

Quality Documentation Package

Customer: NATIONAL OILWELL VARCO - DUBAI
Customer Purchase Order Number: JAPT7604
Rig Reference: 3000 HP
NOV GP Sales Order Number: 10000811
NOV GP Order Line Number: 2.1

4" OD X 2.438" ID X ' LONG Tri-Spiral HEAVYWEIGHT DRILL PIPE W/ 4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Bevel 4.5625 Standard PIN X XT38 Bevel 4.5625 Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING (GRADE TUBE: TOOL JOINTS: 120 KSI)

Grant Prideco
NAVASOTA, TX, USA



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Connection Wear Table		
Connection: XT™38 4.75" x 2.438" (120 KSI SMYS)		
Tool Joint OD (in)	Max MUT	Min MUT
4.75	20500	17100
4.725	20100	16700
4.701	19600	16400
4.676	19200	16000
4.651	18800	15600
4.626	18300	15300
4.602	17900	14900
4.577	17500	14600
4.552	17000	14200
4.527	16600	13900
4.503	16200	13500
4.478	15800	13200

The Technical information contained herein, including the product performance sheet and other attached documents, is for reference only and should not be considered as a recommendation. The user is fully responsible for the accuracy and suitability of use of the technical information. NOV Grant Prideco cannot assume responsibility for the results obtained through the use of this material. No expressed or implied warranty is intended. Drill pipe assembly properties are calculated based on uniform OD and wall thickness. No safety factor is applied. The information provided for various inspection classes and for various wear conditions (remaining body wall) is for information only and does not represent or imply acceptable operating limits. It is the responsibility of the customer and the end user to determine the appropriate performance ratings, acceptable use of the product, maintain safe operating practices, and to apply a prudent safety factor suitable for the application. For API connections that have different pin and box IDs, tool joint ID refers to the pin ID. Per Chapter B, Section 4 VII of the drilling manual, it is recommended that drilling torque should not exceed 80% of MUT.



Certificate of Compliance

In Accordance API Specification 7-1, Latest Edition
NOV Grant Prideco Spec 346, Rev. 8 dated 08/02/2010

Customer Purchase Order Number: JAPT7604

This hereby certifies that NOV Grant Prideco has met or exceeded the manufacturing and quality requirements of the above referenced specification(s) in manufacturing the following below described material for: NATIONAL OILWELL VARCO - DUBAI

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NOV Grant Prideco Representative

03/30/2016

Date

Customer: NATIONAL OILWELL VARCO - DUBAI

Date: 03/30/2016

NOV GP Sales Order Number: 10000811

Customer Purchase Order #: JAPT7604

Description: 4" OD X 2.438" ID X ' LONG Tri-Spiral HEAVYWEIGHT DRILL PIPE W/ 4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Bevel 4.5625 Standard PIN X XT38 Bevel 4.5625 Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING (GRADE TUBE: TOOL JOINTS: 120 KSI)





Certificate of Cold Rolled Threads

This hereby certifies that the Cold Rolled Threads Operation has been performed on the following:

4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Standard PIN CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING

4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING

in strict compliance with the Applicable Grant Prideco Standard Operating Procedure DS-OP-14 Rev.7, dated 8-24-12 for the Cold Rolled Threads Operation, Latest Revision. The issuance of this certificate indicates that the Cold Rolled Threads Operation was completed.

NOV Grant Prideco Representative

03/30/2016

Date

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Certificate of Make and Break

This hereby certifies that the Make and Break Operation has been performed on the following:

4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Standard PIN CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING

4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING

in strict compliance with the Applicable Grant Prideco Standard Operating Procedure No. DS-OP-31 Rev. 12, 12-15-15 for the Make and Break Operation, Latest Revision. The issuance of this certificate indicates that the Make and Break Operation was completed.

4" OD X 2.438" ID X ' LONG Tri-Spiral HEAVYWEIGHT DRILL PIPE W/ 4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Bevel 4.5625 Standard PIN X XT38 Bevel 4.5625 Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING (GRADE TUBE: TOOL JOINTS: 120 KSI)

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Certificate of Hardband

This hereby certifies that TCS-8000 has been applied on the following:

4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Standard PIN CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING

4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING

in strict compliance with the Applicable Grant Prideco Standard Operating Procedure DS-OP-13 Rev. 10, dated 8/14/15 for the Hardband Operation, Latest Revision. The issuance of this certificate indicates that the Hardband Operation was completed.

