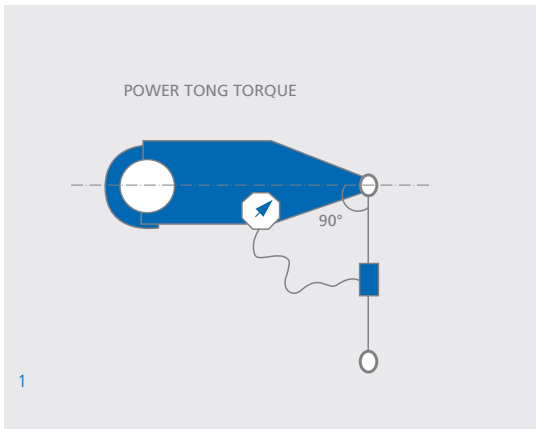
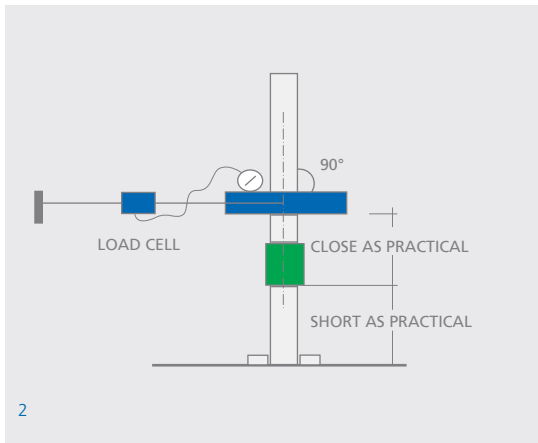


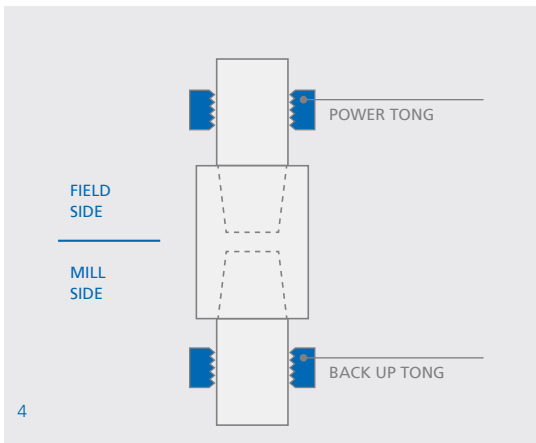
08. Torque Application

1. The correct application of torque for the connection type, OD, weight and grade being assembled is imperative in ensuring the connection can perform optimally.
2. The power tong snub line should be attached to a back up post, leveled and positioned at a 90° angle to the power tongs.
3. The snub line should be of cored wire construction, nylon slings or chains are not acceptable.

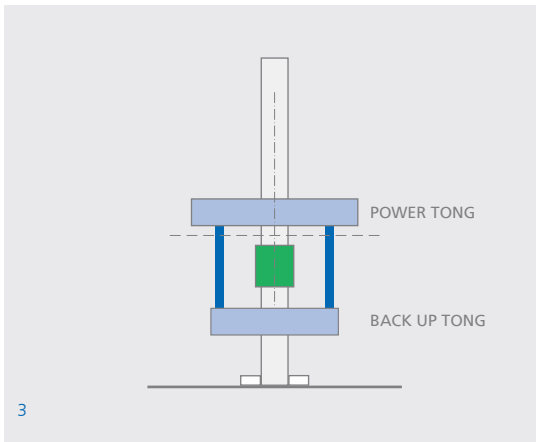


**MAKE UP**

1. Power tong, upper view.
2. Load cell installation, side view.
3. Power tong, lower view.
4. Ideally jaws which allow wrap around die contact of the pipe body should be used.
5. Tongs should be placed on the pipe body either side of the connection.
6. Do not grip the coupling or the OD of integral connections.



3



MAKE UP

Power tong positioning for make up of coupled connections.

7. If using a power tong with integral back up ensure both units are level allowing even die contact round the pipe OD. Power tongs with integral back up are highly recommended for pipe up to and including 7" OD.

8. The size of power tong used should be appropriate for the size of pipe being assembled. The tong should have the capability of applying the required torque plus 30% in order to ensure break out capability which may require a higher torque.

9. The tong and load cell should not be excessively oversized for the pipe to be run, a 30k load cell should not be used to assemble pipe which has a make up torque of 5k. Likewise a 14" tong should not be used to make up 5 ½" pipe.

