

TenarisHydril BlueDock® Connector

Scope

These guidelines apply only to the specific case of TenarisHydril BlueDock® connectors. This document should be used in conjunction with the Tenaris Running Manual, which is the main document applicable for running all TenarisHydril premium connections.

Tenaris Field Service Representatives can modify these guidelines when circumstances dictate. Implementation will only occur if the representative deems the modification to be non-detrimental to product integrity. All modifications being explained and agreed with the client representative prior to implementation and fully documented in the running report.

References

- TenarisHydril Running Manual.
- API Recommended Practice 5C1.
- API Specification 5L.
- Premium Connection Approved Thread Compounds FTD29356.
- Recommended guidelines for the field inspection of TenarisHydril connections, GDL31457.

Equipment, Material & Documents

1. Verify the appropriate thread compound is available onboard for this connector.

2. Refer to document FTD29356 for a list of compounds approved by Tenaris.
3. Latest version of the specific Product Data Sheet can be obtained from Tenaris web site. In case it is not available, request the data sheet from the local Technical Sales representative or contact-tenarishydril@tenaris.com.
4. There are two designs of BlueDock® connector; Metal To Metal (MTM) and Elastomeric (ELS) seal variants.
5. Both MTM and ELS seal designs can also be supplied with a sea water exclusion seal (SWS).
6. Additionally BlueDock® connector has two designations of each variant, High Range (HR) and Low Range (LR), these designations are dependent on wall thickness (WT).
7. 20" LR is the only variant without a retainer groove at the pin external shoulder.
8. Verify the compatibility of the BlueDock® connector with accessories such as pup joints, etc.
9. Ensure accessories such as O-rings (elastomeric seal variant), spare Anti Rotation Keys (ARK's) and ARK installation tools are available on the rig prior to operation commencement.
10. Specific tools required for successful running or pulling of BlueDock® connectors
 - Feeler gauges from 0.05 mm to 1 mm
 - Allen key: 5 mm
 - Spare ARKs and hexagonal bolts
 - Hammer
 - Chisel

Pre-Running

1. Check weld cord, ensuring the elevators can pass over to seat against the connector.
2. The following connector information will be hard stamped on the connector OD:
 - Seal Type
 - Range: Low Range (LR) or High Range (HR)
 - OD
 - Connector SMYS
 - Manufacturing Facility
 - Manufacturing Quarter
 - Traceability Numbers.

Connector Color Coding

RANGE	SEAL	GRADE	COLOUR
HR	MTM	70 Ksi	Blue
HR	MTM	90 Ksi	Grey
HR	ELS	70 Ksi	Yellow
HR	ELS	90 Ksi	Brown
HR	MTM SWS	70 Ksi	Green
HR	MTM SWS	90 Ksi	Purple
HR	ELS SWS	70 Ksi	Silver
HR	ELS SWS	90 Ksi	Red
LR	MTM	70 Ksi	Orange
LR	MTM	90 Ksi	Pink
LR	ELS	70 Ksi	Violet
LR	ELS	90 Ksi	Black
LR	MTM SWS	70 Ksi	Sky-Blue
LR	MTM SWS	90 Ksi	White
LR	ELS SWS	70 Ksi	Magenta
LR	ELS SWS	90 Ksi	Bright Green

One 50mm wide band painted round the connector OD indicating; Range, Seal Type and Connector Grade.

Products prepared for fatigue resistance will have an additional silver band on the pipe OD beside the girth weld.

3. The pipe grade will be stenciled in the pipe ID no less than 6" back from the pipe end.
4. Alternatively / additionally if requested by customer during manufacture a colour code may be painted in the pipe ID:

GRADE	COLOUR
X46	Black
X52	Green
X56	Blue
X60	Red
X65	White
X70	Purple
X80	Yellow

5. Make note of the connector and pipe grade, there should be a disparity.
6. Shift ARK(s) to the unlocked position and tighten bolt then remove the protectors.
7. Check if ARK(s) are moving freely, if not loosen with the aid of anti-seize spray.
8. Ensure the connectors are cleaned and free of all debris and / or contaminants, cleaning methods employed should conform to the recommendations contained within the TenarisHydril running manual.
9. Visually inspect threads, shoulders and seal areas as per field inspection guideline GDL31457, prior to running ensuring no damage is evident.
10. Check the condition and fit of the O-ring (Elastomeric and SWS variants).

