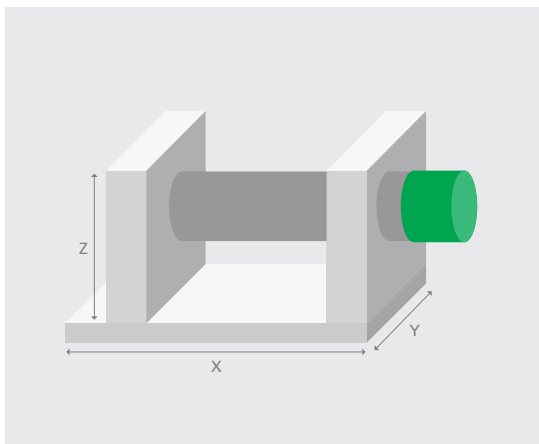


Horizontal Assembly

When assembling accessories, shoe tracks and other such assemblies the application of good practices will ensure successful horizontal make up of the product.

Bucking unit

1. Check torque gauge, load cell and computer equipment have valid calibration certification.
2. Check unit is level, place a pup joint / pipe in the unit, check alignment along all 3 axis with a spirit level, adjust if necessary.
3. Check condition of tong dies in both rotating head and back up, these should be clean, in good condition and sharp. Poor quality dies will slip and create tears and / or gouging of the steel surface.
4. Non / low marking dies should be used for chrome material $\geq 13\text{CR}$.
5. Check and note configuration of tong jaws ensuring symmetrical circumferential grip on OD. Ideally tong jaws should be configured to spread the compressive load around the OD to prevent deformation of the part gripped.
6. If the unit is of the skid type, special care should be taken in leveling the unit along all 3 axis.



BUCKING UNIT

Level bucking unit along 3 axis.

7. If the unit is of the type which has a bull tong as a back up with the load cell attached, ensure the back up arm length is input to the computer as this arm length will indicate the applied force measurement.
8. The tong arm snub line to which the load cell is attached should be at right angles to the tong arm, $\pm 15^\circ$, to ensure correct force is applied and recorded.
9. Ensure one of the tong heads is free floating and capable of natural movement along both 'X' and 'Y' axis to allow smooth assembly of the connections.
10. Computer make up equipment with the capability of torque turn measurement and a minimum of 1000 pulses per turn should always be used when assembling horizontally.
11. Computer graph acceptance criteria is the same as that for running pipe.

Torque Values Wedge™ Series

When making up any doped variant Wedge™ Series connection horizontally add 20% to the indicated optimum torque. Relax the tongs, scribe a line across the assembled connections then re-apply optimum torque plus 20% 'double bump'. If the line moves less than ½" accept the assembly, if the line moves more than ½" check and rectify any variables which may absorb torque then repeat the process.

For Wedge™ Series 400, movement up to 1" is acceptable during double bump process.

For buck on of Wedge™ Series couplings, torque values corresponding to the mill end make up torques detailed in the TenarisHydril connection datasheet should be applied. The additional 20% is not necessary for couplings as the mill end make up torques are higher than standard optimum torque applied to the field end. If movement above ½" is witnessed after re-applying mill end make up torque, apply maximum mill end make up torque, relax the tong and repeat.

Except for couplings, any Wedge™ Series connection assembled horizontally requires 20% additional torque added to the optimum then 'double bump'. For couplings only, apply mill end make up torque then 'double bump'.

It is not necessary to add an additional 20% on top of optimum + 20% when thread locking.

For Dopeless® connections add 20% to the indicated optimum torque, however it is not necessary to apply the torque twice.

Torque Values Blue® Series, Legacy Series and TXP® BTC

As a general rule, the shoulder torque of a Blue® Series, Legacy Series and TXP® BTC connection depends on the contact pressure generated between threads and seal. If there is a large change in the OD or ID of the connection an increase in the shoulder torque value may be observed. For example, larger OD box connections such as running tools or hangers will often result in an increased shoulder point during make up. For this reason it is advisable to check with Tenaris to validate if an adjustment in torque is required. If making up a connection with a larger OD or smaller ID than standard for the connection the following information should be provided:

- Assembly schematics
- Item configuration
- OD and ID
- Material grades

Torque values of mixed assemblies can be obtained from the tool available at https://dcp.tenaris.com/Mixed_Assemblies.

For coupling buck on and all other accessory make ups of Blue® Series, Legacy Series and TXP® BTC connections, field make up torque values detailed in the datasheet are to be used.

