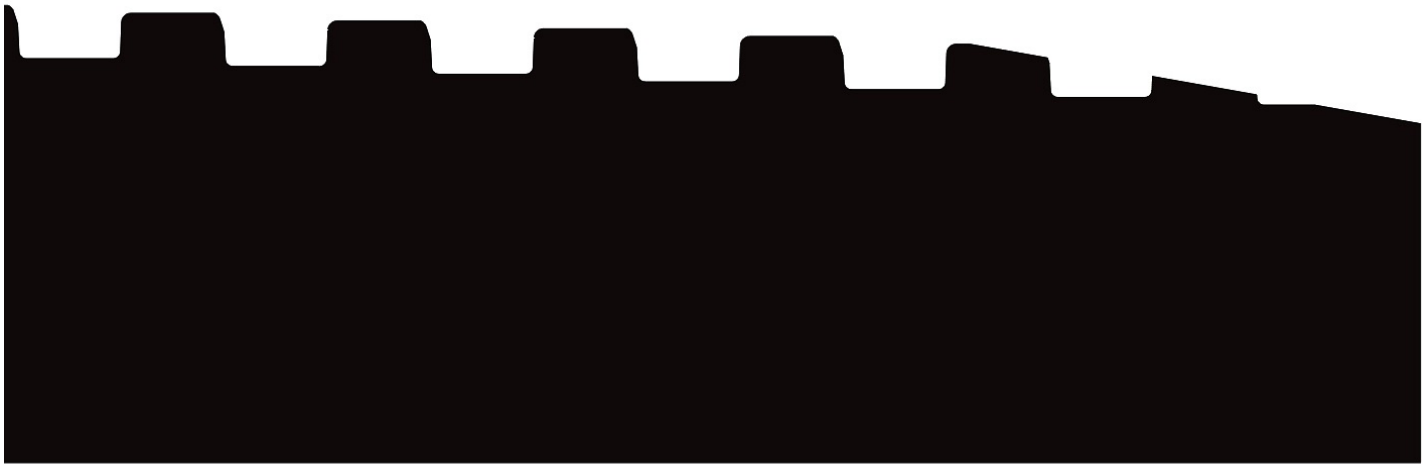


In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of ULTRA™ DQX & DQX HT connections.

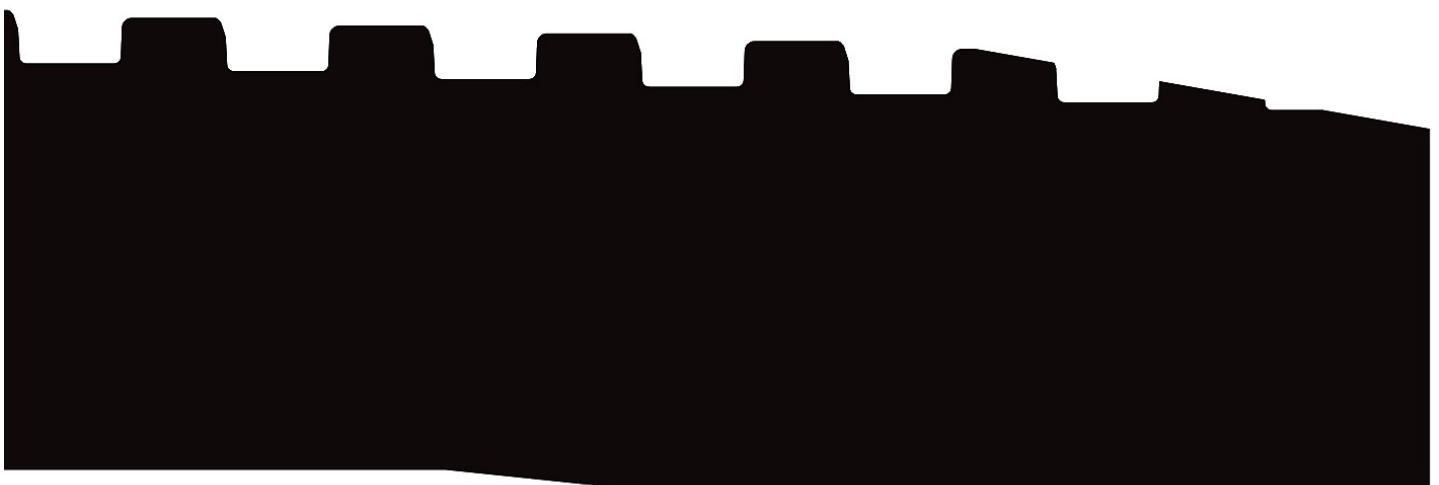
### Interchangeability

1. ULTRA™ DQX and DQX-HT pins are interchangeable between both connections and with different weights of the same nominal OD. However, the connection is limited to all the mechanical properties of the weakest pin including the make-up torque and downhole rotation.

2. Interchanging pins between connections and weights will not provide an internally flush connection.
3. ULTRA™ DQX and DQX-HT can be distinguished by inspecting the pin nose ID. ULTRA™ DQX has a non-machined ID surface and ULTRA™ DQX-HT has a swaged and bored ID surface.



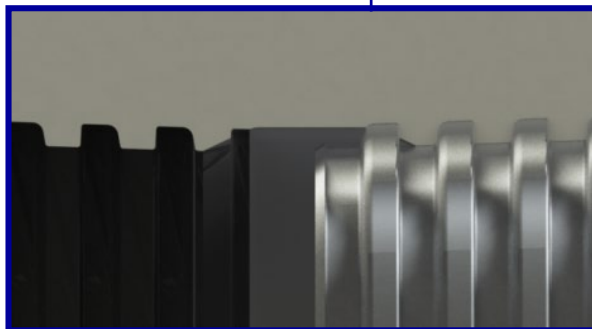
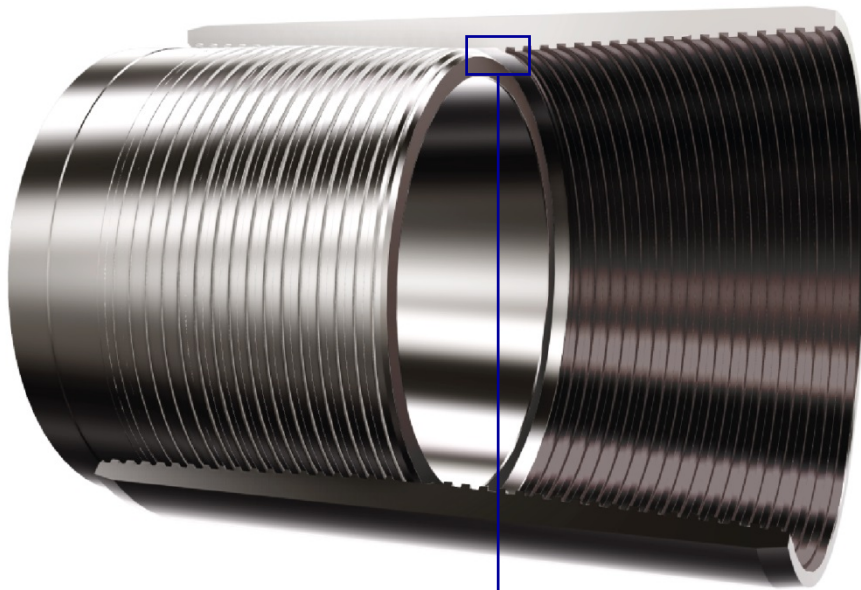
ULTRA™ DQX



ULTRA™ DQX-HT

### Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the pin face and full threads and to the coupling threads as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound. Do not fill the dope pocket (see coupling diagram).



Do not fill thread compound

### Make-up Torque

1. ULTRA™ DQX and DQX-HT connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled the first time.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up.