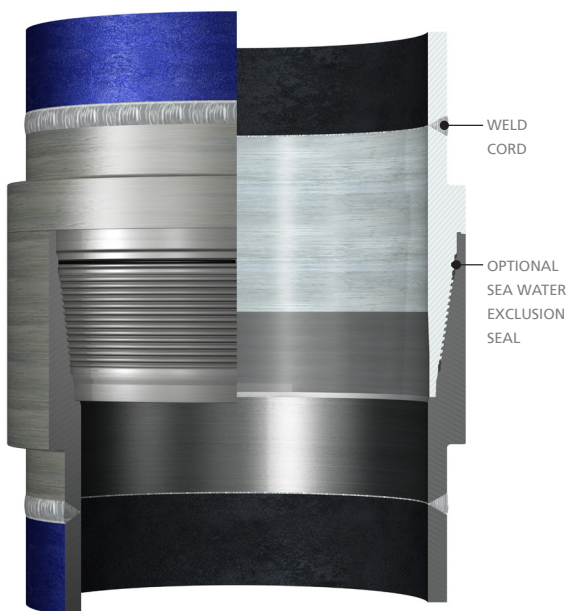
11. Pipe should arrive with the O-ring installed, if not check the fit of O-rings onboard.
12. Ensure there are spare O-rings on board.
13. Clean, dry then replace protectors.
14. Re-set all ARK(s) and secure in order to prevent protectors backing off when pipe is moved.
15. Never move or handle pipe without protectors securely in place.
16. Check the number of ARK(s) of each connector; one, two or three as per customer specification.
17. Verify the material grade of any pups or accessories is compatible with main string.
18. Pay particular attention and note the type of connector on each item.

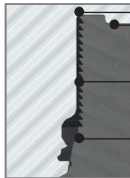
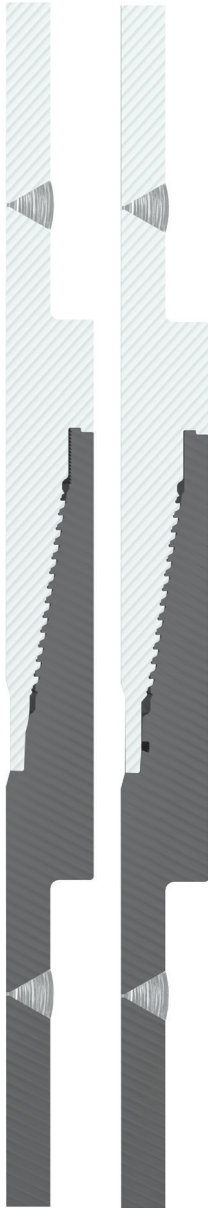
Inspection

1. Check box and pin connectors for mashes or out of round, large OD connectors can be susceptible to handling damage such as mashes, dents or ovality.
2. Visually inspect all connectors as per Tenaris document, GDL31457.
3. Ensure the pin and box shoulders have no dents, tears or raised material which could interfere with correct assembly.
4. Ensure there are no gouges or raised material on the alignment guide areas.
5. Pay particular attention to MTM seal areas, any damage witnessed is cause for rejection.

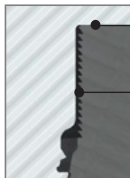
6. Check O-ring groove has no dents, mashes or gouges which would preclude correct installation of the ring.
7. Check O-ring has no abrasions, cuts or tears, if found replace with a new ring ensuring it is correctly seated.
8. Check function of Anti Rotation Keys (ARK) to ensure ease of use whilst RIH.
9. It is advisable to use an anti-corrosion spray on the ARK(s) to prevent seizure whilst in storage.
10. Alternatively a storage grease such as Kendex can be applied.