NOV Grant Prideco Representative

03/30/2016

Date

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Date: 03/30/2016

NOV GP Sales Order Number: 10000811

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Description: 4" OD X 2.438" ID X ' LONG Tri-Spiral HEAVYWEIGHT DRILL PIPE W/ 4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Bevel 4.5625 Standard PIN X XT38 Bevel 4.5625Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING (GRADE TUBE: TOOL JOINTS: 120 KSI)





Certificate of Hardband

This hereby certifies that Smooth-X Hardband has been applied on the following:

4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Standard PIN CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING

4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING

in strict compliance with the Applicable Grant Prideco Standard Operating Procedure DS-OP-13 Rev. 10, dated 8/14/15 for the Hardband Operation, Latest Revision. The issuance of this certificate indicates that the Hardband Operation was completed.

NOV Grant Prideco Representative

03/30/2016

Date

Customer: NATIONAL OILWELL VARCO - DUBAI

Date: 03/30/2016

NOV GP Sales Order Number: 10000811

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Description: 4" OD X 2.438" ID X ' LONG Tri-Spiral HEAVYWEIGHT DRILL PIPE W/ 4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Bevel 4.5625 Standard PIN X XT38 Bevel 4.5625Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING (GRADE TUBE: TOOL JOINTS: 120 KSI)





Certificate of Origin

March 18, 2016

NATIONAL OILWELL VARCO - DUBAI
P.O. BOX 61490 R/A#13, PLOT MO 0682
DUBAI,,AE

NATIONAL OILWELL VARCO - DUBAI
Customer Purchase Order Number: JAPT7604
NOV GP Sales Order Number: 10000811

Description of Goods:

4" OD X 2.438" ID X ' LONG Tri-Spiral HEAVYWEIGHT DRILL PIPE W/ 4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Bevel 4.5625 Standard PIN X XT38 Bevel 4.5625Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING (GRADE TUBE: TOOL JOINTS: 120 KSI)

We certify that the goods are of the United States of America origin. They contain the United States of America materials and they are being exported from the United States of America.

Sworn to before me this Friday, March 18, 2016.



The Navasota Chamber of Commerce, a recognized Chamber of Commerce under the laws of the State of Texas, has examined the manufacturer's invoice concerning the origin of the merchandise and, according to the best of its knowledge and belief, issues and certifies that these goods are of the United States of America origin.



Member of

Navasota/Grimes County Chamber of Commerce

Customer: NATIONAL OILWELL VARCO - DUBAI

Date: 03/18/2016

NOV GP Sales Order Number: 10000811

Customer Purchase Order #: JAPT7604

Description: 4" OD X 2.438" ID X ' LONG Tri-Spiral HEAVYWEIGHT DRILL PIPE W/ 4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Bevel 4.5625 Standard PIN X XT38 Bevel 4.5625Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING (GRADE TUBE: TOOL JOINTS: 120 KSI)





NOV Grant Prideco
 Engineering Technology Center
 10100 Houston Oaks Dr
 Houston, Texas 77064

P R O C E D U R E	Field Inspection		A P P R O V E D	PRODUCT ENGINEERING MANAGER	
	Field Inspection Procedure for Used XT and XT-M™ Connections			<i>David Chin</i>	
	NUMBER	REV.		CHECKED BY	
	1H965	09	<i>Ben Fisher</i>		
	DATED		APPROVED BY		
	January 13, 2014		<i>Marshall Taylor</i>		

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**FIELD INSPECTION PROCEDURE FOR USED EXTREME™ TORQUE
 CONNECTIONS (XT™ AND XT-M™)**

GENERAL

- 1.1 This document defines the field inspection procedure for the eXtreme™ Torque family of connections (XT™ and XT-M™).

SCOPE

- 1.2 The following procedure stipulates the equipment, inspection methods, and acceptance criteria for field inspection and repair of XT™ and XT-M™ connections. This inspection shall encompass both visual and dimensional methods. The field refacing method addressed in this procedure does not apply to the XT-M™ connection, which requires machine redressing in a qualified controlled “shop” environment.