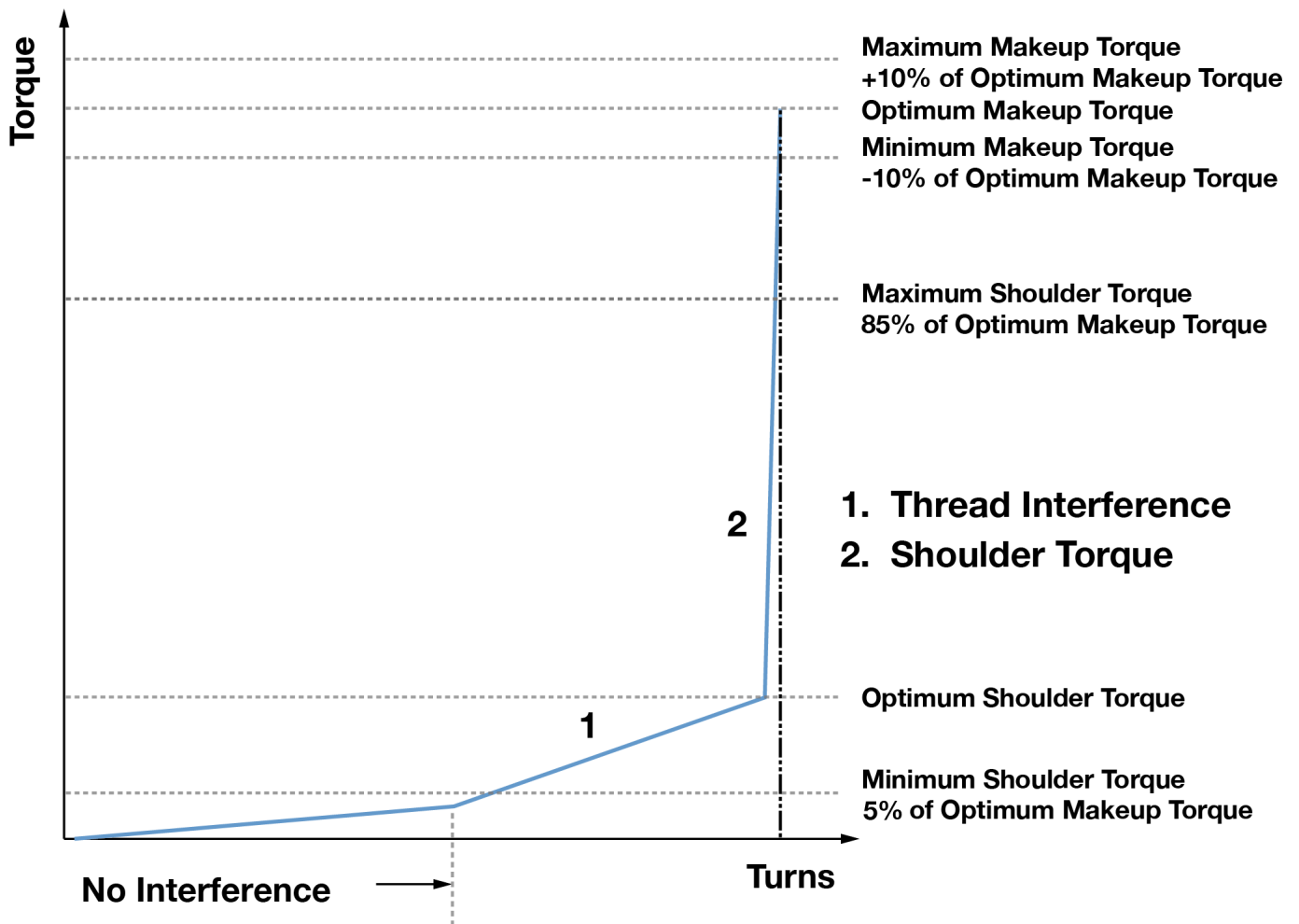
### Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the shoulder engagement appears in the torque turn graph.
3. The below table lists the approximate recommended make-up RPM for the ULTRA™ DQX and DQX-HT connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 ½ – 5 ½	30	15
6 ⅝ – 7 ⅝	20	10
8 ⅝ – 9 ⅝	15	7
10 ¾ – 14	10	5
16 ≥	8	4

### Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 5% of optimum make-up torque and at a maximum of 85% of optimum make-up torque, with a minimum delta torque of 10% of shoulder torque and with a 0.020 – 0.100 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and coupling.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. Ensure the mill end pin is made up to the center of the coupling to prevent a low or high shoulder torque.
5. See the example graph below that demonstrates the make-up limits for ULTRA™ DQX and DQX-HT connections.



### Spinning Coupling

1. Ensure the mill end pin is made up to the center of the coupling to prevent spinning couplings.
2. Tenaris allows coupling movement of no more than  $\frac{1}{2}$  turn on the mill end during make-up.
3. Back-up tongs can be placed on the lower half of the coupling if the coupling spins during make-up.
4. A ruler or caliper may be used to verify the coupling position. Measure from the coupling face to the pin nose face. The acceptable length is  $\frac{1}{2}$  the overall coupling length  $\pm 1/32"$ . Take two readings  $180^\circ$  apart and verify that both readings are within tolerance, if either reading is out of tolerances, take two more and average the four readings.

### Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The ULTRA™ DQX and DQX-HT connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

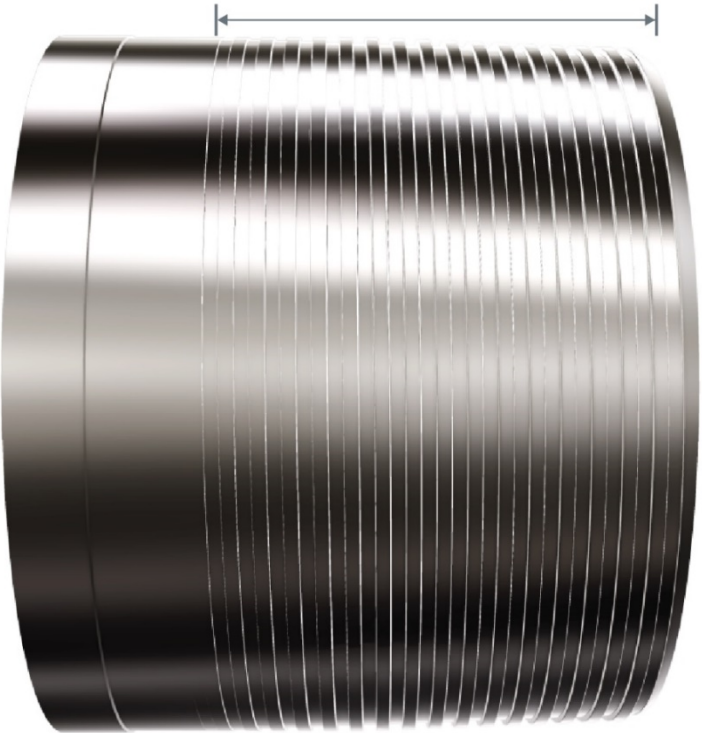
## Re-run

1. The ULTRA™ DQX and DQX-HT connections may be used as work strings.
2. It is recommended to apply the backup tongs to the lower half of the coupling or make a paint mark that extends from the mill side of the coupling to the mill end pin to help monitor any movement of the coupling on the mill end during pin field end break out.
3. The pin and coupling must be thoroughly cleaned and visually inspected for any damage after each break out.
4. Any subsequent make-up of the connection must be performed to a torque equal or greater than the previous torque to which the connection has experienced. If a different pin is made up into a coupling, the make-up torque must be greater than that which either pin or coupling member has previously experienced.
5. The joint must be laid down if for any reason it is determined that a coupling must be bucked-off.
6. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.

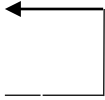
## Field Repair

1. Field repair of ULTRA™ DQX and DQX-HT connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Galling on pin face may be repaired if it does not exceed 25% of the pipe circumference. The repair shall fully remove any protrusions which may cause galling on subsequent make-up.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Only qualified personnel may make the decision regarding the serviceability of a given connection.
6. ***Loose burrs and sharp raised edges must be removed or rounded down.***

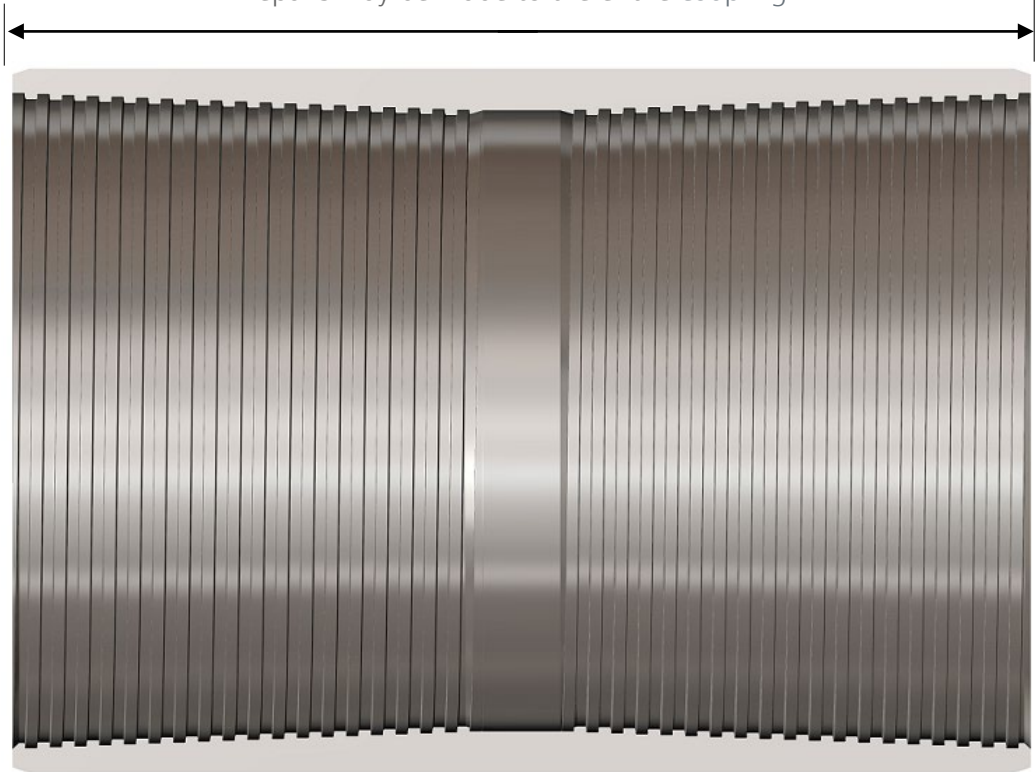
Entire threaded area of Pin may be repaired



Minor tears and scratches on pin nose face may be repaired



Repairs may be made to the entire coupling





## ULTRA™ DQX-SR



In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of ULTRA™ DQX-SR connections.