BlueDock® Configuration





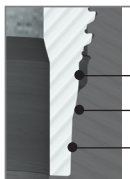
RETAINER
EXTERNAL SHOULDER
ALIGNMENT GUIDE
DOPE POCKET



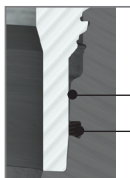
NO RETAINER
GROOVE ON 20" LR
ALIGNMENT GUIDE



THREE START
HOOKED THREAD

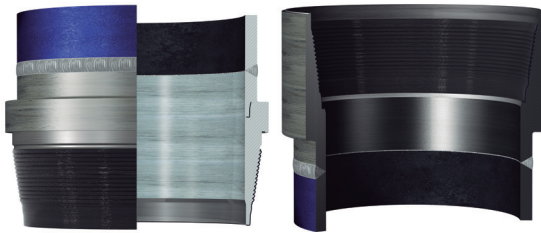


DOPE POCKET
MTM SEAL
ALIGNMENT GUIDE



ALIGNMENT GUIDE
ELASTOMERIC
SEAL

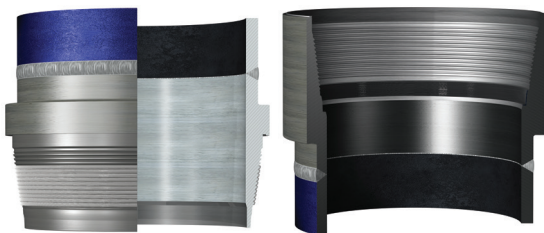
Thread Compound Application



1. Ensure all connector surfaces are free of all contamination / debris and completely dry prior to doping, ensure any previously applied storage compound is completely removed.
2. Do not use solvents on Elastomeric or Sea Water Exclusion Seals as they may degrade the O-ring.
3. For Tenaris approved thread compounds, reference document FTD29356.
4. Always use a new unopened pail of thread compound, ensuring it is completely homogenised prior to use.
5. **PIN END:** Apply a thin even coat of running compound, covering the full thread area, seal surfaces (MTM, ELS and / or SWS), pin nose and torque shoulder. The thread form should be clearly visible.
6. Do not apply dope on the dope pocket nor external alignment guide.
7. **BOX END:** Apply an even coat of running compound covering the full thread area, seal surfaces (MTM, ELS and / or SWS) and torque shoulder. The thread form should be clearly visible.
8. Do not fill dope pockets or stress relief groove at box shoulder.

9. Do not pack the O-ring causing dope to encroach under the ring (Elastomeric and SWS variant).
10. For Tenaris approved thread compounds, apply the friction factor indicated in FTD29356. For thread compounds other than those listed, apply the thread compound manufacturers indicated friction factor.

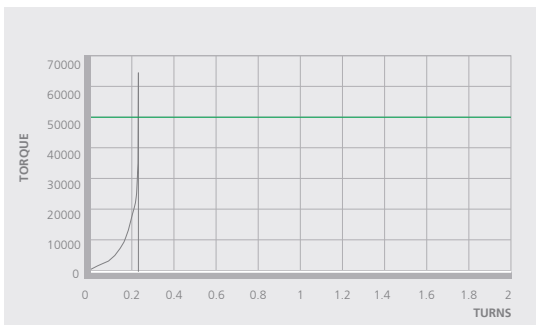
Thread Lock Application



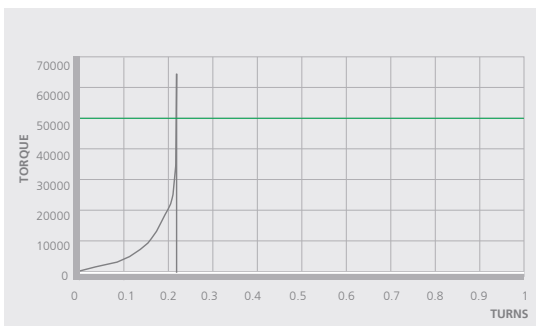
1. Ensure the connectors are completely clean and dry prior to applying thread lock.
2. Apply thread lock to 50% of the threads behind the pin seal.
3. Do not apply thread lock onto the seal.
4. Apply thread compound to SWS area.
5. Apply an even coat of running compound to the box torque shoulder and seal surface.
6. Do not fill dope pockets or stress relief groove at box shoulder.
7. Apply the thread lock manufacturers indicated friction factor.