REFERENCES

- 1.3 XT™ and XT-M™ Connection Field Inspection Dimension Drawing.

SECTION

- 1.4 Equipment: The equipment listed below shall be required to perform these inspections.
 - 1.4.1 Generic

Product: Field Inspection

Title: Field Inspection Procedure for Used XT and XT-M™ Connections

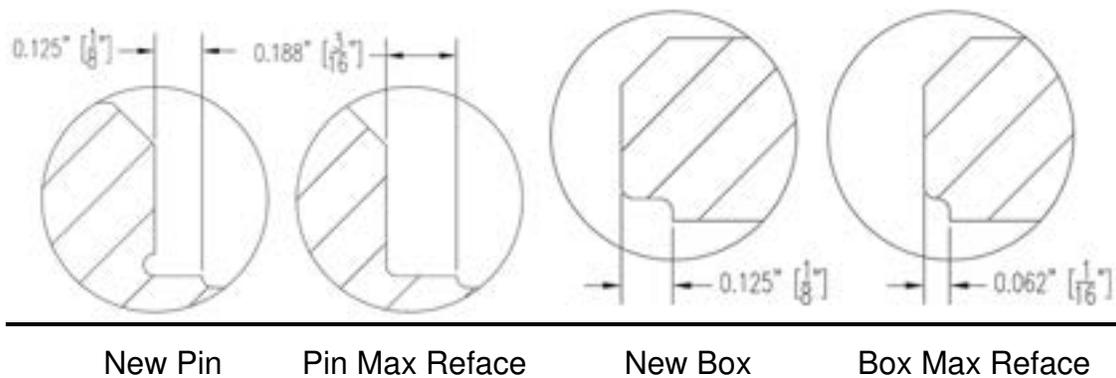
Procedure Number: 1H965 Rev 09, January 13, 2014

- 1.4.1.1 12" Steel Rule graduated in 1/64"
- 1.4.1.2 Outside and Inside Diameter Spring Calipers
- 1.4.1.3 Long Stroke Depth Micrometer
- 1.4.1.4 Setting Standards for Depth Micrometer
- 1.4.1.5 Lead Gage with appropriate contacts
- 1.4.2 Acquired through NOV Grant Prideco
 - 1.4.2.1 Thread Profile Gage
 - 1.4.2.2 Lead Gage Setting Standard
- 1.5 Preparation: All thread, make-up shoulder, and seal surfaces shall be cleaned sufficiently to allow for visual inspection. The starting threads of the pin and box connections should be cleaned using a "soft wheel" or other buffing method.
- 1.6 Visual inspection:
 - 1.6.1 Primary Make-up Shoulder (External Torque Shoulder): Refer to the "XT or XTM Connection Field Inspection Dimension" drawing for terminology and shoulder locations. The seal surface should be free of galls, nicks, washes, fins, or other conditions that exceed the limits of par. 1.6.1.1 and 1.6.1.2 (below).
 - 1.6.1.1 Damage that does not exceed 1/32" in depth and crosses less than 30% of the radial width of the seal is acceptable. If the damage exceeds these limits, refacing shall be used to repair the seal surface.
 - 1.6.1.2 The refacing repair should only remove enough material to repair the damage. A maximum of 1/32" of material may be removed during each refacing operation and a maximum of 1/16" may be removed from the connection before re-threading is required. After refacing repair, a minimum length of 1/16" (.062") shall remain on the box refacing benchmark, and 3/16" maximum (.188") shall remain on the pin refacing benchmark. See sketch.