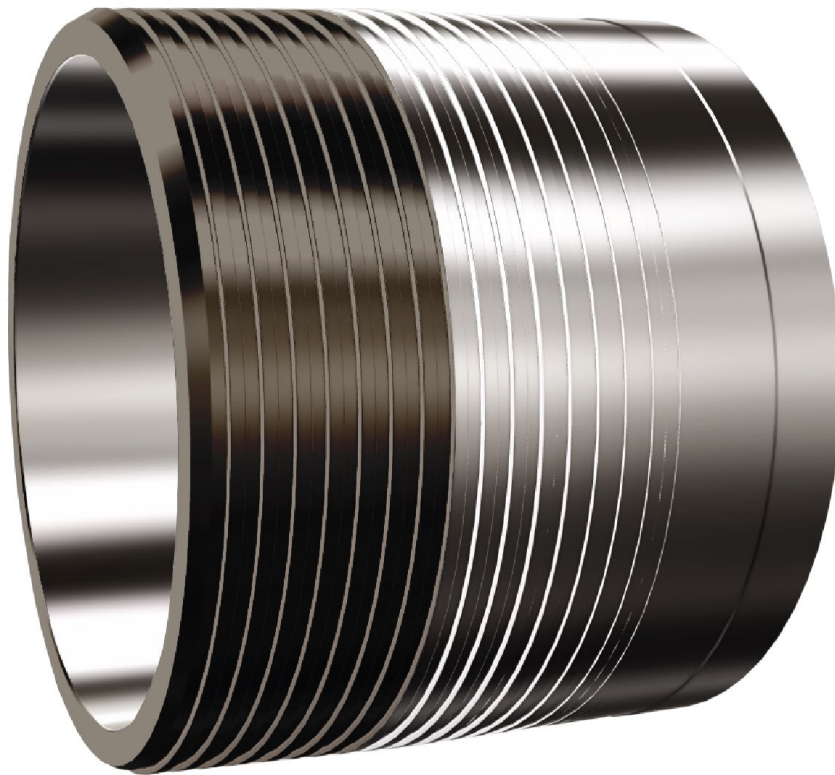
### Interchangeability

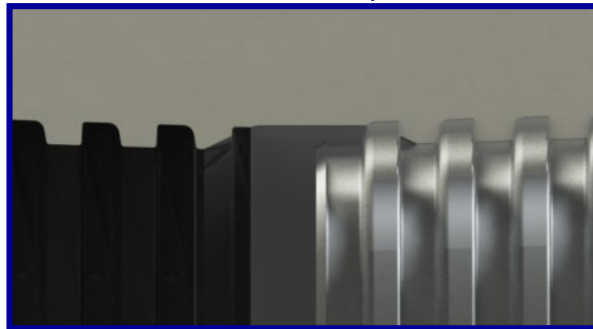
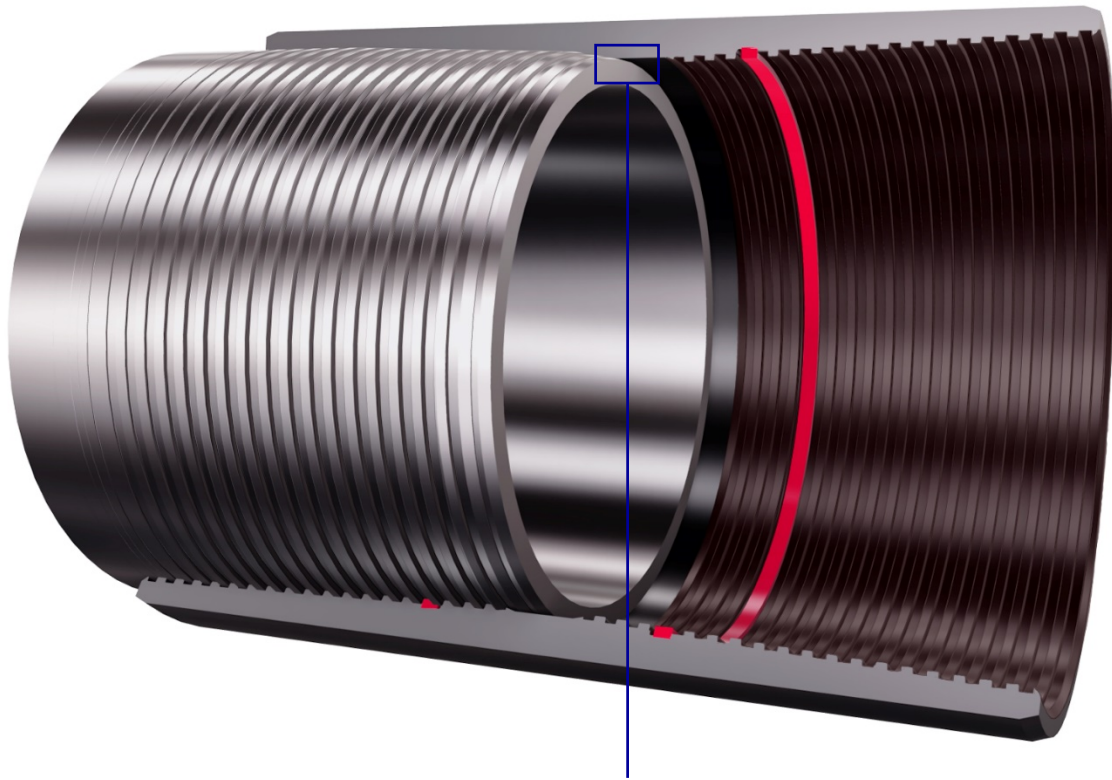
1. ULTRA™ DQX-SR pins are interchangeable between different weights of the same nominal OD. However, the connection is limited to all the mechanical properties of the weakest pin including the make-up torque and downhole rotation.
2. Interchanging pins between weights will not provide an internally flush connection.

3. ULTRA™ DQX-SR can be distinguished by inspecting the coupling for a visible Seal Ring. ULTRA™ DQX-SR has a non-machined ID surface.

#### Thread Compound Application

1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the pin face and full threads and to the coupling threads as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound. Do not fill the dope pocket (see coupling diagram).





Do not fill thread compound

### Make-up Torque

1. ULTRA™ DQX-SR connections shall be made up to the torque specified on the most current Connection Data Sheet.
2. The specified minimum make-up torque in the data sheet is the minimum torque to which the connection should be assembled the first time.
3. The specified optimum make-up torque in the data sheet should be used as the target make-up torque for optimum performance.
4. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
5. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up.

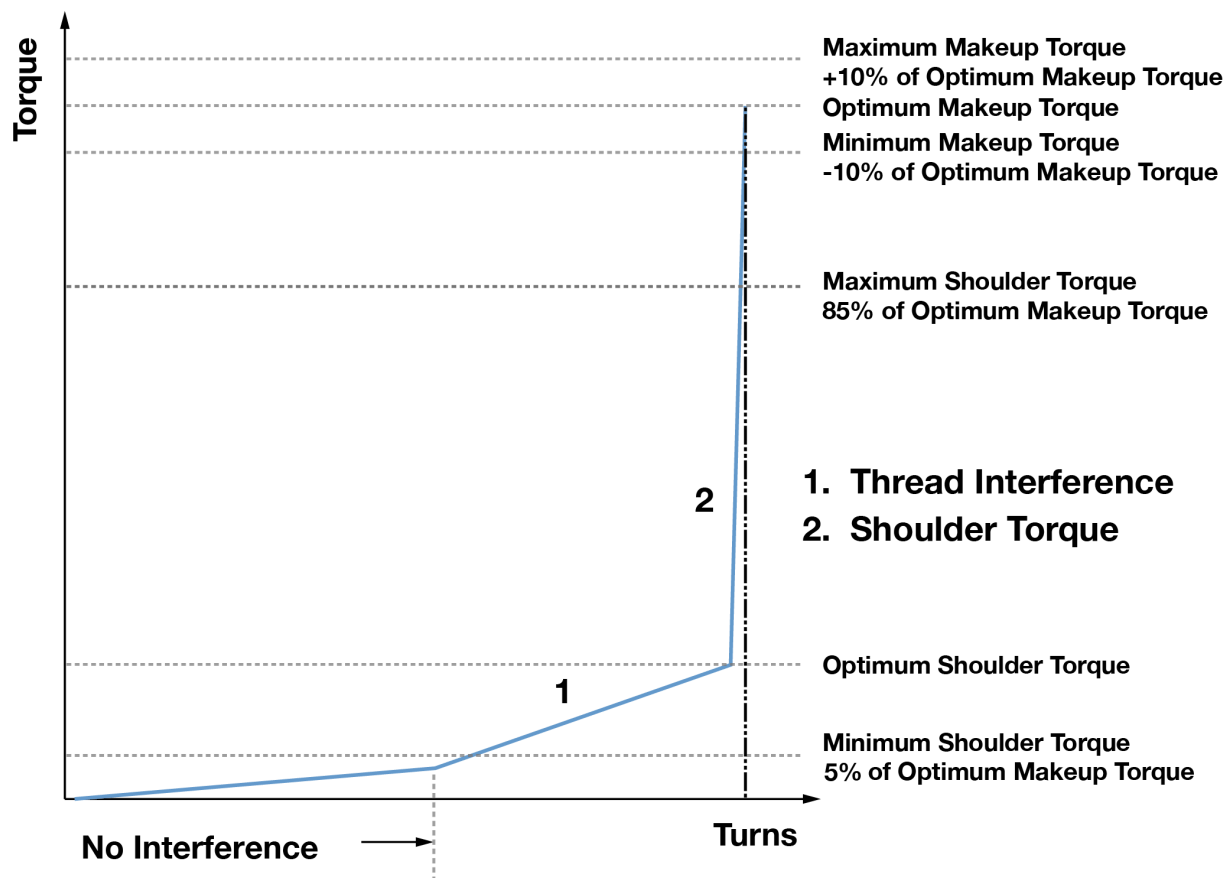
## Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the shoulder engagement appears in the torque turn graph.
3. The below table lists the approximate recommended make-up RPM for the ULTRA™ DQX-SR connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 ½ – 5 ½	30	15
6 ⅝ – 7 ⅝	20	10
8 ⅝ – 9 ⅝	15	7
10 ¾ – 14	10	5
16 ≥	8	4

## Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 5% of optimum make-up torque and at a maximum of 85% of optimum make-up torque, with a minimum delta torque of 10% of shoulder torque and with a 0.020 – 0.100 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and coupling.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. Ensure the mill end pin is made up to the center of the coupling to prevent a low or high shoulder torque.
5. See the example graph below that demonstrates the make-up limits for ULTRA™ DQX-SR connections.