Torque Application

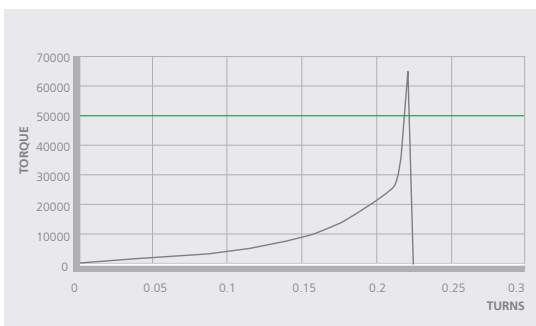
1. The use of computer make up analysis equipment is recommended when assembling BlueDock® MTM seal connectors.
2. Shoulder points for BlueDock® connectors can be found in the product data sheets.
3. A BlueDock® connector assembles within $\frac{3}{4}$ of a turn from stabbing to power tight make up.
4. For accurate graph definition it is important to set the horizontal scale (turns) to 1 or below.
5. Reference torque should be set at zero.
6. The dump valve should be set at optimum torque, verify correct operation on the pipe body prior to first make up.
7. The graphs below correspond to the make up operation of the same connector displayed with three different turn spans.
8. Quite different profiles can be obtained by changing the turn span of the graph.



Graph window set at 2 turns.



Graph window set at 1 turn.



Graph window set at 0.3 turn.

9. The second and third graphs display an obvious clarity advantage.

10. In case the preferred method of computer make up analysis is not available, once made up, the external shoulders should be used as a visual guide of correct assembly by checking the gap between pin and box face with feeler gauges, and ensuring that:

- A 0.35 mm feeler gauge **does not fit** at any position.
- A 0.3 mm feeler gauge **does not fit** in at least one position.

If either of these two requirements are not met the assembly cannot be accepted.

11. In order to overcome the torque dissipation caused by the extra weight of the extension joint and wellhead housing combination it may be necessary to apply maximum torque or beyond when assembling to the string.

Running

1. Alignment is critical for all pipe running operations, with large OD being even more so. Ensure travelling block / top drive is aligned with the rotary.

2. A misalignment of 20% of the connector OD is excessive and must be corrected.

3. A stabbing guide is highly recommended to allow controlled, safe stabbing.

4. The use of a weight compensator is recommended.

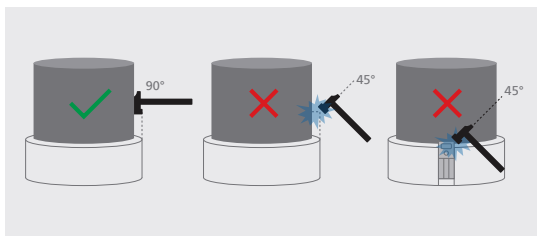
5. Stab pipe in a smooth controlled fashion, ensuring elevators are slackened off from the connector.

6. Ensure pipe is stabilised during stabbing and make up, this is especially important in windy conditions and if running on a floating installation.
7. Once stabbed and stabilised the make up should be conducted in a single continuous operation without starts and stops until optimum torque is attained.
8. Ensure ARK(s) are in the unlocked position prior to stabbing.
9. Apply Low gear and make up below 5 RPM but no slower than 2 RPM.
10. Apply the torque indicated in the appropriate data sheet ensuring an acceptable make up is attained as previously described.
11. Slacken the fixing bolt on the open ARK(s) and hammer into position.
12. Tighten ARK bolt to lock in position.
13. Once assembled scribe a longitudinal line across both connectors as a visual reference.
14. If a situation arises where an O-ring and / or ARK(s) requires replacing, do so away from well bore.
15. BlueDock® connector metal to metal and elastomeric seal variants are not interchangeable.
16. BlueDock® connector has limited same OD interchange capability, dependent upon wall thickness.
17. Low Range (LR) and High Range (HR) connectors of the same diameter are not interchangeable.

