

TPN™ Connection

Scope

These guidelines apply specifically to the use of TPN™ connection. This document provides an overview of best practices for this specific product and should be used in conjunction with the TenarisHydril Running Manual.

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 need to be clearly explained and agreed with the client representative prior to implementation and fully documented in the running report.

References

- GDL23349 - Pre-Running Preparation.
- GDL23353 - Blue® Series and Legacy Series Make up Acceptance.
- FTD29356 - Premium Connections Approved Thread Compounds.
- API Recommended Practice 5A5.

Equipment, Material & Documents

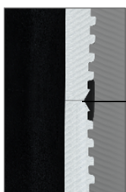
1. Verify the appropriate thread compound is available for this connection.
2. Refer to document FTD29356 for a list of thread compounds approved by Tenaris.
3. Latest version of the specific Product Data Sheet can be obtained from Tenaris web site. In case this is unavailable, request the data sheet from the local Technical Sales.
4. The use of a torque-turn computer monitoring equipment is recommended when assembling TPN™ connections.
5. The use of a weight compensator is highly recommended for running or pulling stands of 3 pipe $\geq 7"$.

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 GDL23349 –Pre-Running Preparation".
3. Verify all pipe and accessories have genuine Tenaris manufactured connections.
4. Visually inspect thread, pin nose and couplings ensuring no damage is evident.

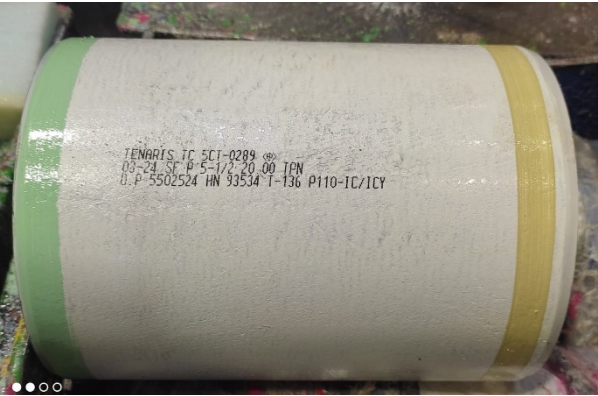
5. Verify the compatibility of the TPN™ pipe with accessories such as cement heads, safety valves, cross overs, etc.
6. Connection weight interchange compatibility is indicated in the Product Data Sheet available from Tenaris website.
7. Verify material grade of all accessories ensuring compatibility with main string.
8. On thin wall and/or low-grade pipe, the use of full wrap around type dies is recommended to avoid the possibility of crushing the pipe body when high torque is applied.

TPN™ Configuration



PIN TO PIN CONTACT
AFTER MADE-UP

In addition to the color bands utilized for identifying steel grades, TPN™ connections have an additional green beige color band at the other end of the coupling.



Interchange Capability

TPN™ is compatible with TXP® BTC and API Buttress connections of same OD, however the resulting mechanical properties of the assembled connections are limited to those of the weakest end. The make up criteria with resulting torque and compression capabilities of any given combination are indicated in the table below.

PIN END	BOX END	ASSEMBLY CRITERIA	TORQUE & COMPRESSION CAPABILITY
TPN™	TPN™	TPN™	TPN™
	TXP® BTC	TXP® BTC	TXP® BTC
	API Buttress	API Buttress	API Buttress
TXP® BTC	TPN™	TPN™	TXP® BTC
API Buttress		API Buttress (*)	API Buttress

(*) As TPN™ couplings are shorter than API Buttress couplings, when assembling an API Buttress pin into a TPN™ box the finish point of the coupling face should not exceed the triangle base.

Inspection

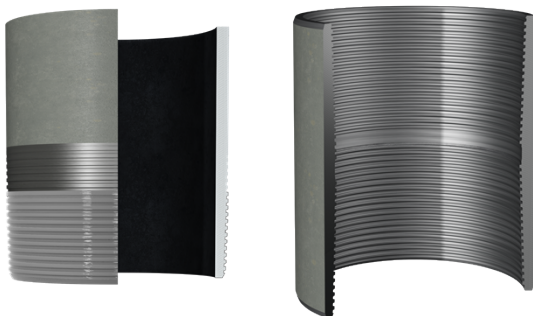
1. Visual inspection guidelines as outlined in API RP 5A5 should be applied.
2. Pay particular attention to pin nose condition (field side and mill side), ensuring there is no raised material which may preclude correct make up.
3. Ensure threads are clean and free of any debris or contamination.
4. Repair of connections is limited to Tenaris Field Services Representative.

Thread Compound Application



1. Apply thread running compound to both pin and box ends, covering all threads and pin nose areas.
2. The compound should be applied as a continuous even film round the entire circumference of the connection. The thread form should be clearly visible.
3. For Tenaris approved thread compounds, apply the friction factor indicated in FTD29356.

Thread Lock Application



1. Ensure connections are clean and dry when applying thread lock.
2. Apply thread lock to the 50% of the pin threads furthest from the pipe body.
3. Apply the thread lock manufacturers indicated friction factor.