### Spinning Coupling

1. Ensure the mill end pin is made up to the center of the coupling to prevent spinning couplings.
2. Tenaris allows coupling movement of no more than  $\frac{1}{2}$  turn on the mill end during make-up.
3. Back-up tongs can be placed on the lower half of the coupling if the coupling spins during make-up.
4. A ruler or caliper may be used to verify the coupling position. Measure from the coupling face to the pin nose face. The acceptable length is  $\frac{1}{2}$  the overall coupling length  $\pm 1/32$ ". Take two readings  $180^\circ$  apart and verify that both readings are within tolerance, if either reading is out of tolerances, take two more and average the four readings.

### Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The ULTRA™ DQX-SR connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

### Seal Ring Installation

1. Before installing the seal ring, both the Box groove and the seal ring must be dry and free of debris.
2. Place the seal ring in the box groove until the ring snaps into the box groove. If necessary, use a non-metallic tool to properly seat the seal ring.

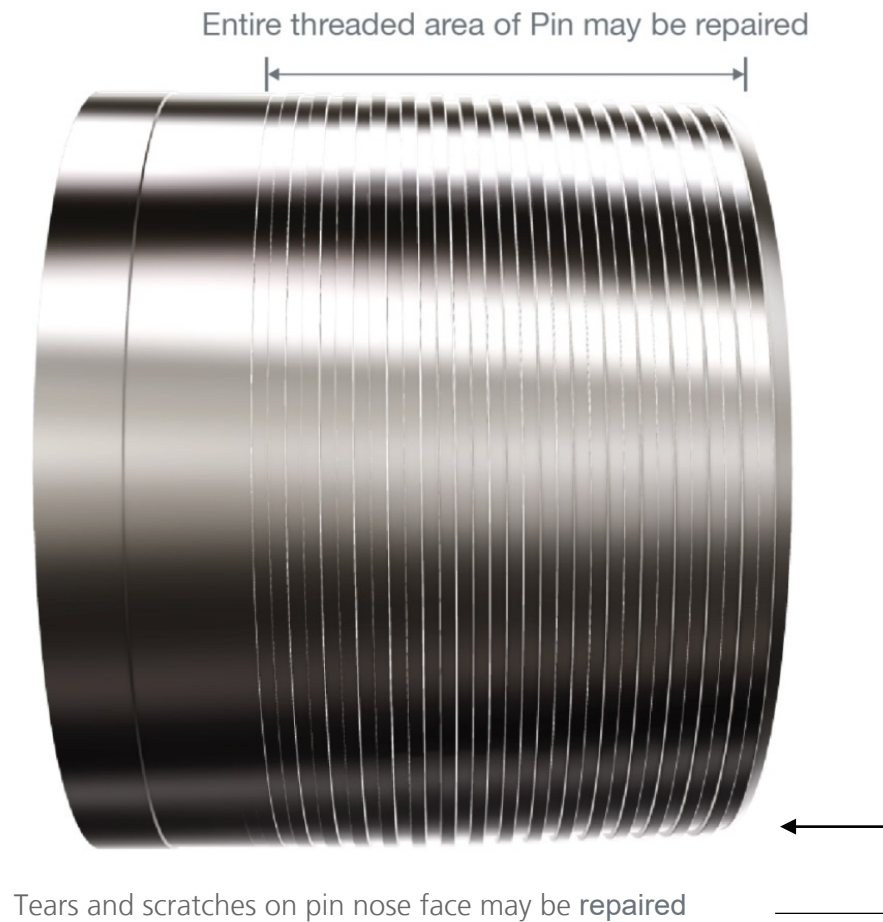
3. Ensure that the seal ring can freely spin inside the groove, indicating proper installation.
4. Avoid adding excessive thread compound as it may damage the seal ring during make up.
5. ***The seal ring must be removed and replaced after every breakout.***

#### Re-run

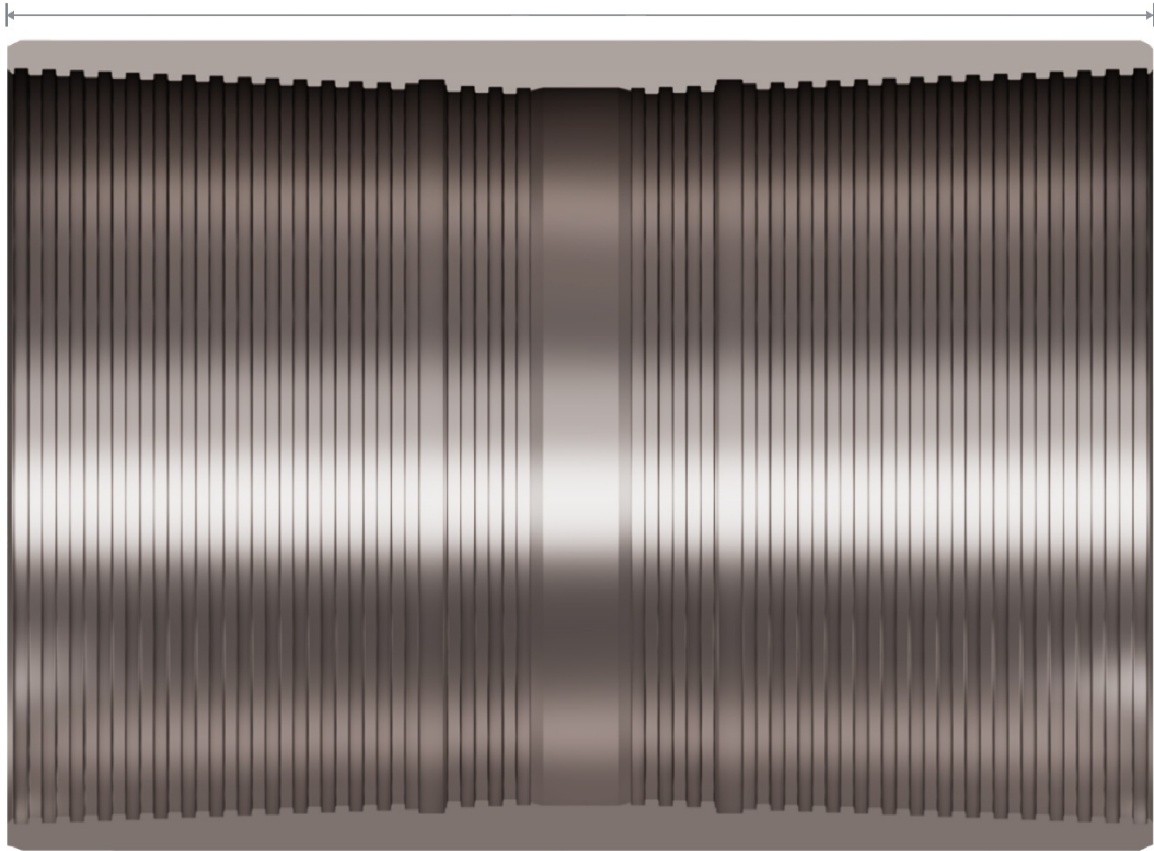
1. It is recommended to apply the backup tongs to the lower half of the coupling or make a paint mark that extends from the mill side of the coupling to the mill end pin to help monitor any movement of the coupling on the mill end during pin field end break out.
2. The pin and coupling must be thoroughly cleaned and visually inspected for any damage after each break out.
3. Any subsequent make-up of the connection must be performed to a torque equal or greater than the previous torque to which the connection has experienced. If a different pin is made up into a coupling, the make-up torque must be greater than that which either pin or coupling member has previously experienced.
4. The joint must be laid down if for any reason it is determined that a coupling must be bucked-off.
5. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
6. ***The ULTRA™ DQX-SR connections shall not be used as work strings.***

## Field Repair

1. Field repair of ULTRA™ DQX-SR connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls, dents or burrs on the thread profile may be able to be repaired by qualified personnel in the field.
3. Galling on pin face may be repaired if it does not exceed 25% of the pipe circumference. The repair shall fully remove any protrusions which may cause galling on subsequent make-up.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Only qualified personnel may make the decision regarding the serviceability of a given connection.
6. ***Loose burrs and sharp raised edges must be removed or rounded down.***



Repairs may be made to the entire coupling





## BPN



In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of BPN connections.