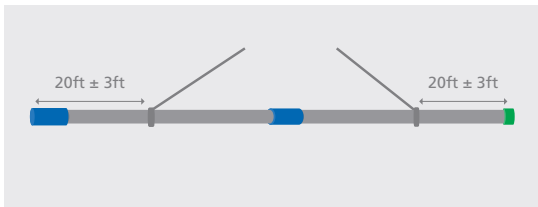
If a connection is found to have a poor make up graph it should be backed out fully, both connections cleaned and inspected for damage.

Horizontal Pre-Assembly Wedge™ Series

In certain regions it is common practice to assemble stands of range 2 or range 3 pipe horizontally prior

to shipping to the rig site. If this process is utilized the following guidelines apply.

1. Verify the connections are not over doped as this can absorb applied torque resulting in a connection which is incorrectly assembled.
2. Always apply optimum torque plus 20%, then relax the tong and re-apply optimum torque plus 20%. The re-application of torque is unnecessary for Dopeless® connections.
3. If connections were made up with thread compound, proceed as follows:
 - For Wedge™ Series 500 & 600: any movement above 1/2" relax tong then apply optimum torque plus 20%.
 - For Wedge™ Series 400: any movement above 1" relax tong then re-apply optimum torque plus 20%.
4. Scribe a longitudinal line across the assembled connections with an indelible marker indicating make up point. This allows a quick visual indicator if any back off occurs during handling and transportation.
5. On Wedge™ connections that have a visual indication stamp or make up band, ensure box face is within the acceptable final position.
6. When moving assembled doubles ensure sling placement is as below:



HORIZONTAL PRE-ASSEMBLY

Sling placement for pipe stands.



Preparation

As with all connections any accessories being assembled should be cleaned of all thread compounds ensuring the connection is clean, dry and free of any damage prior to applying appropriate thread compound or thread lock.

Apply TenaRis approved thread compound or API equivalent as advised in the specific connection running guideline. If thread lock compound is to be applied this should also be done in accordance with the connection specific running guideline. It is also good practice to visibly identify, with paint if possible, which connections are thread locked for ease of identification at the rig site.

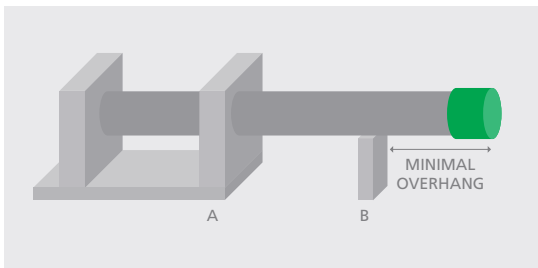
It is good practice to drift the assemblies before and after assembly.

Connection Engagement

After ensuring both connections to be made up are true and level in the bucking unit and completely aligned with each other, make the connections up as far as possible by hand utilizing a chain tong or strap wrench. Once the connections are hand tight apply rotation with the bucking unit in low gear ensuring rotation speed is between 2 and 5 RPM.

If a long accessory or full length joint has to be made up ensure the joint / accessory / assembly is fully supported along the entire length of the item preventing sag, as this can result in misalignment and erratic make up behavior due to a fulcrum effect.





CORRECTLY SUPPORTED ITEM

Without support 'B' the item would tilt down at the overhang.

Support 'A' would act as a fulcrum on the tong head.

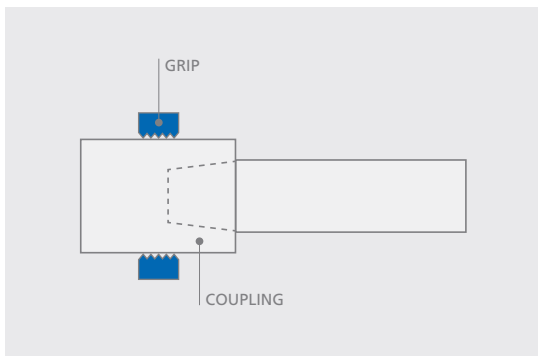
Ensure that the tong jaws are not situated over the threaded area of the box connection being assembled. This will compress the OD of the connection creating higher contact pressures which may lead to high shoulder and / or galled connections.

Break Out

When breaking out any connection use the tong to make initial break and one full rotation then use a chain tong or strap wrench to fully disengage the connections.

Ensure the item is fully supported and aligned along its entire length, this prevents any thread damage due to sag and misalignment as the item disengages.





BREAK OUT

Grip coupling at centre or field end when making or breaking.

Ensure the jaws do not grip the coupling over the pin end being broken out as this will create high contact pressure during break out due to the compressive forces applied and can result in damage to both connections.

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