TenarisHydril Wedge 461™ Connection

Scope

These guidelines apply specifically to the use of Wedge 461™ connections. This document shall be used in conjunction with the TenarisHydril Running Manual, which is the main document applicable to the running of 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 GDL00337.
- 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.

2. Refer to document FTD29356 for a list of compounds approved by Tenaris.

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3. Latest version of the specific Product Data Sheet can be obtained from Tenaris website. In case this is not available, request the data sheet from the local Technical Sales representative or contact-tenarishydril@tenaris.com.

Pre-Running

1. Never move or handle pipe without the correct thread protectors securely in place.

2. Ensure connections are clean and free of all debris and / or contaminants, cleaning methods employed should conform to the recommendations contained within the TenarisHydril Running Manual.

3. Verify all pipe and accessories have genuine TenarisHydril manufactured connections.

4. Visually inspect thread area prior to running, ensuring no damage is evident.

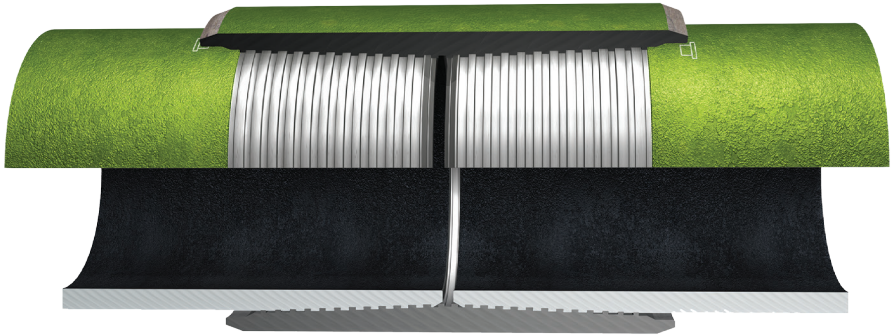
5. Verify the compatibility of the Wedge 461™ connection with accessories such as cement heads, safety valves, cross overs, etc.

6. Verify material grade of all accessories ensuring compatibility with main string.

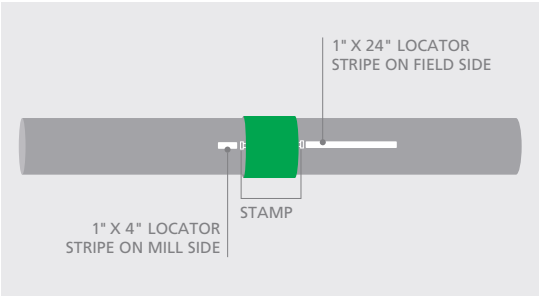
Inspection

1. Inspection criteria for Wedge 461™ connection is as outlined in the Field Service Operative Guideline GDL31457.

2. Light scratches on pin nose are acceptable as long as there is no protruding metal.

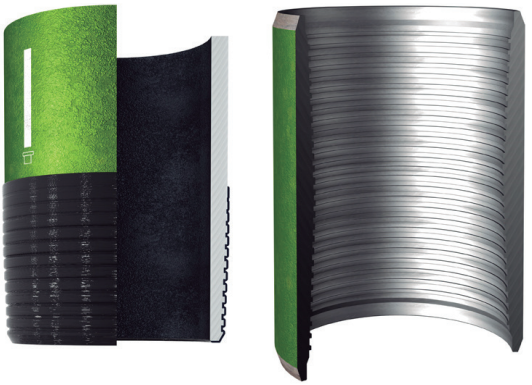


Wedge 461™ Configuration



Wedge 461™ has limited same size / weight interchange capability, and is not compatible with any other connection.

Thread Compound Applicationn

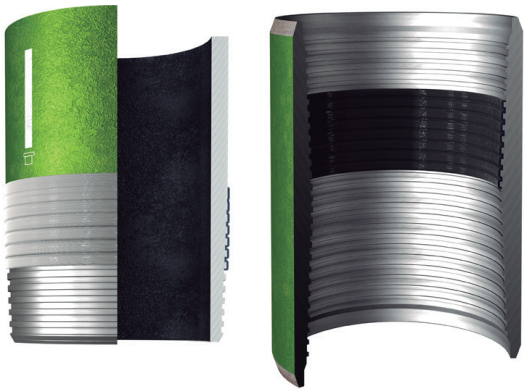


1. Apply a thin coating of thread compound on the full pin end only, threads and pin nose, the thread form should be clearly visible.

2. Do not apply running compound to the box end. If thread compound has been applied previously, remove before running.

3. If pipe is received from Tenaris as "Run Ready", no additional cleaning or compound application is required prior to running. Remove thread protectors, redistribute thread compound on the pin with clean brush to ensure homogeneous coverage of threads and nose.