10. All make up and shoulder torques are to be taken from the latest product data sheet.

11. Premium connection performance data can be obtained from www.tenaris.com.

12. A new data sheet should be downloaded for each run to ensure the latest torque figures are being applied.

13. With the exception of SLX®, MACII™, PH6™, PH4™ and CS® apply the friction factor indicated in the TenarisHydril approved thread compound list FTD 29356 to the appropriate torques for all Blue® Series, Legacy Series and TXP® Buttress connections.

14. For all Wedge Series 400™, Wedge Series 500™ and Wedge Series 600™ connections do not apply a friction factor.

15. Computer make up analysis equipment is strongly recommended for all Blue® Series and Legacy Series connections.

16. Computer make up analysis equipment is strongly recommended for all Wedge Series 500™ and Wedge Series 600™ connections in chrome and CRA.
17. Computer make up analysis equipment is recommended for all Wedge series 400™, Wedge Series 500™ and Wedge Series 600™ connections.
18. Computer equipment should have the capability to display torque turn analysis.
19. Torque Time analysis is not accurate enough for premium connections.
20. Computer equipment capable of 1000 pulses per turn as a minimum is recommended.
21. All measuring equipment such as load cells must be calibrated.
22. Dump valve actuation should be set at optimum torque.
23. Check dump valve actuation on the pipe body prior to assembling the first connection.
24. Some TenarisHydril connections have visual make up indicators. These indicators are an aid to be used in conjunction with good make up practices and computer graph interpretation. See connection specific running guidelines.
25. The following data should be loaded into the computer:
 - Reference torque
 - Minimum shoulder torque
 - Maximum shoulder torque
 - Minimum make up torque
 - Optimum make up torque
 - Maximum make up torque

- Calibration value of the load cell
- Dump valve sensitivity
- Turn transducer sensitivity

26. Initially it is recommended to set reference torque at 5% of optimum. Thereafter it can be adjusted to allow at least the last full turn of assembly to be displayed.

27. Special clearance or matched strength connections may require torque adjustment, contact the local Tenaris Technical Sales Representative or: contact-tenarishydril@tenaris.com.

TORQUE DEFINITIONS

REFERENCE TORQUE

The torque set in the computer where graph depiction begins.

MINIMUM SHOULDER TORQUE

The lowest point at which indicated shoulder can be accepted.

MAXIMUM SHOULDER TORQUE

The highest point at which indicated shoulder can be accepted.

MINIMUM MAKE UP TORQUE

The lowest acceptable make up torque.

OPTIMUM MAKE UP TORQUE

The ideal applied make up torque.

MAXIMUM MAKE UP TORQUE

The highest acceptable make up torque.

OPERATIONAL TORQUE

Maximum useable torque measured at surface when rotating the string. Operational torque should never be exceeded.*

YIELD TORQUE

The torque at which deformation of the connection is expected. Yield torque should never be approached.

(*) PRIOR TO APPLYING OPERATIONAL TORQUE CONTACT TENARIS FOR ANALYSIS OF RPM, ROTATION TIME AND FATIGUE.

Combining Different Weight / Grade

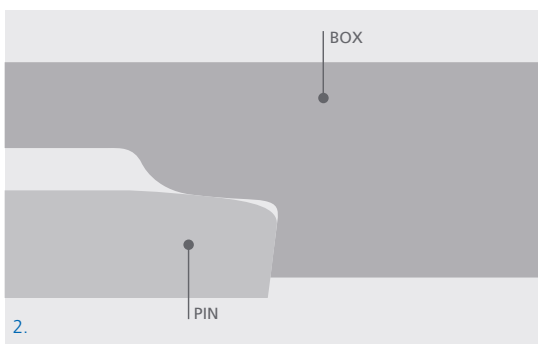
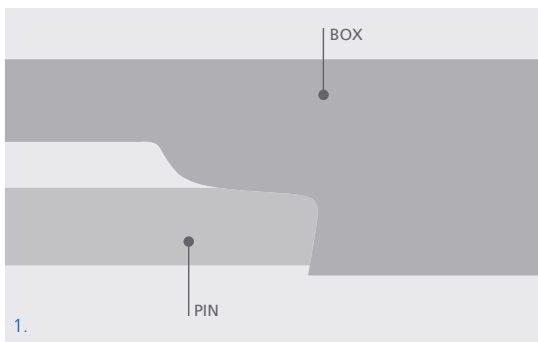
1. When combining different weight / grade of connections ensure compatibility of weight as indicated in the TenarisHydril premium connections catalogue. If any doubt exists as to interchange capability contact the local Tenaris Technical Sales representative.
2. For all Blue® Series, Legacy Series and TXP® Buttress connections use the lower of the two torque values.
3. For Wedge Series 500™ and Wedge Series 600™ connections, including interchangeable designs, use the higher of the two torque values.
4. If the higher torque exceeds the operational torque of the lower weight / grade connection contact Tenaris for torque to be applied.

