TENARIS
SWIVEL JOINT
RUNNING MANUAL

Tenaris

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Tenaris Fast Swivel Joint (any size except 9-5/8")
INSTALLATION GUIDELINES

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Table of Contents

Objective

This Installation Guidelines Document includes Tenaris' recommendations on best practices for the care, handling and installation of Tenaris Swivel Joint product, also known as Fast Joint. These recommendations aim to maximize the value of our products before, during and after installation.

Scope

These Guidelines apply to all the Tenaris Fast Swivel Joint products, of **any nominal size comprised between 2-3/8" and 7-5/8" included**.
The product configurations covered by these Guidelines include the Standard Swivel Joint, the Torque-Transmission Swivel Joint, and the Swivel Joint with NPT Test Port.
The present document also covers the installation guidelines of the optional accessories provided with the Tenaris Swivel Joint, i.e. the Kickstand Joint and the Swivel Joint Pressure Plugs.

Tenaris Swivel Joint of size 9-5/8" is out of the scope of this document and has a dedicated Installation Procedure.

Abbreviations

TSJ	Tenaris Swivel Joint
TSH	Tenaris Hydril
Ksi	one thousand Psi (Pound per Square Inch)
OD	Outer Diameter
SMYS	Specified Minimum Yield Strength
MTM	Metal-To-Metal (Seal)
TBG	Tubing
MU	Make-Up (Tong, Torque, etc.)
BU	Back-Up (Tong)
HDPE	High Density Polyethylene
NPT	National Pipe Thread Taper

Definitions

N/a

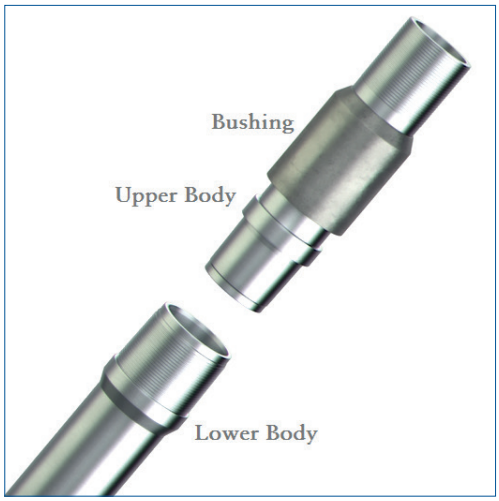
Development

General Product Description

The Tenaris Swivel Joint is a premium device specifically designed to allow the relative rotation and easy alignment of the upper and lower parts of the string before the make-up of the connection.

During make-up, the alignment between upper and lower parts is preserved, so to allow the operator to install completion equipment without caring of inconsistent alignment usually associated with pipe make-up.

Moreover, the Tenaris Swivel Joint is equipped with Metal-to-Metal seals, so to allow the operator to rely on perfect tightness along the string, especially in gas wells, without using conventional swivel joints with elastomeric seals.



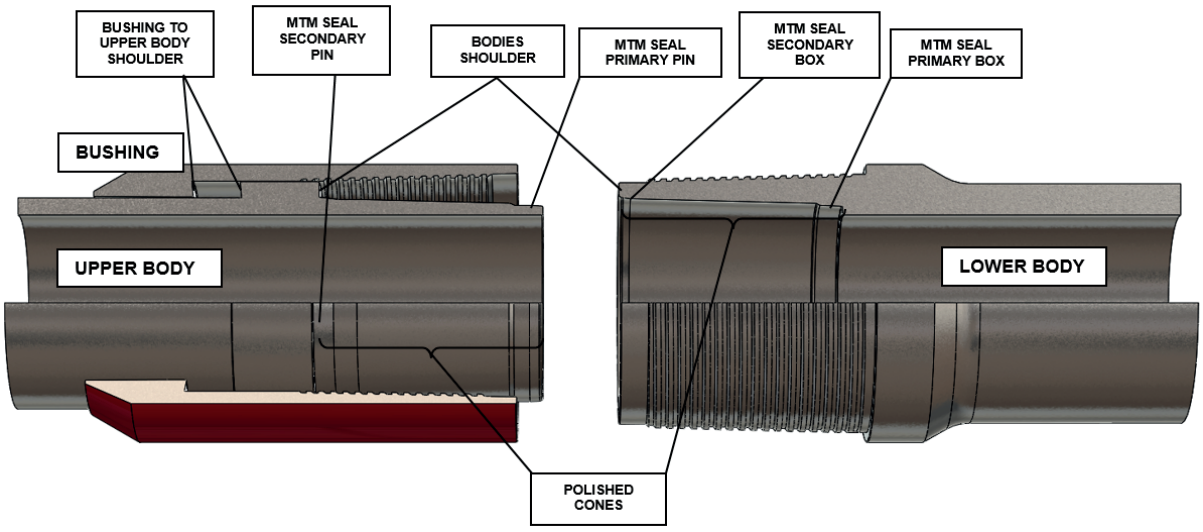
Dual Metal-to-Metal Seal: with its unique design, the Fast Swivel Joint will preserve the pressure integrity of the tubing string being a solid piece of steel. It does not employ crush rings or seal stop devices both of which have been shown to provide worst performances and require additional maintenance.