Thread Lock Application



1. Connections must be clean and dry when applying thread lock.

2. Thread lock should be applied to 50% of the threads at the back of the pin connection.

3. Running compound should then be applied to the threads at the back of the box connection.

Torque Application

1. Computer make up equipment is not mandatory for Wedge 461™ connections.

2. Set tong dump valve at optimum torque then test on pipe body.

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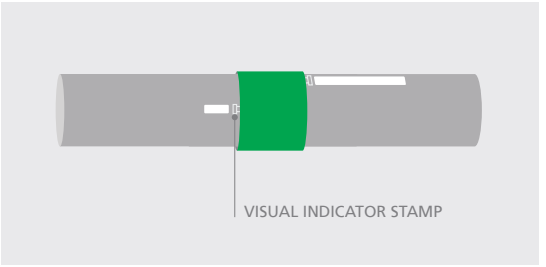
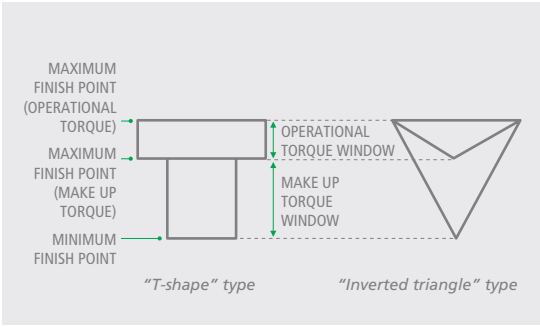
3. Apply the specified torques as indicated on the Wedge 461™ data sheet. Do not apply thread compound manufacturer's friction factor.

4. The make up criteria for Wedge 461™ connection is the attainment of optimum torque along with the coupling face final position.

5. Wedge 461™ is correctly assembled when both box faces finish within the region of the visual indicator stamp corresponding to the torque applied, as detailed below:

- The visual indicator can be either a T-shaped stamp, or alternatively an inverted triangle stamp. Both of them have the same function and are equivalent, with the triangular one being the latest design for improved visibility. Refer to sketch on next page.
- If using make up torques, coupling face should finish within the make up torque window.
- If exceeding maximum make up torque, the coupling face should finish anywhere within the minimum finish point and maximum finish point for operational torque.





VISUAL INDICATOR STAMP

6. On the first connection make up:

- Once optimum torque has been attained relax the tong.
- Draw a longitudinal line across pin and box and re-apply optimum torque without breaking out the connection.
- If movement over 1" is witnessed for the drawn line on the field pin end:
  - Check for factors that are absorbing the applied torque. Often the issue is caused by excessive application of thread compound. Recheck alignment and tong function, making adjustments as necessary.
  - Draw a second line, re-apply optimum torque without breaking out the connection and check the new drawn line does not move beyond 1".
  - Repeat this process without breaking out the connection until rotation is less than 1" after re-applying optimum torque.

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- If this process was repeated and rotation exceeded the mark of 1" twice or more, then reduce the amount of thread compound for the following connection and repeat the process until getting less than 1" in the first attempt.

- Only if the re-application of torque does not result in movement above 1" continue running the rest of the string normally applying optimum torque once only along with the adjusted amount of thread compound.

7. When thread locking connections, optimum torque values +20% should be applied at low RPM. Re-apply this increased torque as necessary until rotation witnessed is below 1".

8. Wedge 461™ has limited same size / weight interchange capability, and is not compatible with any other connection.

9. When mixing weights/grades ensure compatibility of design and proceed as follows:

- Place back up tong on the lower side of the coupling (mill side) for making up connections.

- If using recommended make up torques, apply the optimum make up torque value corresponding to the weight/grade of pin member to be assembled.

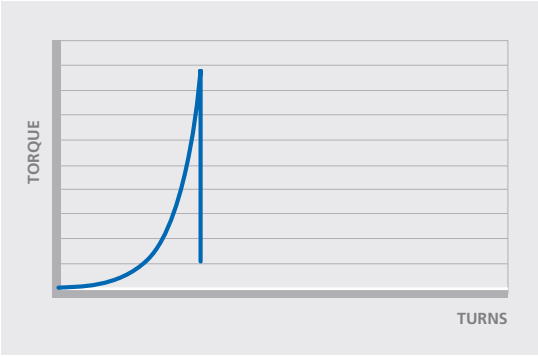
- If using operational torques, apply the lower operational torque value of the two connections.

- The operative torque of a Wedge 461™ string with mixed grades/weights corresponds to the minimum operative torque of all connections within the string.