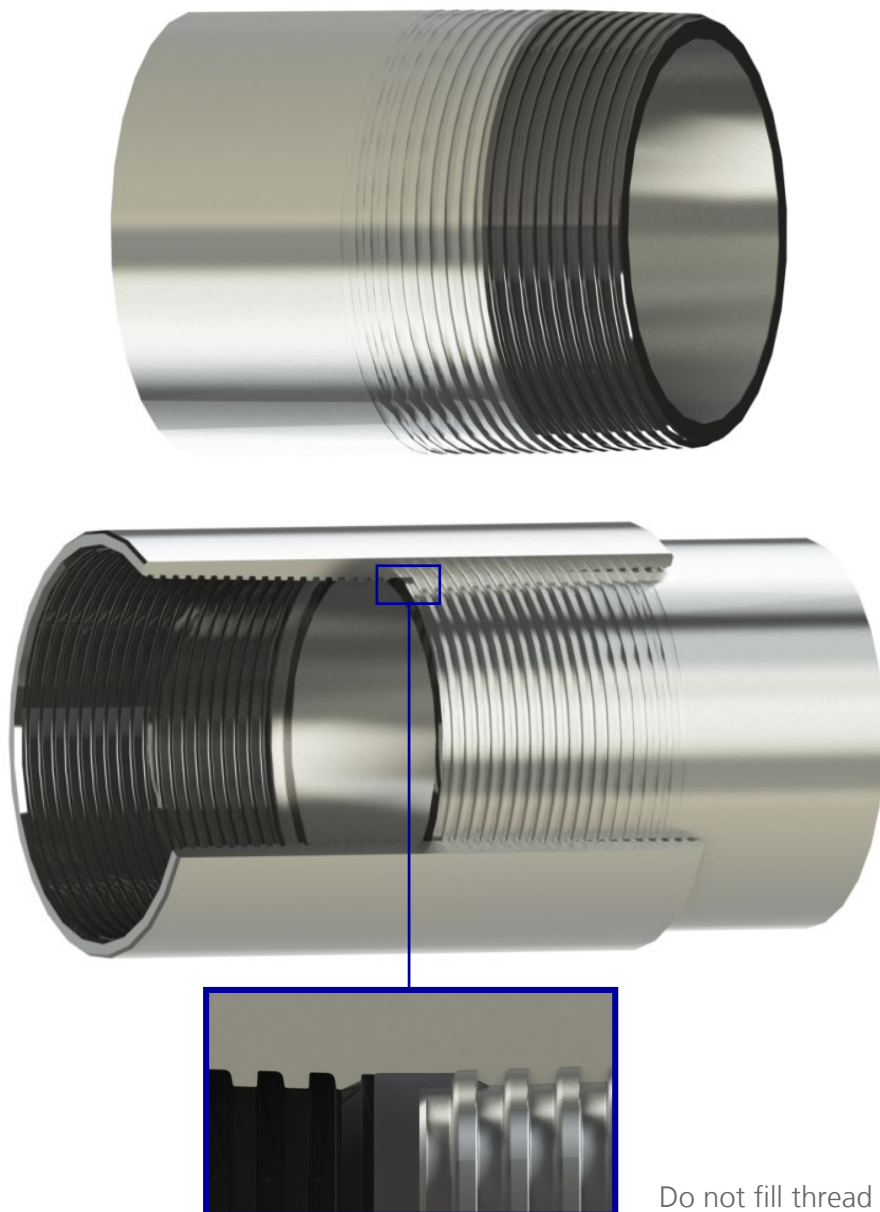
### Interchangeability

1. BPN pins are interchangeable with API BTC and with different weights of the same nominal OD. However, the connection is limited to all the mechanical properties of the weakest pin including the make-up torque and downhole rotation.
2. Interchanging pins between weights will not provide an internally flush connection.
3. When making up a BPN pin into an API BTC coupling, API make-up procedures take precedence.
4. When making up an API BTC pin into a BPN coupling, BPN procedures prevail.

5. Never make-up past the base of the triangle or beyond the maximum make-up torque when using a BPN coupling.

### Thread Compound Application

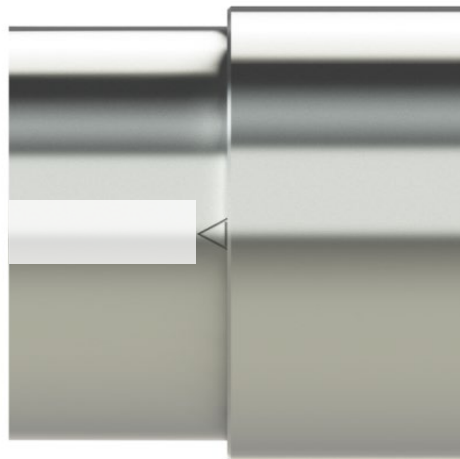
1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the pin and coupling as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound. Do not fill the dope pocket (see coupling diagram).



Do not fill thread compound

## Make-up

1. The BPN connections may be made up without the preferred method of a torque turn graph.
2. Make-up the first 10 joints at a low speed (1-3 RPM) until a shoulder is observed with some additional delta torque and record the shoulder torque values. Do not exceed the maximum make-up torque.
3. For make-up without a torque turn graph, the torque shoulder is indicated when the torque gauge needle spikes.
4. The minimum make-up torque specified on the data sheet is for reference and adjustment to this value may need to be determine in the field. The field stablished make-up will be the higher of:
  - Data sheet minimum make-up torque
  - Highest shoulder torque observed + 10%
5. Make-up the remainder of the string to a torque value high enough to ensure shoulder torque +10% additional torque. In most cases the optimum make-up torque specified on the data sheet will be sufficient to ensure this.
6. All make-ups must have an observable shoulder.
7. A 4" long stripe is painted on the mill end pin and a 24" stripe is painted on the field end pin to aid in locating the triangle.
8. Make-up of BPN connections can be verified by checking that the base of the triangle is aligned with the coupling face  $\pm 1/16"$ .
9. Check position of the triangle stamp randomly with a frequency of 1 in 10 joints if no torque turn graph is available.



## Make-up Torque

1. The specified minimum make-up torque in the data sheet is for reference only.
2. The specific make-up torque used during the casing run may be adjusted anywhere between the minimum make-up torque established in bullet point 4 of the above Make-up section and the maximum make-up torque. This is to allow flexibility to work within the capabilities of the equipment used for make-up.
3. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.
4. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up.

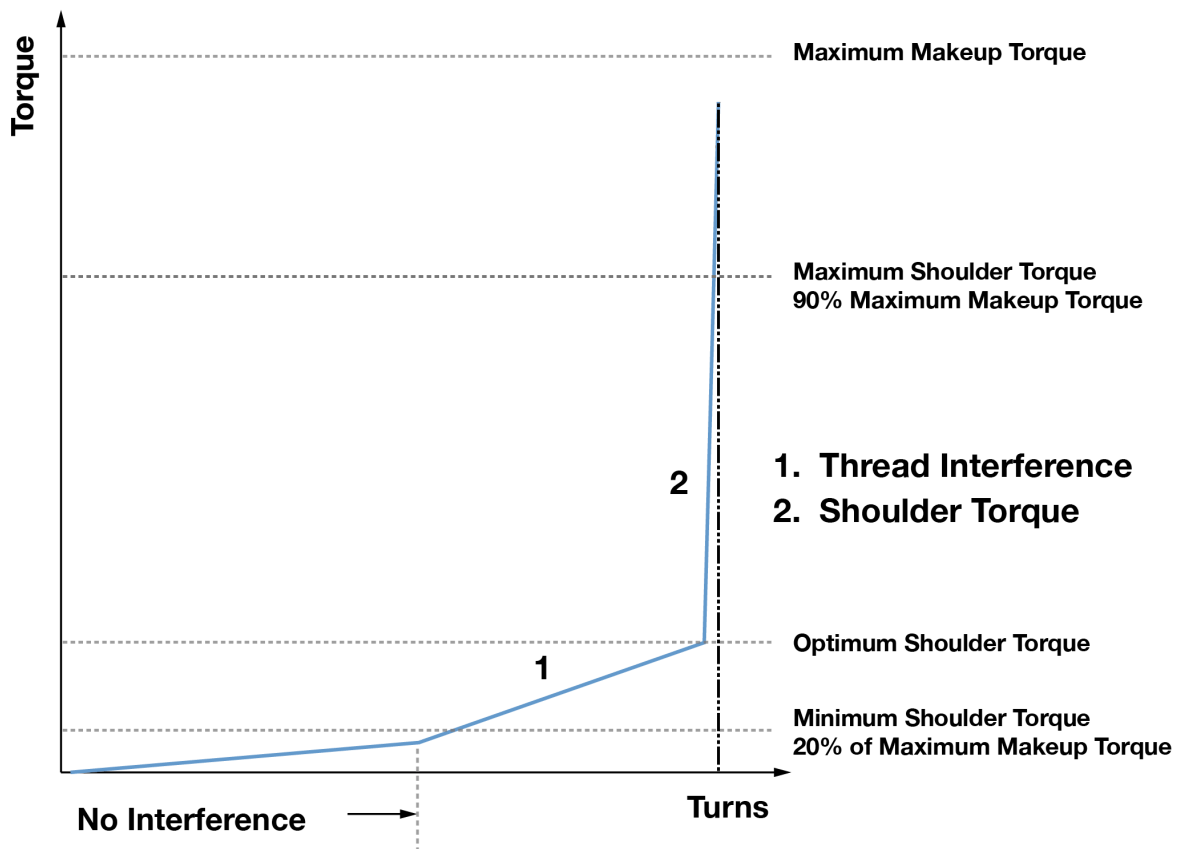
## Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the shoulder engagement appears in the torque turn graph.
3. The below table lists the approximate recommended make-up RPM for the BPN connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 – 5 ½	30	15
6 ⅝ – 7 ⅝	20	10
8 ⅝ – 9 ⅝	15	7
10 ¾ – 14	10	5
16 ≥	8	4

## Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 20% of maximum make-up torque and at a maximum of 90% of maximum make-up torque, with a minimum delta torque of 10% of shoulder torque and with a 0.015 – 0.080 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and coupling.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. Ensure the mill end pin is made up to half way the coupling length to prevent a low or high shoulder torque.
5. See the example graph below that demonstrates the make-up limits for BPN connections.