Full Tubing Strength: once it is made up to the stated torque, it grants a tensile, compression, burst and collapse capabilities greater than the correspondent tubing tensile strength.

Simple Construction: the tool is composed by only three components, the Lower Body, the Upper Body and the threaded Bushing.

Simple Installation: the two subassemblies can be joined together without any axial rotation. The bushing is the only item that must rotate, so the upper and the lower body stay aligned during the make-up.

Nomenclature



Product Configurations

Tenaris Swivel Joint is available in various configurations, including the Torque-Transmission Swivel Joint and the Swivel Joint with Test Port. The installation Guidelines detailed in this document are applicable to all configurations, with the clarifications set forth:

Torque Transmission Swivel Joint: in this configuration, the upper and lower bodies are designed with a special castellation that provide rotation resistance to any torque in excess of the maximum make-up torque of the premium connection of the tubing string. When an instruction is specifically related to the Torque Transmission Swivel Joint, the following symbol is shown TT.

Swivel Joint with Test Port:in this configuration, when specifically required by the customer, the lower body is provided with a test port for pressure testing between the two Metal to Metal seals. When an instruction is specifically related to the Swivel Joint with Test Port, the following symbol is shown T_{port}.

T_{port} **Disclaimer:** Tenaris discourages the use of the Swivel Joint with Test Port for the simple reason that its misuse can seriously jeopardize the sealing collaboration of the two metal to metal seals, that have been proven by a series of qualification tests according to ISO 13679 CAL IV Mod. Tenaris does not take any liability for improper use of the test port and/or for the inappropriate installation of the NPT sealing plug of the test port that shall always be installed before the Swivel Joint is run in hole.

Pre-Installation checks

Prior to run any of the parts, all threads and MTM sealing surfaces shall be fully cleaned, removing the shipping protectors and the preservation dope. For this operation it is recommended to use solvent followed by air drying. Threads and MTM shall be carefully examined to ensure that there are no indications of damage, scouring, etc.

NOTE: It would be always recommendable to install the Swivel Joint Upper Body (together with its Bushing) at the bottom of its Downhole Assembly before shipment to the rig site and protect the ends not made up with the plastic Protectors provided.

T_{port} The Swivel Joint with Test Port SHALL be sent to the site with the test port plugged.

Running Procedure

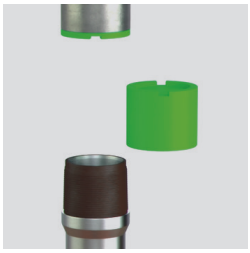
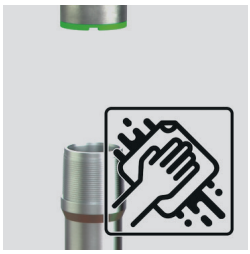
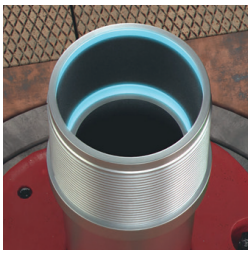
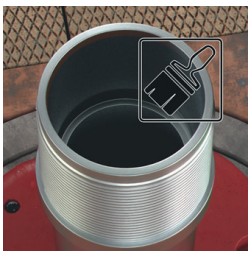
TSJ Lower Body Make Up to TBG

- Apply the correct amount of dope (Ref. Annex 3) to the tubing box threaded connection sitting inside the rotary and stab the TSJ Lower Body inside the box end.
- At first, make up by hand, then using the Automatic Tong, following Thread Manufacturer procedures and data.

ALWAYS VERIFY PROPER ALIGNMENT OF ROTARY TABLE CENTERLINE AND TRAVELLING BLOCK

Tenaris Swivel Joint preparation sequence

A. LOWER BODY PREPARATION

A1	Remove protector from the TSJ lower body	
A2	Clean and dry the surface from the storage compound. The metallic surface shall be clearly visible.	
A3	Perform a visual inspection to check there is no visible damage on the metal seals and on the pin thread (blue surfaces in the picture)	
A4	Apply a thin layer of dope (Ref. Annex 3) on the metal seals that are on the inside surface of the swivel joint lower body.	
A5	Apply a thin layer of light oil on the inside surface of the cone *Note: In case light hydraulic oil was not available on site, leave the surface in bare conditions. NEVER APPLY DOPE on these conical surfaces.*	