Product: Field Inspection

Title: Field Inspection Procedure for Used XT and XT-M™ Connections

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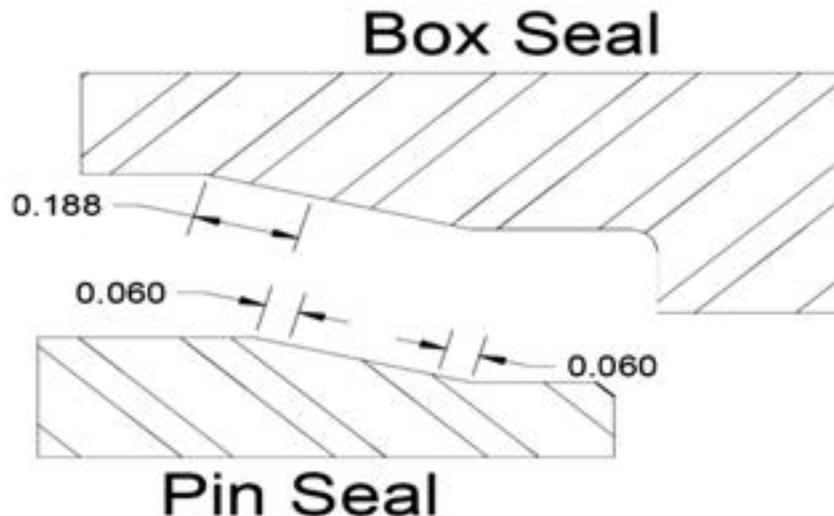
- 1.6.2 Secondary Make-up Shoulder (Mechanical Stop): The Secondary Shoulder is not a sealing surface. Damage to this surface is not critical unless the damage interferes with the make-up, driftability, or torque capacity of the connection. Dents, scratches, and cuts do not affect this surface unless these exceed 1" in width and cause the connection to be rejected due to shortening of the shoulder-to-shoulder length. Filing may be used to repair material protrusions, which extend from the face. *Connection length readings shall not be taken in damaged areas.*
- 1.6.3 15° Seal: The TF-M™ connection contains a 15° metal-to-metal sealing surface near the pin and box secondary shoulders. This is the primary sealing surface for the XT-M™ connection. This surface is allowed to contain round pit type defects in the contact area of the seal surface up to 1/32" in diameter and not exceeding 1/32" in depth. Multiple pits of this type are acceptable provided there is at least 1" circumferential separation between them. Circumferential lines or marks are acceptable in this surface provided they cannot be detected by rubbing a fingernail across the surface. The following "Pin Seal" and "Box Seal" diagram shows areas of the seal that may contain damage exceeding the previously stated criteria in this procedure. The area on the pin seal within 0.060" of the minor pin nose diameter is a non-contact surface and damage in this area does not affect sealing. The area on the pin seal within 0.060" of the major pin nose diameter may also contain damage or pitting (in addition to the area on the pin seal within 0.060" of the minor pin nose diameter), provided that the balance of the seal contact surface is without damage. The area on the box seal within 0.188" of the major box cylinder contains the non-contact portion of

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the box seal and that portion of the seal that corresponds to the first 0.060" of the pin seal. Damage or pitting is permitted in this area of the box seal provided that the balance of the seal contact surface is without damage.



1.6.4 Threads: The stab flank to crest radius of the starting 4 to 5 threads of the pin and box connections round off during break-in and normal operation. This condition is normal and does not affect the service of the connection. The remaining thread flank surfaces should be free of damage that exceeds 1/16" in depth or 1/8" in diameter. Thread roots should be free of damage that extends below the radius. Thread crest should be free of damage that would interfere with make-up. Material that protrudes beyond the thread profile should be removed using a round cornered triangle hand file or soft buffing wheel.

1.6.5 Profile: The thread profile shall be verified along the full length of complete threads in two locations at least 90° apart. The profile gage should mesh evenly in the threads and show normal contact. If the profile gage does not mesh in the threads, lead measurements shall be taken.

1.6.6 Coating: Threads and shoulders that are repaired by filing must be protected by phosphate coated or by using copper sulfate.

1.7 Dimensional Inspection:

1.7.1 Lead: The thread lead should be verified, if the profile gage indicates that thread stretch has occurred. The thread shall be

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measured over a 2" interval and shall not exceed 0.006". Connections failing this inspection should be inspected for cracks and, if none are found, re-threaded.