### Spinning Coupling

1. Ensure the mill end pin is made up to the center of the coupling to prevent spinning couplings.
2. Tenaris allows coupling movement of no more than ½ turn on the mill end during make-up.
3. If any coupling movement is noticed, Tenaris recommends applying the backup tongs to the lower half of the coupling and completing the connection make-up.
4. A ruler or caliper may be used to verify the coupling position. Measure from the coupling face to the pin nose face. The acceptable length is ½ the overall coupling length  $\pm 1/32$ ". Take two readings 180° apart and verify that both readings are within tolerance, if either reading is out of tolerances, take two more and average the four readings.

### BPN Pin into API Buttress Couplings

1. When crossing over from a BPN pin to an API Buttress coupling, API procedures prevail.
2. BPN pins are 100% interchangeable with API Buttress pins of the same size and weight. Performance (including torque) is limited to that of standard API Buttress.
3. Rotation of the string is not permitted without the use of thread locking compound.

### API Buttress Pin into BPN Couplings

1. When crossing over to a BPN coupling, make-up is to BPN torque and position. Follow all BPN recommended procedures.
2. ***Never make-up past the base of the triangle or beyond the maximum make-up torque when using a BPN coupling.***
3. ***Rotation of the string is not permitted without the use of thread locking compound.***

### Accessories

1. BPN accessories are available and preferred over API Buttress accessories.
2. Float equipment threaded with API Buttress can be used with thread locking compound and rotated at BPN torque values.
3. It is strongly recommended that accessories other than float equipment be threaded with BPN to rotate at BPN torque values.

### Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The BPN connection should not be rotated beyond the specified operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

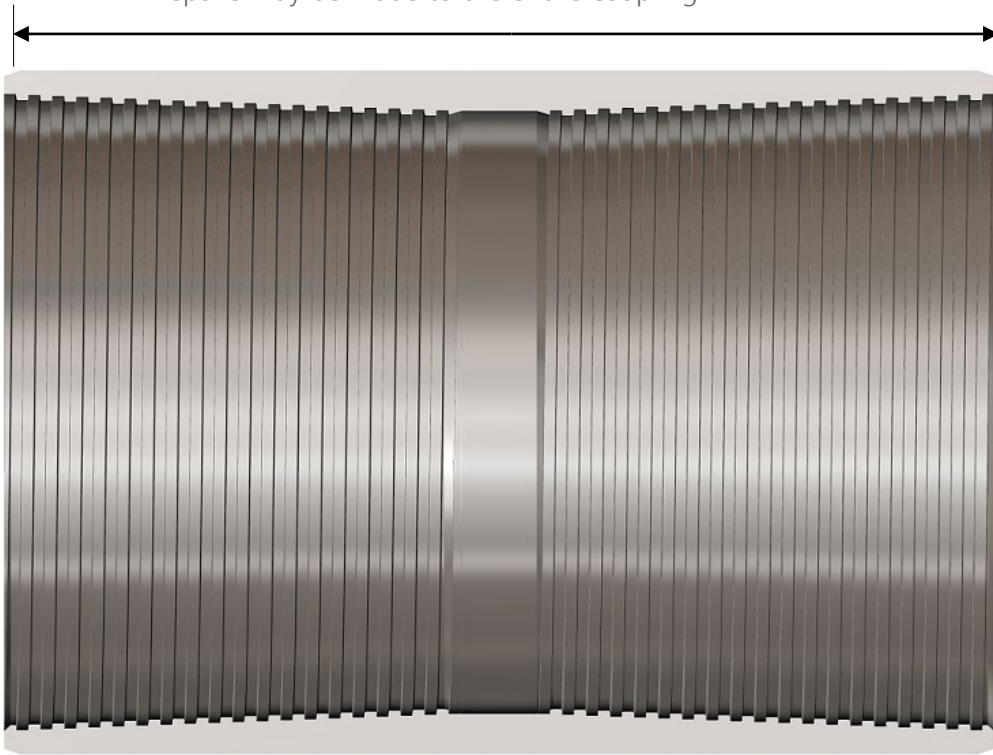
## Re-run

1. It is recommended to apply the backup tongs to the lower half of the coupling or make a paint mark that extends from the mill side of the coupling to the mill end pin to help monitor any movement of the coupling on the mill end pin during field end break out.
2. Break out in low gear at a RPM equal to or lower than the target make-up RPM to prevent the connection from overheating and galling. If overheating is observed, lower the break out RPM to prevent damage to the connection.
3. The pin and coupling must be thoroughly cleaned and visually inspected for any damage after each break out.
4. Any subsequent make-up of the connection must be performed to a torque equal or greater than the previous torque to which the connection has experienced. If a different pin is made up into a coupling, the make-up torque must be greater than that which either pin or coupling member has previously experienced.
5. The joint must be laid down if for any reason it is determined that a coupling must be bucked-off.
6. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
7. ***The BPN connections shall not be used as work strings.***

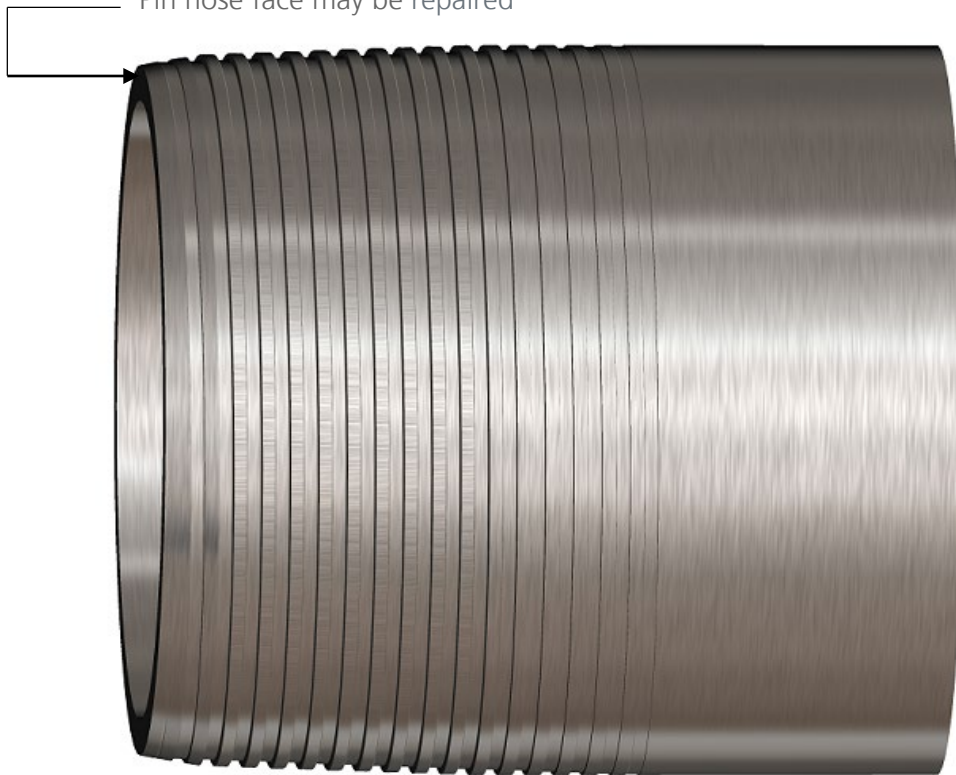
## Field Repair

1. Field Repair of BPN connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls or dents on the thread profile may be able to be repaired by qualified personnel in the field.
3. Galling on pin face may be repaired if it does not exceed 25% of the pipe circumference. The repair shall fully remove any protrusions which may cause galling on subsequent make-up.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Only qualified personnel may make the decision regarding the serviceability of a given connection.
6. ***Loose burrs and sharp raised edges must be removed or rounded down.***

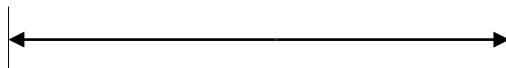
Repairs may be made to the entire coupling



Pin nose face may be repaired



Entire threaded area of pin may be repaired



## BPN-SR



In addition to this section, ensure that all instructions from the GENERAL GUIDELINES section starting on page 9 are followed. Refer to the Pre-run Checklist on page 7 to aid in proper running of BPN-SR connections.