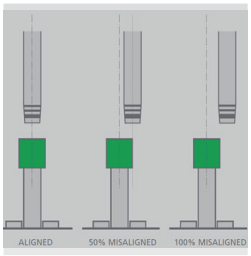
B. UPPER BODY PREPARATION

B1	Remove the protector from the upper body, lift the bushing and apply the bushing retainer to keep the bushing in the lifted position. *Note 1: the bushing retainer is optional; the bushing can be kept in the lifted position by hand.* *Note 2: For sizes 5-1/2" and above, the bushing is provided with special handles to help the lifting, handling and manual make-up.*	 

B. UPPER BODY PREPARATION		
B2	Carefully clean the surface from the storage dope and perform a visual inspection to check there is no visible damage on the metal seals and on the cone (blue surfaces in the picture).	
B3	Apply a thin layer of dope on the metal seals that are on the outside surface of the swivel joint upper body	
B4	Apply a thin layer of light oil on the outer surface of the cone *Note: In case light hydraulic oil was not available on site, leave the surface in bare conditions. NEVER APPLY DOPE on these conical surfaces.*	

Tenaris Swivel Joint stabbing

⚠ NEVER ROTATE FSJ UPPER AND LOWER BODIES WHILE ENGAGING, IT WOULD GALL THE MTM SEALS.

C. STABBING		
C1	Alignment is critical in ensuring a properly assembled connection without incurring damage. If misalignment is evident take remedial action to minimize (Ref Annex 1, TR1). ⚠ Misalignment of more than 10% of the Lower Body maximum OD is deemed to be excessive. ⚠ The use of a weight compensator is highly recommended for all chrome and CRA Swivel Joints, and also recommended when upper assemblies are very heavy.	
C2	Install the stabbing guide on the lower body. *Note: the stabbing guide is optional, but it's recommended to facilitate accurate and safe stabbing of the TSJ upper body cone into the TSJ lower body receptacle.*	
C3	Stab in the swivel joint upper body and remove the stabbing guide.	

C. STABBING

C3 **TT**

In the case of the Torque Transmission Swivel Joint, the stabbing procedure is exactly the same. The only difference is the correct alignment and engagement of the teeth before completing the stabbing.

C4

Land the upper body inside the lower body.

NOTE: A gap of about 4-6 mm should be visible now on the tool, between the upper and lower bodies (light blue gap here aside); this is correct,and it's a sign of engagement of the primary seal.
If the gap is much smaller than 4-6mm, tending to close completely, ref. Annex 1, TR2.
If the gap is higher than 4-6mm, ref. Annex 1, TR3.

C5

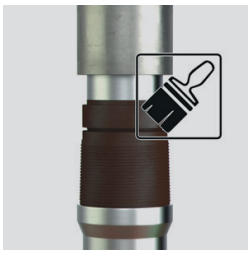
Apply a uniform and thin layer of dope on the pin thread of the lower body, so that the thread profile remain clearly visible after deposing the compound.

C6

Lift the bushing and remove the bushing retainer.

C7

Apply dope on the upper body shoulder, as indicated in the sketch here aside.



Swivel Joint Initial (Manual) Make Up

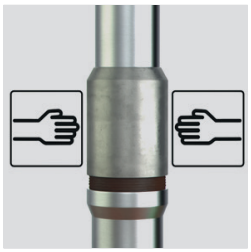
D. INITIAL (MANUAL) MAKE UP

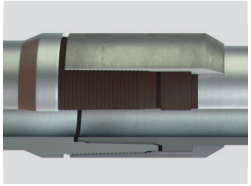
D1

Land the bushing in position, and start to makeup it on the lower thread by hand, until is possible. When the bushing starts taking torque it means that the it's starting to work on the Swivel Joint Upper Body Shoulder, correctly starting to drive the Upper Assembly down.

Note: in ideal conditions, the bushing can be hand tight until the gap between bushing and lower body is approximately 3-5mm. If, before applying the hydraulic tongs, the gap is considerably higher than 3-5mm, check the trouble-shooting section TR4.

⚠ At this moment, any lifting device sustaining the upper assembly shall be slacked off in order that no pull is exerted to contrast the upper assembly to move down. If any pull force is maintained during the subsequent operations, there is the risk of damaging the thread without energizing the mtm seals.



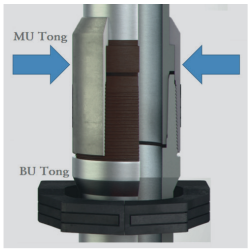


Swivel Joint Final Make Up

E. FINAL MAKE UP

E1

Start using the automatic power tongs, with the lower tong (the Back Up) holding the Lower Body just underneath the bevel and the top tong (the Make Up) applying torque on the Bushing cylindrical body.