- 1.7.2 Box Outside Diameter: The outside diameter of the box shall be measured at a distance of 2" +/-1/4" from the primary make-up shoulder. Measurements shall be taken around the circumference to determine the minimum diameter. This dimension shall be compared to the minimum diameter for the connection being inspected to determine acceptance or rejection.
- 1.7.3 Box Counterbore Diameter: The inside diameter of the box counterbore shall be verified. This dimension is not used to determine acceptance or rejection, but is needed to test for box swell and to verify the connection length.
- 1.7.4 Box Counterbore Wall Thickness: The wall thickness between the "Box Outside Diameter" and "Box Counterbore Diameter" shall be measured to insure that it exceeds the minimum dimension for the connection being inspected.
- 1.7.5 Box Connection Length: The distance between the primary and secondary make-up shoulders shall be verified in two locations 180° apart. This distance shall be compared to the requirement for the connection being inspected to determine acceptance or rejection.
 - 1.7.5.1 Repair by Refacing - General Repair nonconformance of connection length may be accomplished as noted below.
 - 1.7.5.1.1 Machine refacing in a lathe is the preferred method, although the portable field refacing units have proven to produce acceptable results.
 - 1.7.5.1.2 If the portable field refacing unit method is used, the variability of face flatness and squareness is introduced and should be monitored. When this method is used, length measurements should be taken in more than the two locations (as specified above). It is suggested that a minimum of four measurements should be taken. Should any measurement be found to be outside the drawing limits, the connection will be deemed as rejected.

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- 1.7.5.2 If the connection length exceeds the specified dimension, repair may be made by refacing the primary make-up shoulder.
 - 1.7.5.3 If the connection length is less than the specified dimension, refacing the secondary make-up shoulder may be adequate to repair this condition.
 - 1.7.5.4 Refacing limits are the same as for repair of damaged shoulders.
- 1.7.6 Pin Nose Diameter: The outside diameter of the pin nose shall be verified. This dimension is not used to determine acceptance or rejection, but is needed to test for pin nose swell and to verify connection length.
- 1.7.7 Pin Connection Length: The distance between the primary and secondary make-up shoulders shall be verified in two locations 180° apart. This distance shall be compared to requirement for the connection being inspected to determine acceptance or rejection. Repairs can only be made by re-threading the connection. (See Section 1.7.5.1. -Repair by Refacing- General, above)
- 1.7.7.1 If the connection length exceeds the specified dimension, repair may be made by refacing the secondary make-up shoulder (pin nose).
 - 1.7.7.2 If the connection length is less than the specified dimension, refacing the primary make-up shoulder may be adequate to repair this condition.
 - 1.7.7.3 Refacing limits are the same as for repair of damaged shoulders.
- 1.7.8 Tong Length: a minimum tong space requirement of 6" for pins and the minimum box tong space shall ensure there is no hardbanding over the box threads and shall be at least equal to the connection length +1" (8" minimum).
- 1.8 Shop Redressing of XT-M Shoulders and Radial Seal: To correct connection length or damage to sealing surfaces, the XT-M connection must be redressed by facilities that have been specifically qualified by NOV Grant Prideco to perform this operation. All three surfaces (Primary shoulder, Secondary shoulder, and 15° Seal) shall be redressed in one operation in accordance with Refacing Thread Drawing. See requirements for refacing benchmark after machining (Para. 1.6.1.2. above.)
- 1.9 Re-threading: This method shall be used to repair connections that fail to meet the requirements stipulated in this inspection procedure.

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Performance of this operation may not require complete removal of the thread profile if sufficient material can be removed to comply with the new product requirements. (The connection does not have to be “reblanked”, however all torque shoulders, seal surfaces, and thread elements must be machined to 100% “bright metal”. This is not necessary for cylindrical diameters). After completion, the connection must be phosphate coated. *(Copper Sulfate is not an acceptable substitute for phosphate for “re-threaded” connections.)*



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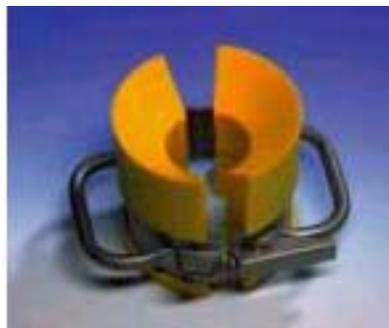
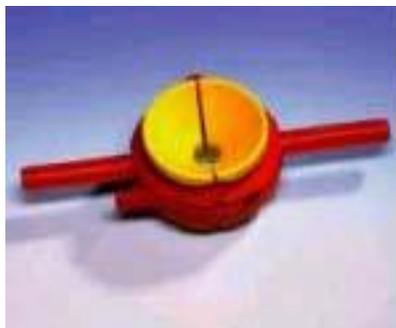
NOV Grant Prideco DPS Bulletin