### Interchangeability

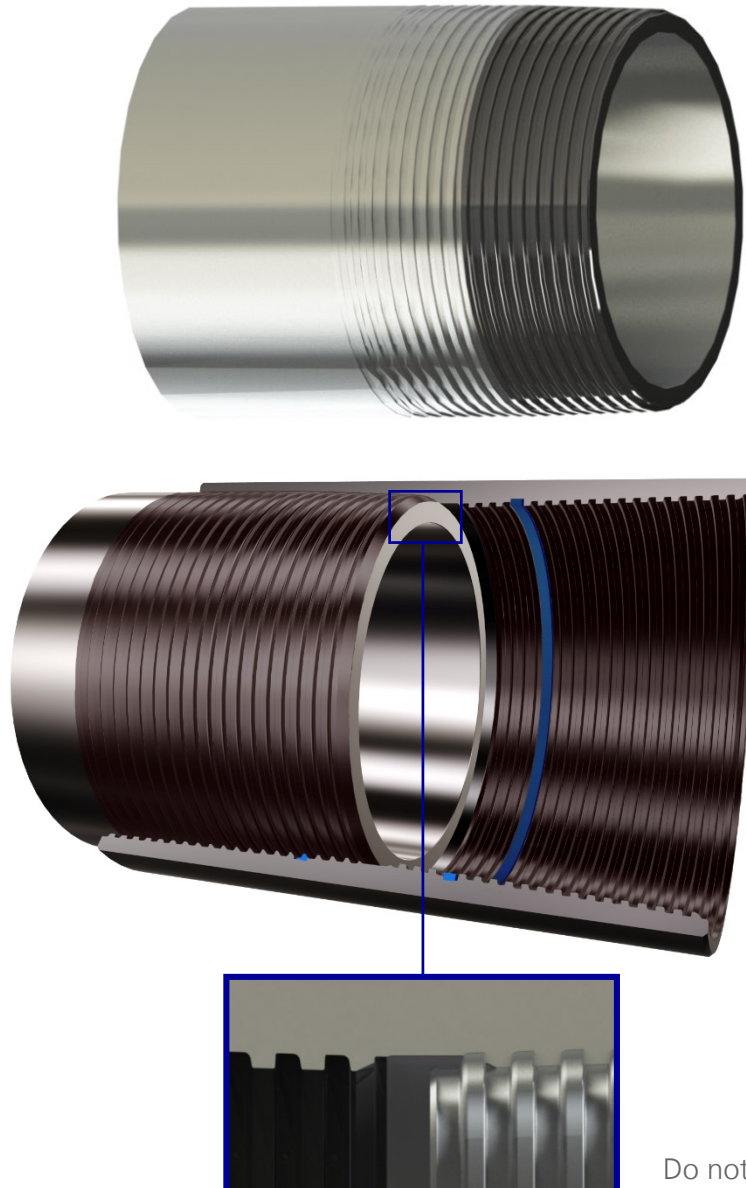
1. BPN-SR pins are interchangeable with API BTC and with different weights of the same nominal OD. However, the connection is limited to all the mechanical properties of the weakest pin including the make-up torque and downhole rotation.
2. Interchanging pins between weights will not provide an internally flush connection.
3. When making up a BPN-SR pin into an API BTC coupling, API make-up procedures take precedence.
4. When making up an API BTC pin into a BPN-SR coupling, BPN-SR procedures prevail.



5. Never make-up past the base of the triangle or beyond the maximum make-up torque when using a BPN-SR coupling.

### Thread Compound Application

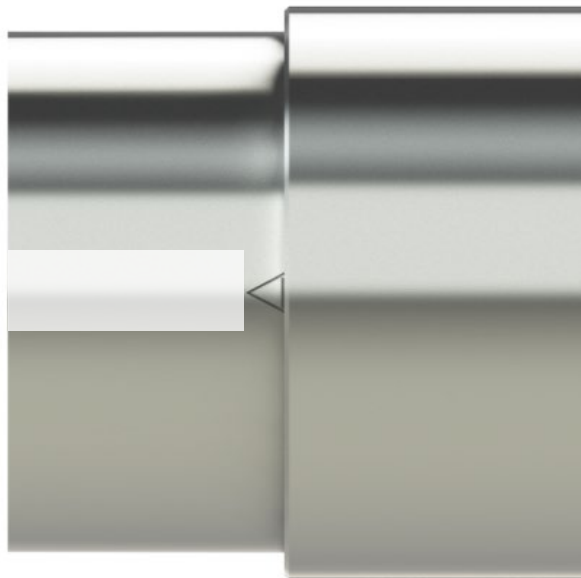
1. Tenaris recommends the use of thread compounds that meet or exceed ISO 13678 or API RP 5A3 requirements.
2. The use of an applicator “moustache” brush is recommended for the box and a paintbrush for the pin to best control the application and quantity of thread compound.
3. Inspect that the brush is clean and free of any dirt. If the brush has been recently cleaned, make sure that no water or other foreign debris remains in the bristles.
4. Water that is on the brush, connection, or in the running compound bucket must be completely removed before applying the compound. The brush and connection can be dried with a clean rag.
5. Apply an evenly distributed light coat of thread compound to the pin and coupling as demonstrated in the graphics below. A “light coat” means that the machined thread profile can be clearly and distinctly seen, with no more than 30% of the thread height filled with thread compound. Do not fill the dope pocket (see coupling diagram).



Do not fill thread compound

## Make-up

1. The BPN-SR connections may be made up without the preferred method of a torque turn graph.
2. Make-up the first 10 joints at a low speed (1-3 RPM) until a shoulder is observed with some additional delta torque and record the shoulder torque values. Do not exceed the maximum make-up torque.
3. For make-up without a torque turn graph, the torque shoulder is indicated when the torque gauge needle spikes.
4. The minimum make-up torque specified on the data sheet is for reference and adjustment to this value may need to be determine in the field. The field stablished make-up will be the higher of:
  - Data sheet minimum make-up torque
  - Highest shoulder torque observed + 10%
5. Make-up the remainder of the string to a torque value high enough to ensure shoulder torque +10% additional torque. In most cases the optimum make-up torque specified on the data sheet will be sufficient to ensure this.
6. All make-ups must have an observable shoulder.
7. A 4" long stripe is painted on the mill end pin and a 24" stripe is painted on the field end pin to aid in locating the triangle.
8. Make-up of BPN-SR connections can be verified by checking that the base of the triangle is aligned with the coupling face  $\pm 1/16"$ .
9. Check position of the triangle stamp randomly with a frequency of 1 in 10 joints if no torque turn graph is available.



## Make-up Torque

1. The specified minimum make-up torque in the data sheet is for reference only.
2. The specific make-up torque used during the casing run may be adjusted anywhere between the minimum make-up torque established in bullet point 4 of the above Make-up section and the maximum make-up torque. This is to allow flexibility to work within the capabilities of the equipment used for make-up.
3. The specified maximum make-up torque in the data sheet should be used as the highest recommended make-up torque for normal operations.

4. Add 10% to the optimum make-up torque when using thread locking compound. A torque shoulder must be visible for proper make-up.

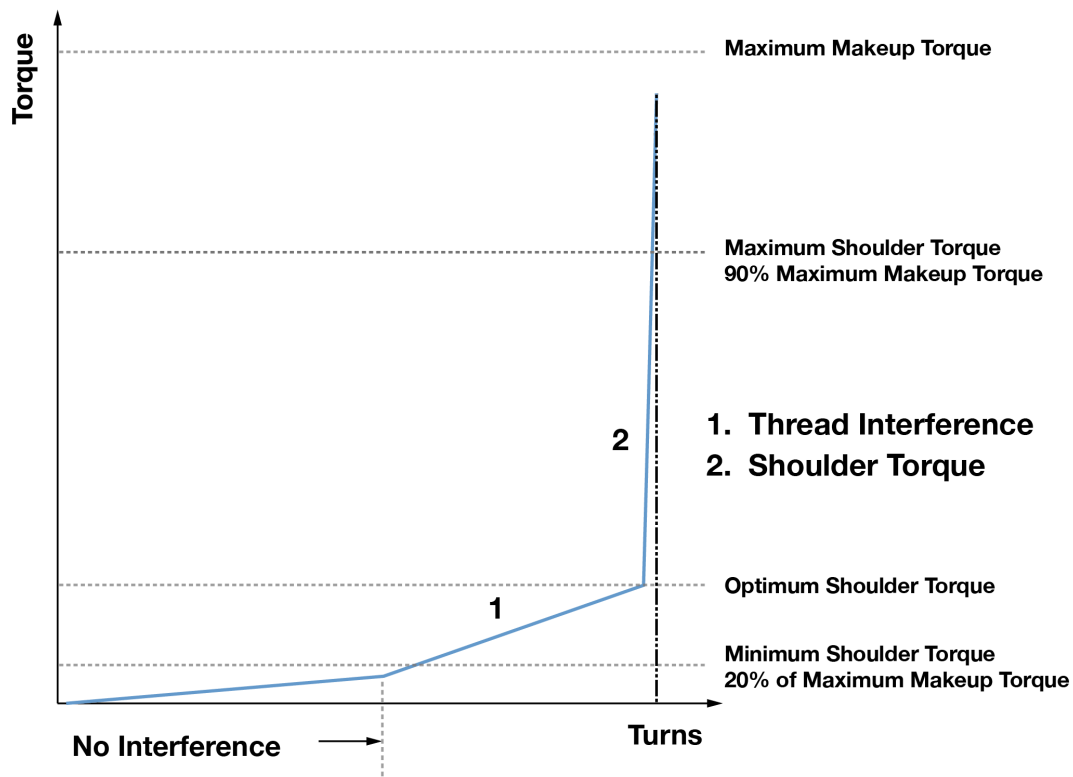
#### Make-up RPM

1. Initial RPM shall start in high gear with a low torque and high RPM.
2. Switch to low gear before the shoulder engagement appears in the torque turn graph.
3. The below table lists the approximate recommended make-up RPM for the BPN-SR connections.

TARGET MAKE-UP RPM		
OD	INITIAL RPM	FINAL RPM
4 – 5 ½	30	15
6 ⅝ – 7 ⅝	20	10
8 ⅝ – 10	15	7
10 ¾ – 14	10	5
16 ≥	8	4

#### Shoulder Torque

1. The shoulder torque shall be clearly visible at a minimum of 20% of maximum make-up torque and at a maximum of 90% of maximum make-up torque, with a minimum delta torque of 10% of shoulder torque and with a 0.015 – 0.080 delta turn range.
2. If the shoulder torque is outside of these specifications, break out and inspect the pin and coupling.
3. A large torque increase prior to 1 turn from shouldering may indicate a problem in make-up such as cross threading or galling.
4. Ensure the mill end pin is made up to half way the coupling length to prevent a low or high shoulder torque.
5. See the example graph below that demonstrates the make-up limits for BPN-SR connections.