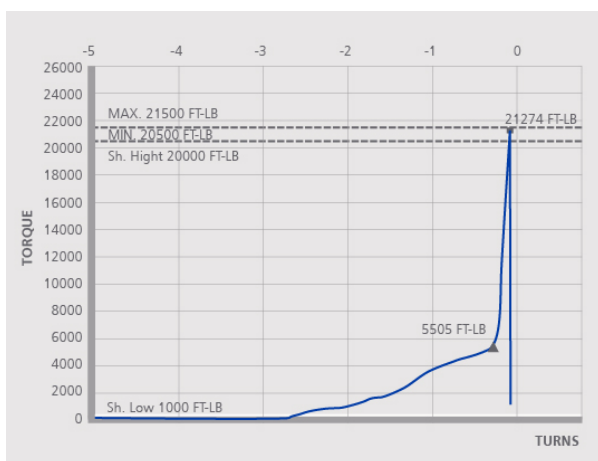
Torque Application

1. Torque values for TPN™ connection should always be taken from the latest product data sheet.
2. The use of torque turn computer equipment is recommended to make up TPN™ connection.
3. Reference torque should initially be set at 5% of optimum.
4. The dump valve should be set at optimum, verify correct operation on the pipe body prior to first make up.

5. Set the computer turns to 2 initially then adjust as necessary to attain good graph depiction. The computer make-up profile for TPN™ connections should look like the one on next page.

6. The torque turn graph should clearly show a shoulder point located between the reference torque and the minimum make up torque parameters. If the shoulder torque exceeds the minimum make up torque, the make-up can still be accepted if the following conditions are met:

- Final make up torque is within minimum and maximum make up torque values,
- Shoulder point is clearly visible, and
- The graph profile complies with the guidelines outlined in GDL23353.



7. Refer to document GDL23353 -"Blue® Series and Legacy Series Make up Acceptance" for further detail on make-up acceptance, with exception of delta turn criteria which is not applicable for TPN™.

8. If different weights or grades of TPN™ connections are to be mixed, verify compatibility, and apply the lower of the make up torque values. If different weights of connections are combined there will be a step in the bore.

Running

1. 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 stabbing and make up operation.

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

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

4. Maximum assembly speeds are indicated in the table below. These are applicable for running in singles with a tong or CRT and assuming ideal conditions. Conditions may dictate lower assembly speeds than the maximum values indicated. High winds or excessive pipe movement among other variables will necessitate a lower RPM to be used.

Tenaris TPN™	OD	SPIN IN RPM	FINAL M/U RPM
Carbon Steel	4 1/2" – 7"	40	5

5. The make-up criteria for TPN™ connection are the attainment of optimum torque along with an acceptable graph showing a clear shoulder point. In addition, when correctly assembled both faces of the couplings fall between the base of the stamped triangle and approximately 50% of its height.

6. If the preferred method of torque-turn graph is not utilized, the stamped triangle can be used to verify the correct final position after assembly. Frequency of the visual check should be agreed with Tenaris Field Services representative and documented in the running report. It is suggested to visually check the first 5 joints, then every 20 joints during the job.

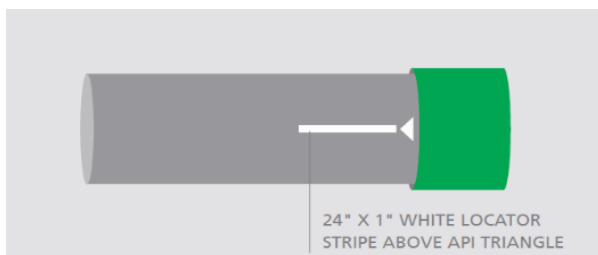
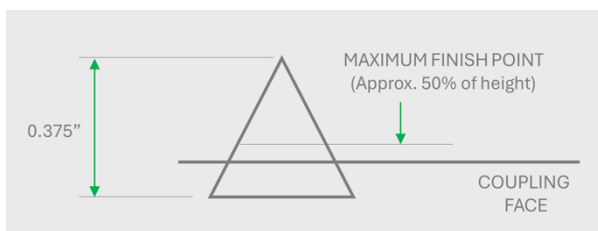
7. Rotation of the mill-end coupling may be observed during make up. It can be accepted as long as:

- It does not rotate more than half a turn, and
- An acceptable make up graph is obtained, or (if not using computer equipment) the maximum final position of stamped triangle is not exceeded on either side of the coupling.

Visual verification of make up

1. As in the assembly of API Buttress there is a triangle stamped on the pin end of TPN™ which is used for visual verification of correct assembly.

2. Final position of the coupling face after make up should be within the 50% of the triangle height. The coupling face should not exceed that position at final make up; if it does, break out the connection and inspect for deformation of pin nose bevel in both field and mill ends, if none is evident repeat doping and make up process. See diagrams on next page.



Pulling

1. Automatic stabbing system or stabber is highly recommended to maintain the pipe in a vertical position.
2. Apply the back-up tong jaw low on the coupling (over the mill end section of the coupling), leaving the field end free.
3. Apply power tong in low rpm (3-5 RPM) to break the connection, ensuring the pipe is stabilized during the break and spin 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 the connections.
7. Storage / thread compound should always be applied to connections post job, even rejects.

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