

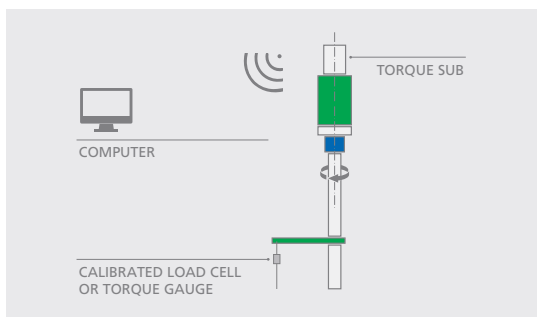
# Casing Running Tools

Tenaris does not recommend the make up of any TenarisHydril connection using a rig top drive system unless a calibrated torque sub is used for torque measurement. If the torque sub has no 'in date' calibration certificate a verification test similar to the one indicated below should be performed prior to the commencement of the run.

When using a casing running tool (CRT) the equipment should have as a minimum the following:

- Weight compensator
- Torque sub
- Make up computer capable of indicating torque turns
- Computer capable of a minimum sample rate of 1000 pulses per turn

Both torque sub and computer equipment should have valid calibration certificates, in the absence of these a torque calibration test should be conducted in order to verify the torque indicated is the actual torque applied.



NOTE: VERIFY THE TORQUE READING FROM TORQUE SUB TO COMPUTER CORRESPONDS TO THAT INDICATED BY THE LOAD CELL.

1. Verify turn measurement is accurate by scribing a line vertically down the pipe and visually verifying against 1 turn indicated by the equipment.
2. Ensure alignment of the system is as close to the well bore as possible, alignment is critical for normal running operations and even more so when using a CRT-type tool. Adjust any misalignment prior to first make up. Misalignment will cause issues with connection assembly.

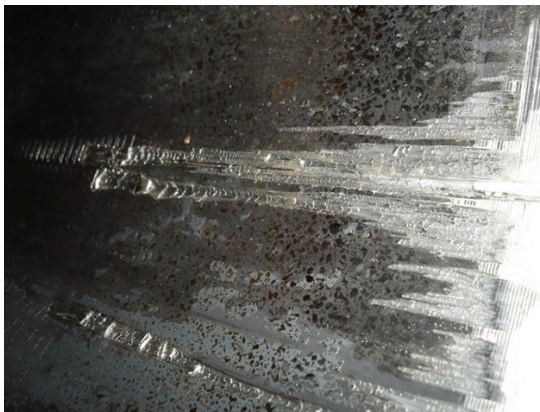
Misalignment may also cause damage to the box face, threads and connection ID / OD when grapples are inserted / extracted which may be detrimental to connection and / or pipe performance.

3. Torque applied should be verified on the calibrated computer, not from the driller's torque gauge.
4. Make up rotation should not exceed 10 RPM at any time, reducing to below 5 RPM for final turn, unless stated otherwise in the connection specific running guidelines.
5. Utilize handling plugs or open end thread protectors in the box connection to protect threads and seals from grapple damage during insertion / extraction.
6. Ensure weight compensator is activated and functioning correctly.
7. Check for excessive grapple damage to pipe body or connection.
8. Ensure grapple is unset completely prior to removal from pipe to prevent gouging.

The photographs below are of damage caused by misaligned CRT equipment.



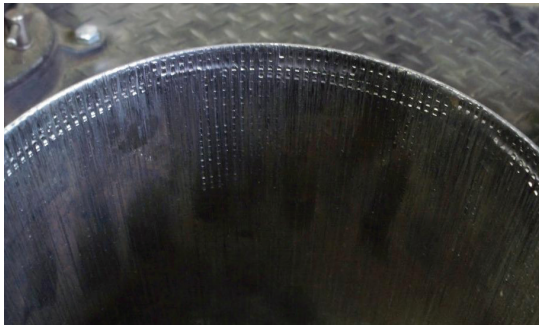
Damage inflicted to face and torque shoulder of a coupling during insertion of CRT grapples.



Gouging on pipe ID and across the coupling central area by insertion / removal of grapples.

Care should be taken by the CRT operator to ensure correct alignment of the equipment and to ensure the grapples are set / unset correctly prior to operating.

Ensure grapple is set on pipe body ID / OD, depending on type used and not over connections.



Die indentations on the ID of a handling plug indicating the grapples were set across the connection area.

## Chrome $\geq$ 13CR

- The use of a CRT to run chrome pipe is not recommended due to the heightened risk of inflicting damage to the connections and / or pipe body.
- If a CRT is used to run chrome pipe, attention to detail and adherence to best practices is of paramount importance.
- It is imperative the CRT is accurately aligned with the pipe set in the rotary, alignment is acutely critical when running chrome but even more so when using a CRT. This is mainly due to two issues; chrome is by its nature more susceptible to galling than standard carbon steels. A CRT holds the pipe rigidly at the top preventing any natural movement during rotation which can assist in alleviating minor misalignment, pipe bend or rig movement. Therefore if alignment is not accurate when running chrome the potential for thread galling as the connection assemblies is far greater.

- Chrome pipe has to be treated with greater care and attention than carbon steels to prevent material damage. If the CRT is misaligned the potential for damage to the connections and pipe bodies is greatly increased as the grapples are positioned / removed.
- Weight compensator is strongly recommended when using CRT equipment to assemble chrome pipe.
- Walking the pipe all the way in to the hand tight position is best practice when running chrome pipe. This ensures the threads are not crossed at stabbing, however this may not be possible when using a CRT.
- If it is not possible to walk the pipe in, rotate the pipe in 1 full revolution by hand immediately after stabbing and prior to grapple positioning, the pipe can then be assembled using the CRT.
- Rotate the pipe constantly at  $\leq 5$  RPM after the initial hand rotation.
- Reduce rotation further for final make up.
- During running it is good practice to constantly check indentation marks created by the grapples on the pipe ID / OD. Ensure indentations are not excessive and no slipping of the grapples has occurred resulting in gouging of the pipe body.
- Check the grapples are not being set too high across the connection.

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