⚠ On the MU Hydraulic Tong, avoid gripping the bushing in the lower area, and set the jaws as close as possible on the upper part (see picture on the right – blue arrows)

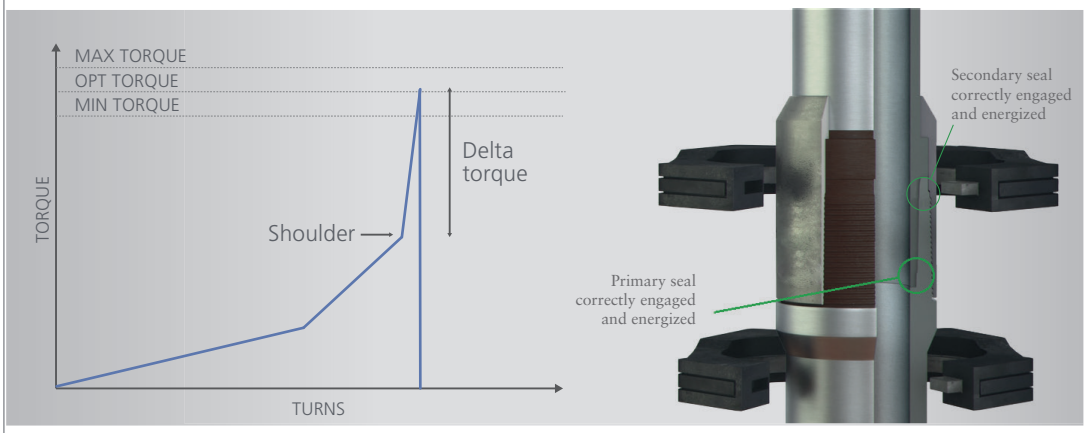
⚠ Try to use the minimum gripping force suitable for the size, to avoid deformation of the bushing, especially in CRA and low YS grades.

E2

Record the torque on a torque chart, as usually done for the premium connections.
Apply torque until the optimal value is reached (Ref. ANNEX 2 of the Guidelines), and DO NOT over torque.

⚠ The make up process should be continuos, i.e. it should not be stopped until the defined torque values are achieved

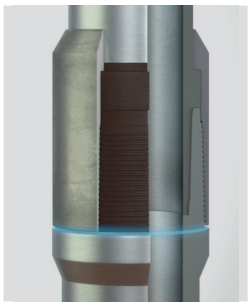
⚠ A shoulder point shall be clearly visible on the chart, although no minimum nor maximum shoulder values are given for this connection.



E3

Use a feeler gauge for measuring the residual gap between the bushing and the lower body external shoulder.

E4 The following decision tree shall be used as acceptance criteria for the make-up:



1. the torque chart MUST in any case be checked and deemed to be acceptable according to section E2 above. If the torque chart is not acceptable, the connection shall be broken, cleaned, inspected and make up procedure shall be repeated.
2. with an acceptable torque chart, if the measured gap is between 0.2mm and 0.7mm, the make-up is ACCEPTABLE.
3. with an acceptable torque chart, but the measured gap is outside the 0.2-0.7mm range, three cases A,B or C may occur as follows:

A. for swivel joints of nominal diameter 5-1/2" and above, a measured gap up to 0.9mm IS ACCEPTABLE, provided it is fairly uniform all over the circumference of the tool.
B. if the measured gap is below 0.2mm, but still visible and measurable with a feeler gauge, and at the same time the torque chart is acceptable, with no sign of over-torque, the make-up is considered ACCEPTABLE.
C. if the gap is not visible at all, i.e. the bushing is touching the lower body shoulder all over the circumference of the tool, the make up is NOT ACCEPTABLE even in case of good torque chart.

⚠ Any other case not specifically mentioned above, shall be considered NOT ACCEPTABLE.

NOTE: In case of dual completion, with no possibility to use the automatic torque/turn tongs, an alternative make up method should be used. Reference the dedicated document: "Swivel Joint Installation Guidelines for Dual Completions".

Tport Pressure Test through the Test Port (Only for the Swivel Joint with Test Port)

The test has to be performed only after proper make-up of the swivel joint connection.

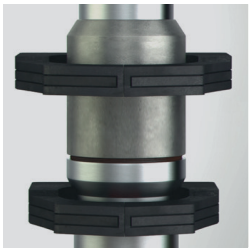
F. PRESSURE TEST THROUGH THE PORT	
F1	Remove the 1/8" NPT plug.
F2	Connect the test line to the outlet. Use light oil as testing medium, fill up and let the air purge. The line should be "T" connected to an appropriate test gauge and/or chart recorder.
F3	Pressurize the connection through the pump. ⚠ The pressure shall never exceed 80% of the Maximum Test Pressure reported on the Test Value Table (Ref. ANNEX 4)
F4	When the test pressure is reached, hold the pressure for 5 minutes and check for pressure stability on the chart recorder. Be sure that air is purged properly since the test volume is very small.
F5	No pressure drop identifies that both metal seals are holding on, and the test is complete and satisfactory.
F6	Release the pressure from the connection through the test pump relief.
F7	Disconnect the test line.
F8	Install the NPT test plug back before running the tool.