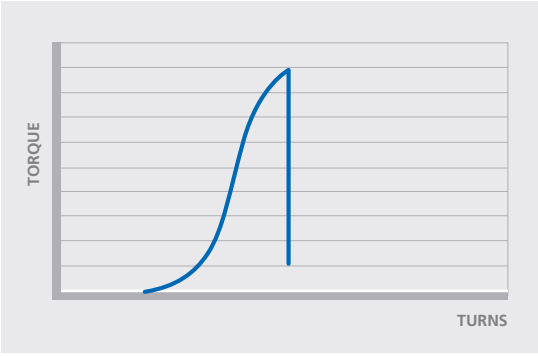
10. Coupling rotation when applying make up torque is acceptable as long as both couplings stay within the make up window.

11. Graph analysis for Wedge 461™ is similar to that for all Wedge Series 500™ and 600™, refer to the TenarisHydril running manual make up acceptance section for further explanation.

12. When computer equipment is used to monitor Wedge 461™ connection make up, the graph profiles should be similar to the ones below.



TYPICAL MU CHART



EXAMPLE - COUPLING ROTATION

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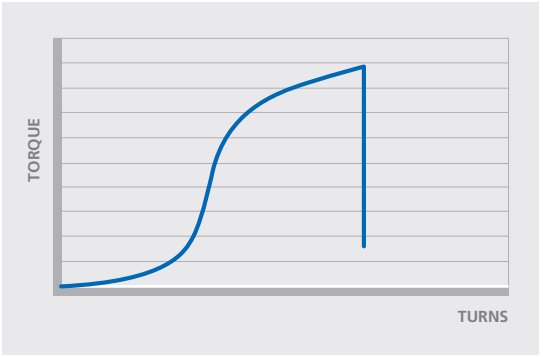
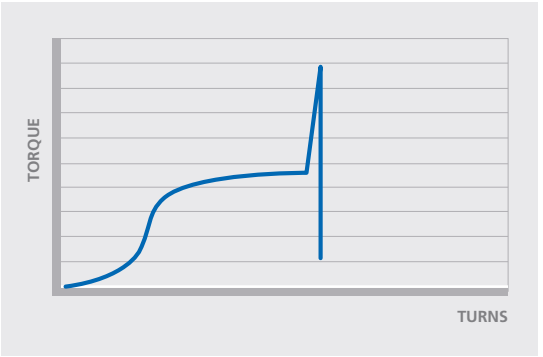
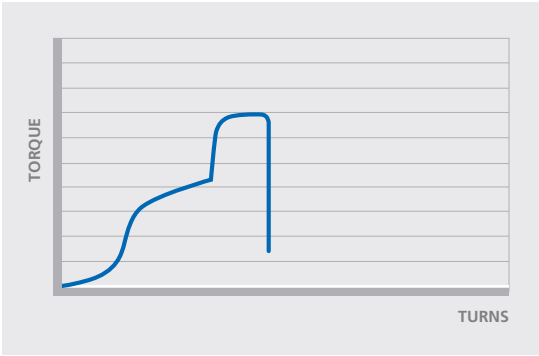


EXAMPLE - HIGH TORQUE & COUPLING ROTATION



EXAMPLE - COUPLING ROTATION & PIN TO PIN CONTACT

13. Below an example of a non-acceptable graph on Wedge 461™ due to yielding.



EXAMPLE - YIELDED CONNECTION

Running

1. The use of a stabbing guide is recommended.

2. The use of slip type elevators is strongly recommended.

3. To avoid cross threading stab pipe in a smooth controlled fashion ensuring the pipe is vertical when doing so, continue to support and stabilize the pipe throughout the make up operation.

4. Upon commencement of initial rotation use low RPM (5 RPM or below) in order to ensure the pipe has not cross threaded during stabbing.

5. If cross threading is evident, immediately reverse rotate the pipe, completely disassemble, clean and inspect both connections.

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6. Maximum assembly speeds are indicated in the table below. These are applicable for running in singles with power tong or CRT and assuming ideal conditions. Several factors may dictate a lower RPM should be used for assembly such as weather, pipe movement or alignment among other variables.

MATERIAL	OD	SPIN IN RPM	FINAL MAKE-UP RPM
Carbon Steel	4 ½" – 7"	40	15

7. A factor which may preclude complete assembly is excessive thread compound applied to the connection, reduce the quantity applied if this is found to be the case.

Pulling

1. The use of a stabbing guide is recommended to prevent hang up.

2. Apply the back up tong on the lower end of the coupling.

3. Apply power tong in low RPM (3-5 RPM) to break out the connection, ensuring the pipe is stabilized during the break out process.

4. Maximum spin out speed should not exceed 15 RPM.

5. Visual inspection is recommended to classify the thread condition; any rejected connections should be clearly marked and segregated for further investigation.

6. Apply clean, dry thread protectors after applying storage compound on clean, dry connections.

7. Storage / thread compound should always be applied to connections post job, even rejects.

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