CONNECTION	LOWER TORQUE	HIGHER TORQUE
Blue® Series, Legacy Series, TXP® Buttress	X	
Wedge Series 500™ and Wedge Series 600™		X

For Wedge Series 400™ use the torque corresponding to the pin member when assembling to field torques.

5. When assembling Blue® Series, Legacy Series or TXP® Buttress accessories with a large disparity in OD / ID, higher shoulder points may be encountered. Contact a Tenaris representative to validate if a change in torque is required.
6. If connections with a grade disparity larger than 30KSI are to be mixed contact Tenaris to validate torques.

NOTE: IF DIFFERENT WEIGHT OF CONNECTIONS ARE COMBINED THERE WILL BE A STEP IN THE BORE.



ASSEMBLED CONNECTIONS OF DIFFERENT WEIGHT

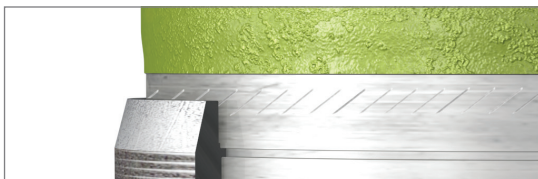
1. Lighter pin into heavier box.
2. Heavier pin into lighter box.

Torque Application Wedge Series 400™, Wedge Series 500™ and Wedge Series 600™

1. For doped variant Wedge series 400™, Wedge Series 500™ and Wedge Series 600™ connections, use the following process on the first joint (double bump):
2. Make up the first joint to the specified optimum torque and relax the tongs.

3. Draw a longitudinal line across the pin and box and re-apply the optimum torque as indicated in the Data Sheet.
4. If the drawn line does not move more than $\frac{1}{2}$ " after the second torque application, continue running the rest of the string normally using the specified optimum torque.
5. If the drawn line moves more than $\frac{1}{2}$ " after the second torque application, a portion of the torque is being absorbed by other variables during assembly. If this occurs, do the following:
 6. Increase the optimum torque by 20% and re-apply the torque.
 7. Draw a second line and re-apply optimum torque plus 20%.
 8. If the second drawn line does not move more than $\frac{1}{2}$ ", continue running the remainder of the string using the 20% higher optimum torque.
 9. If the second drawn line moves more than $\frac{1}{2}$ ", recheck the alignment, dope application and tong function, then repeat this procedure until the drawn line moves less than $\frac{1}{2}$ ".
For Wedge 400™ Series movement up to 1" is acceptable when applying double bump.
10. It is best practice to repeat this procedure if the tongs are changed out during the run.
11. Sufficient torque must be applied to ensure it is not lost to other variables in the make up system such as rig motion, misalignment or tong inconsistencies.
12. For doped variant Wedge Series 500™ and Wedge Series 600™ connections in sizes 10 3/4" and larger either:
 - Apply the optimum torque twice on every connection.
 - Hold the torque for several seconds on every connection.

13. There is no need to hold or apply the torque twice for TenarisHydril Dopeless® Technology connections.
14. Always check the visual make up verification aid if available, refer to specific product running guidelines.
15. During freezing weather, maximum make up torque may be required to overcome running compound viscosity and ensure correct make up.
16. When using tubing as a work string or test string, good practice is to make up the first one or two turns by hand to extend the life of the connection.
17. If when assembling or during the double bump process Wedge series couplings begin to turn check the coupling face finish point of both sides of the coupling in relation to the make up loss bands.
18. If the coupling face of both field and mill ends finish within the make up bands and the computer graph does not indicate damage has occurred, accept the make up.



MAKE UP BAND

Correct make up is achieved when the coupling face finishes within the make up band lines.

Tenaris has produced this manual for general information only. While every effort has been made to ensure the accuracy of the information contained within this publication, Tenaris does not assume any responsibility or liability for any loss, damage, injury resulting from the use of information and data herein. Tenaris products and services are only subject to the Company's standard terms and Conditions or otherwise to the terms resulting from the respective contracts of sale, services or license, as the case may be. The information in this publication is subject to change or modification without notice. For more complete information please contact a Tenaris's representative or visit our website at www.tenaris.com.

©Tenaris 2020. All rights reserved.