⚠ THE TOOL MUST NOT BE RUN WITH THE TEST PORT OPEN

Retrieving (Break Out) procedure

⚠ NEVER ROTATE THE TWO BODIES WHILE PULLING FOR DISCONNECT

Tport DURING THE RETRIEVING AND DISMANTLING PROCEDURE IT IS NOT NECESSARY TO UNPLUG THE TEST PORT.

G. RETRIEVING (BREAK OUT)		
G1	Apply the Break Out tong to the threaded Bushing and the Back Up Tong to the Lower Body. ⚠ Make sure that the two bodies NEVER ROTATE WHILE PULLING FOR DISCONNECT, this may damage the threaded profile	
G2	Using the Automatic Tong, break out the connection. ⚠ BREAK OUT TORQUE MAY BE UP TO 50% HIGHER THAN MAKE UP MAX TORQUE.	

G. RETRIEVING (BREAK OUT)

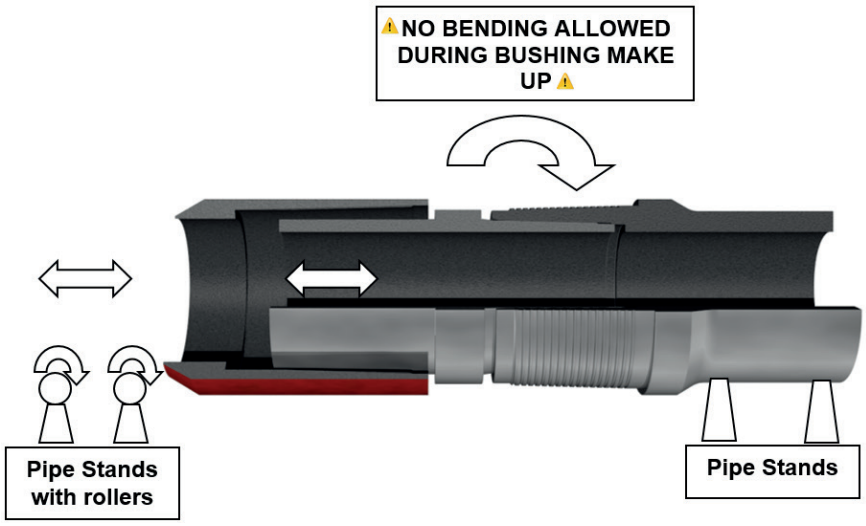
G3	Continue manually until complete break out has been reached, and lift the threaded Bushing.	
G4	Install the suspension bushing (if available)	
G5	Split the Swivel Joint into two parts, by pulling the Upper Assembly.	
G6	Remove the suspension bushing, apply the Protector Caps to the bottom end of the Swivel Upper body and lay the Upper Assembly on the side.	
G7	Apply the Protection Cap on the top end of the Swivel Joint Lower body.	
G8	Break Out the Tenaris Swivel Joint Lower Body from the tubing joint sitting in the rotary and apply the thread Protectors.	
G9	Lay on the side and ship to town for the inspection procedures	

AFTER ANY DISASSEMBLY THE SWIVEL JOINTS NEEDS TO BE CAREFULLY INSPECTED PRIOR TO BE RE-USED.

Assembly in horizontal position

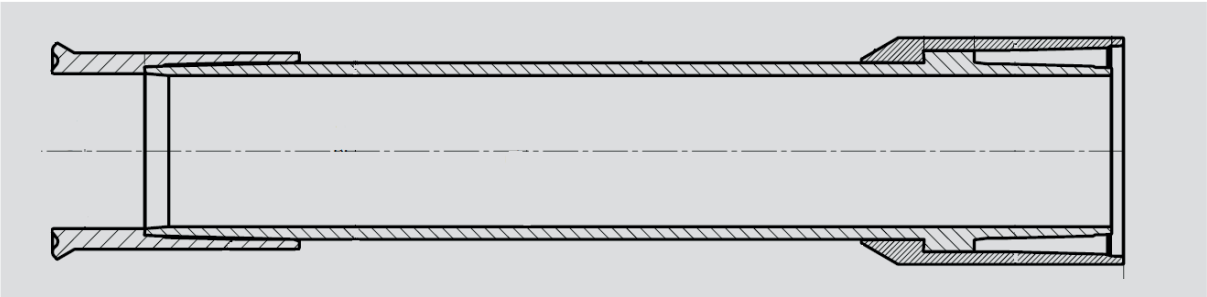
- In case the Tenaris Swivel Joint had to be connected to sub-assemblies in the shop, it is recommended that the TSJ Upper Body is made up to the Upper Assembly and the TSJ Lower Body is made up to the Lower Assembly separately.
- The two halves of the TSJ can be separately pressure tested together with the related sub-assembly, using the properly designed *Pressure Plugs*. In this case no particular handling problems would arise.
- If, on the opposite, the two Sub-assemblies (Upper and Lower) would need to be joined together in the horizontal position, **special care should be used to assemble them to avoid damage to the too**l.
- Lay down horizontally and align the TSJ Upper and Lower Body on four pipe stands. The pipe stands must be capable of holding the two parts horizontally aligned on the tool axis.
- The two pipe stands sustaining the TSJ Upper Body assembly should be provided with rollers, to allow the Upper Assembly to move along its longitudinal axis (with minimal friction). This in order to grant that, when the Bushing starts to make up on the Lower Body thread, it can freely pull the Upper Body and force it inside the Lower Body, energizing the two MTM seals.
- In other words, the two TSJ halves should be always mated in 'neutral position', with no bending whatsoever applied during the Bushing make up.