Anti Rotation Key (ARK) Function

1. ARKs are intended to be used for multiple installations if required, but this is only possible if they are properly handled, used and stored.
2. If an ARK is damaged it should be replaced with a new one.
3. To activate, completely loosen the lock bolt and knock the ARK into place with a hammer, slide sledge or other such device.
4. Ensure all hammer blows contact the ARK strike face parallel to the face. Glancing blows or angled strikes can cause damage or break the ARK.
5. Hammer the ARK in the direction of travel only.
6. Stop hammering the ARK as soon as it is fully set to prevent breakage.
7. Ensure the ARK(s) are locked in place by the lock bolt using a hexagonal key.
8. Correct and incorrect methods of setting / un-setting the ARK are indicated in the following diagrams.

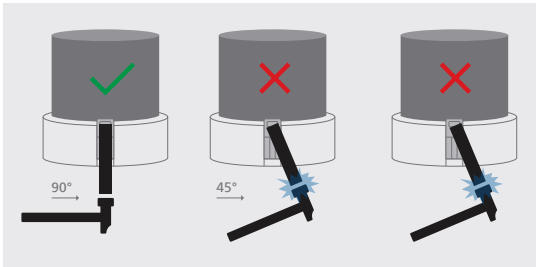
Setting:



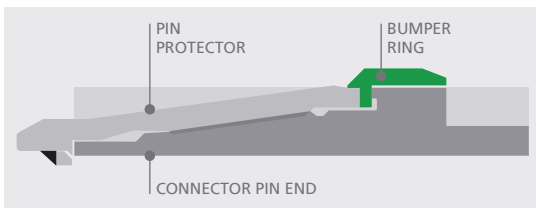
9. The use of a chisel and hammer to unset the ARK is required.

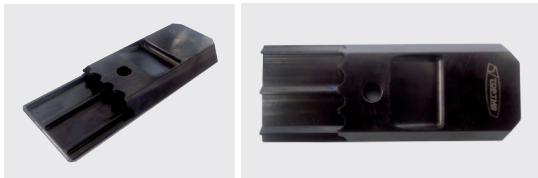
10. The chisel should be placed correctly in the removal slot to prevent damaging the ARK or slot edges.
11. Hammer the ARK in the direction of travel only.
12. Correct and incorrect de-activation methods are indicated in the following diagrams.

Un-setting:



13. When the pipe is not being used knock the ARK(s) into the set position and lock in place.
14. If the pipe is to be stored ensure the ARK(s) are in the set position and completely cover with storage grease to prevent corrosion to both the ARK and the ARK slot.
15. TenarisHydril BlueDock® protectors are in two parts; the thread / seal protector and the bumper ring. When handling and / or storing pipe both parts must be correctly installed to pin and box in order to prevent damage to the connector, ARK(s) and ARK slots.





Anti Rotation Key (ARK)



ARK set and locked in position

16. The ARK(s) fit snug into the key guide.
17. Cover with grease to prevent corrosion seizure.

Pulling

1. Alignment is equally as critical for pulling as it is for running pipe.
2. Ensure travelling block / top drive is aligned with the hole, 20% deflection is excessive.
3. The use of a weight compensator is recommended.

4. Unlock the ARK(s) bolt with the use of a hexagonal key.
5. Move the ARK(s) to the unlocked position and tighten lock bolt.
6. Ensure all ARK(s) are deactivated.
7. It is possible to break out the connector with the ARK(s) installed however the break out torques will be significantly higher than normal.
8. Back up tong if used should be placed on the pipe body.
9. Break and spin out under 5 RPM.
10. Ensure vertical stabilization of the pipe when breaking and spinning out.
11. When rotating out use the previously scribed alignment marks to prevent connector bump.
12. Stop rotation when marks are aligned.
13. Do not over rotate and allow the pipe to 'bump' or spin on the last engaged thread.
14. A stabbing guide is recommended in order to guide the pin from the box when picked up.
15. Disengage pin from box and pull to one side using a rope or some other form of stabilising aid to secure the pipe. This is imperative in high winds or on a floating installation, care should be taken to lower the pipe to a safe, manageable height as soon as it is lifted free of the box.
16. Apply storage / thread compound to pin and box connector to prevent corrosion, including rejects.
17. Re-install clean, dry thread protectors securely.

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