### Spinning Coupling

1. Ensure the mill end pin is made up to the center of the coupling to prevent spinning couplings.
2. Tenaris allows coupling movement of no more than  $\frac{1}{2}$  turn on the mill end during make-up.
3. If any coupling movement is noticed, Tenaris recommends applying the backup tongs to the lower half of the coupling and completing the connection make-up.
4. A ruler or caliper may be used to verify the coupling position. Measure from the coupling face to the pin nose face. The acceptable length is  $\frac{1}{2}$  the overall coupling length  $\pm 1/32"$ . Take two readings  $180^\circ$  apart and verify that both readings are within tolerance, if either reading is out of tolerances, take two more and average the four readings.

### BPN-SR Pin into API Buttress Couplings

1. When crossing over from a BPN-SR pin to an API Buttress coupling, API procedures prevail.
2. BPN-SR pins are 100% interchangeable with API Buttress pins of the same size and weight. Performance (including torque) is limited to that of standard API Buttress.
3. Rotation of the string is not permitted without the use of thread locking compound.

### API Buttress Pin into BPN-SR Couplings

1. When crossing over to a BPN-SR coupling, make-up is to BPN-SR torque and position. Follow all BPN-SR recommended procedures.
2. **Never make-up past the base of the triangle or beyond the maximum make-up torque when using a BPN-SR coupling.**
3. **Rotation of the string is not permitted without the use of thread locking compound.**

## Accessories

1. BPN-SR accessories are available and preferred over API Buttress accessories.
2. Float equipment threaded with API Buttress can be used with thread locking compound and rotated at BPN-SR torque values.
3. It is strongly recommended that accessories other than float equipment be threaded with BPN-SR to rotate at BPN-SR torque values.

## Downhole Rotation

1. Tenaris recommends using the minimum amount of torque necessary to break the friction between the tubing or casing and the well bore if downhole rotation of the string is required.
2. The BPN-SR connection should not be rotated beyond the operating torque and RPM should be limited to 40 RPM or lower.
3. Care should be taken to gradually increase and decrease torque when rotating to allow the stored kinetic energy to dissipate and prevent downhole connection yielding or break out.
4. The fatigue life of BPN-SR connections is greater than the number of turns it takes to rotate the tubing or casing into a drilled formation as long the dogleg severity is 20°/100 ft. or less.
5. Tenaris advises caution as the torque measurement accuracy and dump-valve response time may vary depending on the specific equipment used.

## Seal Ring Installation

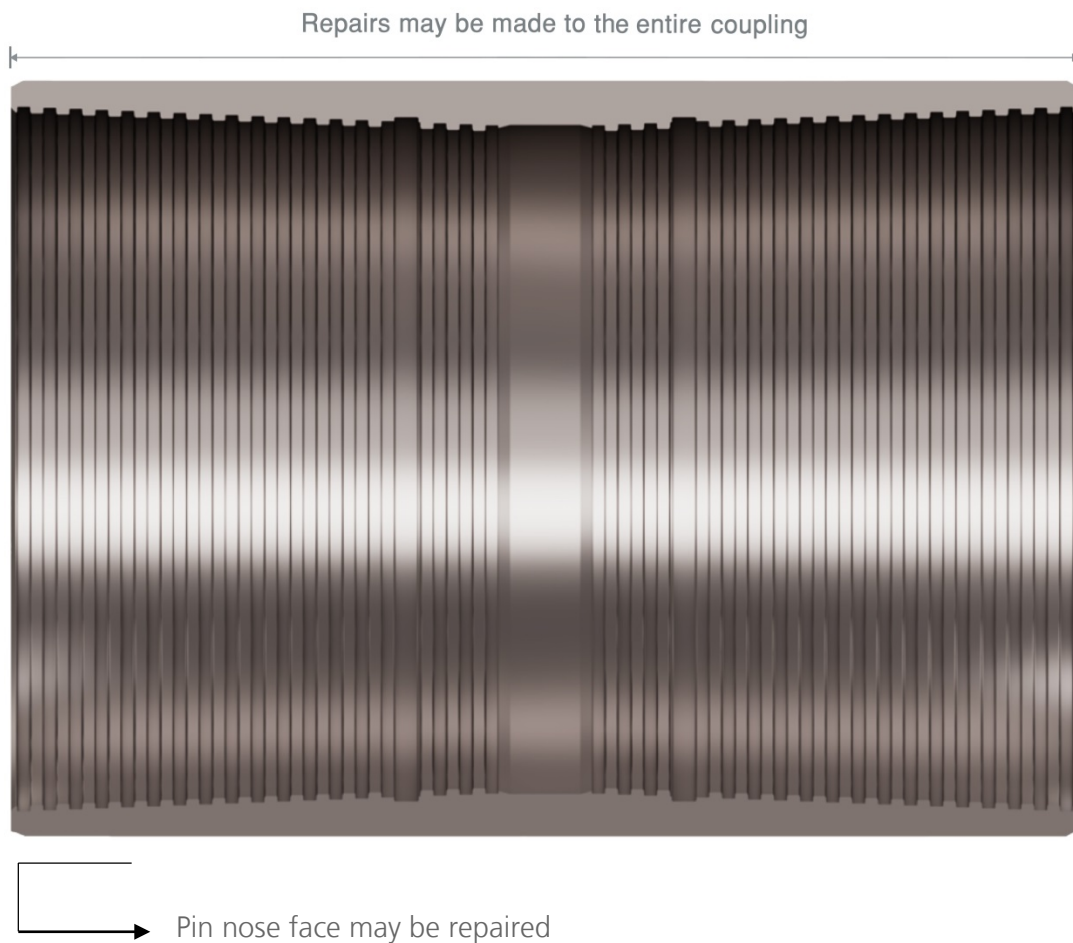
1. Before installing the seal ring, both the Box groove and the seal ring must be dry and free of debris.
2. Place the seal ring in the box groove until the ring snaps into the box groove. If necessary, use a non-metallic tool to properly seat the seal ring.
3. Ensure that the seal ring can freely spin inside the groove, indicating proper installation.
4. Avoid adding excessive thread compound as it may damage the seal ring during make up.
5. **The seal ring must be removed and replaced after every breakout.**

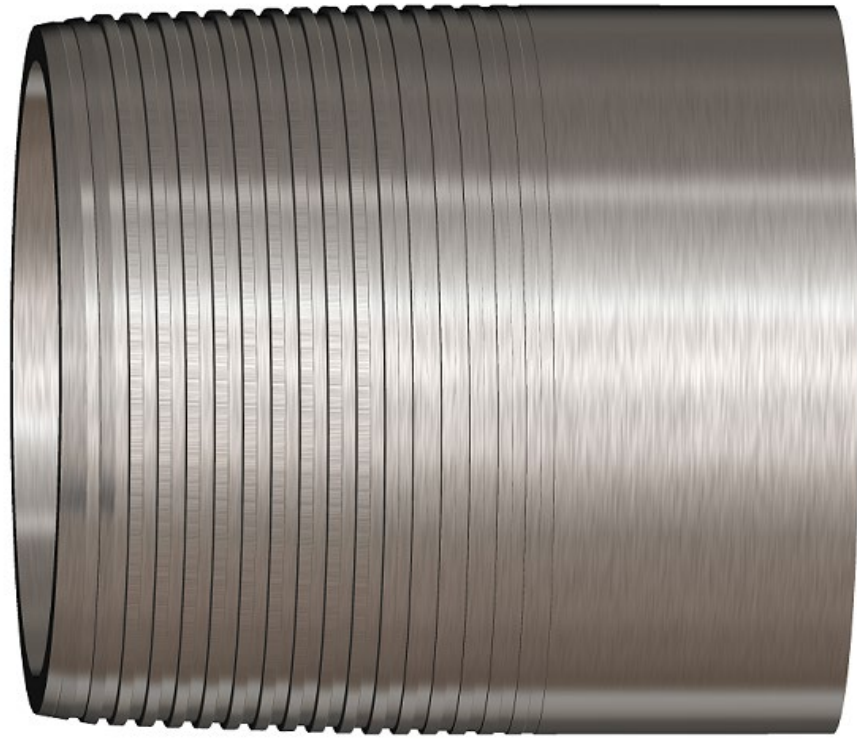
## Re-run

1. It is recommended to apply the backup tongs to the lower half of the coupling or make a paint mark that extends from the mill side of the coupling to the mill end pin to help monitor any movement of the coupling on the mill end pin during field end break out.
2. Break out in low gear at a RPM equal to or lower than the target make-up RPM to prevent the connection from overheating and galling. If overheating is observed, lower the break out RPM to prevent damage to the connection.
3. The pin and coupling must be thoroughly cleaned and visually inspected for any damage after each break out.
4. Any subsequent make-up of the connection must be performed to a torque equal or greater than the previous torque to which the connection has experienced. If a different pin is made up into a coupling, the make-up torque must be greater than that which either pin or coupling member has previously experienced.
5. The joint must be laid down if for any reason it is determined that a coupling must be bucked-off.
6. Do not re-run the string if any portion of the string has been taken beyond the specified operating torque.
7. ***The BPN-SR connections shall not be used as work strings.***

## Field Repair

1. Field Repair of BPN-SR connections shall only be conducted by Field Service Technicians certified by Tenaris.
2. Minor tears, galls or dents on the thread profile may be able to be repaired by qualified personnel in the field.
3. Galling on pin face may be repaired if it does not exceed 25% of the pipe circumference. The repair shall fully remove any protrusions which may cause galling on subsequent make-up.
4. Repair connections using a file, stone, sandpaper or appropriate abrasive tool, and Scotch-Brite™ sponge or equivalent.
5. Only qualified personnel may make the decision regarding the serviceability of a given connection.
6. ***Loose burrs and sharp raised edges must be removed or rounded down.***





Entire threaded area of pin may be repaired