NO ROTATION OF THE UPPER BODY INSIDE THE LOWER BODY IS ALLOWED



Tenaris Swivel Joint Accessories: the Kickstand Joint

- The Kickstand is an accessory designed to take control of the well while assembling the completion subassemblies to the tubing string in case of sudden instability of completion fluids into the well.
- It allows the quick connection of the Top Drive Assembly to the Lower Body of the Swivel Joint sitting in the rotary while the upper Down Hole Assembly is being prepared/handled.
- Machined out of Carbon Steel with a grade compatible with the drilling string it is designed to mate exactly as an Upper Body of the Swivel Joints. As such, it requires the same torque values required for a conventional making up of the threaded Bushing, and the metal seals will operate as within a standard Swivel Joint tool.
- To install the Fast Kickstand Joint, follow the installation instruction from "Tenaris Swivel Joint preparation sequence" to "Swivel Joint Initial (Manual) Make Up", considering the Kickstand exactly as if it was a TSJ Upper Body with its Bushing.



Tenaris Swivel Joint Accessories: Pressure Plugs

- Pressure plugs have been designed to test the Sub Assembly (Upper or Lower) when connected to its pertinent Tenaris Swivel Joint Half (Upper Body or Lower Body). They are rated for the Working Pressure of the corresponding pipe and grade.
- The pressure plugs are designed to be hand-tight to the corresponding half, since the threading and the metal seals are not engaged. Therefore, Pressure plugs are provided with the O-Rings to ensure they are pressure-tight during the test.

Tenaris Swivel Joint Accessories: Shipping Caps (Transport Protectors)

Made in HDPE 300, the transport protectors have been designed to be mounted on the two Tenaris Swivel Joint halves when they need to be shipped to the site separately. They protect the threads and MTM SEALS. They are always provided within the Tenaris Swivel Joint package, since the TSJ halves are shipped disassembled and protected by the caps by our Workshop.

Supporting Documentation

Previous Releases

- GDL25590 Rev.5 – Added 7-5/8" in the scope. Modified sections E2 and added decision tree in E4.
- GDL25590 Rev.4 – Added comment on shoulder point in E2. Added Note4 in E4.
- Modified pictures in E2, G1, G2. Annex 2: removed Torque Value Table, now published in document CTB33882.
- GDL25590 Rev.3 – Modified Torque Value Table (annex 2)
- GDL25590 Rev.2 – Modified Torque Value Table (annex 2)
- GDL25590 Rev.1 – Completely revised
- GDL25590 Rev.0
- Before the GDL document was created, the FAST srl document named P-01-2004 Rev. 14 was in place.

- History of previous releases is hereafter reported for information:
  - Rev. 14 – Modified the dope application on the upper body and delete the typical drawing of the transport cap
  - Rev. 13 – Clarify dope application, added the reference to the procedure P-01- 2015 for dual completion installation and insert troubleshooting section
  - Rev. 12 – Revised illustration drawings – Inserted Dope grams on MTM seals
  - Rev. 11 – Updated FAST Logo.
  - Rev. 10 – Revised Installation Procedure and included instructions for Horizontal Preassembly.
  - Rev. 9 – Modified dwg N° 02.06.012, added make up torque values for 2.3/8" and 2.7/8" 130 Ksi Swivel Joint.
  - Rev. 8 – Modified dwg N° 02.06.012, added make up torque values for 3.1/2" and 5.1/2" 130 Ksi Swivel Joint.
  - Rev. 7 – Updated API Logo
  - Rev. 6 – Modified dwg N° 02.06.012, added make up torque values grade 95 Swivel Joint.
  - Rev. 5 – Modified dwg N° 02.06.012, added make up torque values for 7" 80 Ksi Swivel Joint
  - Rev. 4 – Modified dwg N° 02.06.012, added make up torque values for 9.5/8" 80 Ksi Swivel Joint.
  - Rev. 3 – Modified dwg N° 02.06.012, added make up torque values for 4.1/2" 15.1# 130 Ksi Swivel Joint.
  - Rev. 2 – Modified dwg N° 02.06.012, added make up torque values for 9.5/8" 110 Ksi Swivel Joint.
  - Rev. 1 – Modified dwg N° 02.06.012, added make up torque values for 4" Swivel Joint.
    - Documents must comply with Corporate Policy on Document Retention.

Reference Documents

N/a

Annexes

Annex 1 – Troubleshooting

RUN-IN OPERATIONS

	Event	Cause	Remedial
TR1	**Stab-In** Incorrect alignment of Upper Body and Lower body during stab in	Rig hoisting system axis and rotary table vertical axis offset. If in excess of 10% of the Lower Body Maximum OD and subassembly length in excess of three times the TSJ length, during the stab in the weight of the upper assembly is slacked off and tend to flex the string at TSJ level. MTM seals could be damaged and or bushing can take extra torque during initial make up.	Align axis or try to re-establish alignment offsetting hoist before stabbing. More severe offset during stab in cannot be accepted since will load laterally the connection before complete engagement.
TR2	**Stab-In** Complete closure of shoulder gap between Upper Body and Lower Body	The weight of the upper assembly is totally or partially slacked off on the lower assembly sitting in the rotary table. This kind of load, ineffective in operation, activates both MTM seals.	None, if the manual make-up of the bushing can be correctly completed as specified in D1. Most probably, a different make up diagram of TSJ will be recorded: a step increase to optimal torque will likely be shown, without the typical ramp due to activation of MTM seal that is already energized by slack off. Otherwise, if the manual make-up of the bushing as per D1 is difficult or not possible, see TR4.
TR3	**Stab-In** Excess of gap between bodies shoulders	**1.** Poor cleaning before 'stab in'. **2.** Excess of dope on MTM seals clogging cone surfaces. **3.** Incorrect length between shoulders (machining defect).	Stop stabbing in – pull out -clean - measure distance between shoulders and compare with drawings ('g' dimension on the assembly drawing). **1** or **2.** Redope and oil as per procedure and repeat stab-in. **3.** Segregate and replace.
TR4	**Manual make-up** Impossibility to make up bushing by hand – excess of torque	**1.** Misalignment: see TR1 **2.** Upper assembly weight totally slacked off during stab-in. In this case, the upper assembly, being totally loose, tend to rest on the TSJ lower body, possibly bending and generating lateral forces that contrast the manual make-up operation.	**1.** See TR1 **2.** Proceed as follows: • remove the bushing • partially recover the weight of the upper subassembly to reduce lateral forces due to bending • try again to make up the bushing by hand
TR5	**Automatic Make-up** Upper Body tending to rotate while making up the Bushing	Assuming that during pre-assembly the free sliding of the Bushing over the Upper Body has been verified, this event is due either to causes TR1 or TR4 above: bad alignment or TSJ subject to bending and bushing friction on shoulder and/or one axis of the thread profile.	Stop the Make Up and recover alignment at TSJ with methods used in TR1 or TR4 above.

	Event	Cause	Remedial
TR6	**Automatic Make-up** ZERO gap between bushing and lower body shoulder after make-up (bushing and lower body touching each other).	**1.** The torque chart confirms that the component suffered Over torque. Likely, permanent excessive deformation occurred on the bushing and/or MTM. **2.** The torque chart doesn't show any excess of torque.	**1.** Break-out, segregate and replace both upper and lower body with spare parts. **2.** Break-out, clean and perform a visual inspection. If the component looks OK, try again reducing RPM and aim to minimum/optimal torque value. If the gap is ZERO again, breakout, segregate and replace.
TR7	**Automatic Make-up** Excess of gap between bushing and lower body shoulder after make-up.	**1.** Bad alignment with TSJ bushing suffering friction on should and/or one axis of the threaded profile, reaching maximum torque before the expected point. See TR1. **2.** Excessive gripping force at the tong jaws may ovalize the bushing leading to incorrect make-up.	**1.** Stop the Make Up and recover alignment at TSJ with methods used in TR1 above. **2.** Reduce gripping force at the tong jaws and/or set the jaws as close as possible to the upper part of the bushing as specified in E1.

AFTER ANY BREAK-OUT OF THE CONNECTION, ESPECIALLY IN CASE OF PROBLEMS DURING STAB IN AND MAKE-UP, THE SWIVEL JOINTS NEEDS TO BE CAREFULLY INSPECTED PRIOR TO BE RE-USED.

RETRIEVAL OPERATIONS

	Event	Cause	Remedial
TR7	Excess of break out torque.	**1.** Dope consumed/dried up during long term installation. **2.** Presence of dirt (mud crusts, mud deposits) on Upper body wall that impair Bushing sliding upwards. **3.** Bad straightness – side load on Bushing while breaking out. **4.** Tong dies too heavy loaded deforming the Bushing.	**1.**Try to inject oil from Bushing top to percolate inside; if not working go up with torque to 2 times max MU torque. **2.** Clean upper body external wall to recover pipe nominal OD. **3.** Recover at least 5-10% of upper assembly weight and try to restore straightness. **4.** decrease pressure of tong dies.
TR8	Upper Body tending to rotate while breaking out the Bushing.	Bad alignment, TSJ subject to flexion and Bushing friction on shoulder and/or one generatrix of the thread profile	Recover progressively the upper subassembly weight while breaking the bushing to maintain straightness with max torque to 2 times max MU torque and slowly break the Bushing. If permanently galled, break down the upper Premium connection of the TSJ.
TR9	After Bushing loosening pull with no separation	**1.** Dope consumed/dried up during long term installation. **2.** MTM seals galled.	**1.** Pull after applying 25% of MU torque Value as Break Down torque. **2.** Break down the upper Premium connection of the TSJ – TSJ will never break out if galled.

AFTER ANY BREAK-OUT OF THE CONNECTION, ESPECIALLY IN CASE OF PROBLEMS DURING STAB IN, MAKE-UP OR BREAK-OUT, THE SWIVEL JOINTS NEEDS TO BE CAREFULLY INSPECTED PRIOR TO BE RE-USED.

Annex 2 – Torque Values

Tenaris Swivel Joint make-up torque values are recorded in Tenaris Document Management system and labeled **CTB33882, latest edition**.

An equivalent copy is available as a separate document on Tenaris website.

Annex 3 – Dope Recommendations

Dope recommended: API Modified RP 5A3 (friction factor = 1.0).
Note: "Any thread dope compound that matches or exceeds the API Modified lubricant characteristics can be used, provided that the friction factor is 1.0"

Dope should be applied with the use of a soft bristle brush, moustache brush or similar. Ensure the dope compound is kept free of contaminants.

Dope shall be applied so that it forms a thin a uniform layer on the sealing surfaces so that the thread profiles shall still be clearly visible after deposing the dope. Excess compound on the connections should be removed.

Example of Swivel Joint **Lower Body** after correct dope application.

Example of Swivel Joint **Upper Body** after correct dope application.

Annex 4 – Tport Test Port Pressure Value Table

RUN-IN OPERATIONS

Size	Weight	Min YS (Ksi)	Max test pressure (Psi)	80% of max test pressure (Psi)
2.3/8"	**4,7**	80	8385	**6708**
		95	9481	**7585**
		110	10471	**8377**
		130	11625	**9300**
2.7/8"	**6,5**	80	6407	**5126**
		95	7091	**5673**
		110	7654	**6124**
		130	8215	**6572**
3.1/2"	**9,3**	80	4552	**3642**
		95	4850	**3880**
		110	5104	**4083**
		130	5503	**4402**
3.1/2"	**10,2**	80	5734	**4587**
		95	6278	**5022**
		110	6695	**5356**
		130	7054	**5643**
4"	**10,9**	80	3914	**3131**
		95	4206	**3365**
		110	4514	**3611**
		130	4788	**3830**
	13,2	80	8371	**6697**
		95	9464	**7571**
		110	10451	**8361**
		130	11601	**9280**
4.1/2"	**12,75**	80	2806	**2244**
		95	2988	**2390**
		110	3078	**2462**
		130	3087	**2469**
	13,5	80	3323	**2658**
		95	3611	**2889**
		110	3813	**3050**
		130	3937	**3150**
	15,1	80	6108	**4887**
		95	6730	**5384**
		110	7228	**5783**
		130	7699	**6159**

Size	Weight	Min YS (Ksi)	Max test pressure (Psi)	80% of max test pressure (Psi)
5.1/2"	**15,5**	80	1653	**1322**
		95	1653	**1322**
		110	1653	**1322**
		130	1653	**1322**
	17	80	2255	**1804**
		95	2323	**1859**
		110	2326	**1860**
		130	2326	**1860**
	20	80	4290	**3432**
		95	4534	**3627**
		110	4862	**3890**
		130	5209	**4167**
	23	80	6604	**5283**
		95	7329	**5863**
		110	7934	**6347**
		130	8554	**6843**
	26	80	9843	**7874**
		95	11242	**8993**
		110	12547	**10037**
		130	14138	**11310**
7"	**26**	80	2096	**1677**
		95	2133	**1707**
		110	2133	**1707**
		130	2133	**1707**
	29	80	3274	**2619**
		95	3553	**2842**
		110	3744	**2995**
		130	3854	**3083**
	32	80	4530	**3624**
		95	4823	**3858**
		110	5083	**4067**
		130	5478	**4382**