Bulletin Information	Title:	Running & Handling Procedures for XT® and XT-M™ Connections	Approval	DPS Manager, Marketing & Product Mgmt.:	Jim Brock
	Bulletin Type:	PC-Procedural Bulletin		DPS Manager, Product Engineering	David Chin
	Bulletin Designation:	PC-4.1-2009Feb13-EXT		DPS Manager, Field Services:	Dan Morgan
	Rev. Number:	1		Approval Date:	July 18, 2012
	Rev. Date:	July 18, 2012		Distribution:	EXT-External
	Authored By:	Richard Griffin, Senior Marketing Engineer Sandy Steely, Licensee Services Manager		Distribution Date:	July 18, 2012

Running and Handling Procedure for XT® & XT-M™ Connections

1. Check to ensure the counter balance on the top drive is working properly and provides a minimum amount of weight applied to the connection during make-up operations. If the top drive counter balance is not working or is adjusted incorrectly, too much weight will be applied to the XT/XT-M connection during make-up and may cause connection damage. To make adjustments to the top drive counter balance system, contact the top drive manufacturer for proper counter balance adjustment procedures.
2. Because the XT and XT-M have slower tapers when compared to HI TORQUE or standard API connections, increased effort regarding pin to box alignment during stabbing operations is required. Adjust the bore through the top drive bell stabbing guide so it will not be more than ½" larger in diameter than the drill pipe box tool joint OD. This will guide the pin connection into the box without damaging the box shoulder. For the most common XT connection, the XT57 connection on 5-7/8" drill pipe, the standard 5" drill pipe top drive bell stabbing guide will usually work well (Varco flipper part number is 99304).
3. Visually inspect the pipe and tool joints for damage. If thread protectors are damaged, remove and visually inspect connections.

4. If pipe is picked up with handling plugs, check the plugs for damage before making them up in the drill pipe box connections. Keep protectors on the handling plugs when they are lowered down the V door, and until they are screwed into the box connections.
5. Leave the pin protectors on the pipe as it is pulled up the V door and when the pipe is lowered into the mouse hole. Only remove pin protectors after the pipe is pulled out of the mouse hole.
6. Break in the top drive saver sub by making it up and breaking it out to recommend MUT three times in the rotary table before it is made up in the top drive. Use a short saver sub (5-1/2" shoulder to shoulder). This will position the pipe handler torque wrench 2" below the box shoulder, so it will not crush the counter bore of the box connection.
7. Stab in the top drive near the rig floor so you can see if the pin is centered in the box.
8. Check the top drive torque and iron roughneck torque with the rig tongs and a recently calibrated load cell to make sure the correct torque is being applied to the XT/XT-M connection. Check breakout torque to make sure it is not more than make up torque. It should be 85-95% of makeup torque.
9. Grant Prideco requires the use of a stabbing guide when stabbing any XT or XT-M connection. The use of a stabbing guide 1) ensures proper pin to box alignment and reduces stabbing damage to the box seal face, 2) increases safety by reducing opportunities for finger pinch points when handling the connection, and 3) may actually decrease trip times by reducing time spent by the rig crew when aligning pin to box connections during tripping operations. Stabbing guides are available in many types (plastic and stainless steel) and sizes as shown in the pictures below. The use of a de-stabbing guide is NOT required nor recommended by Grant Prideco when de-stabbing the XT/XT-M connection.



Photos courtesy of Weatherford®

10. Ensure the use of contaminant-free thread compound and proper doping procedures. Standard thread compounds generally used with rotary-shouldered connections such as zinc-based, copper-based, Teflon-based and other metal and metal free thread compounds are compatible with the XT/XT-M connection. Based on in-house testing and field experience, Grant Prideco has seen consistent friction properties for copper-based thread compounds.
11. Proper alignment, along with slow initial make up of the starting threads, is necessary with

the XT/XT-M connection. Caution is required in making up the first 5 or 6 threads before spinning it up. If the connection is made up with misalignment and fast spin up, minor thread damage may occur within the starting threads. Should this happen, it can be removed with a soft grinding wheel or a file. This will not be detrimental to the connection.

Note 1): If a slow speed spinner is not available, one to two inches of initial make up should be made with a chain tong prior to spin up.

Note 2): The information contained above is especially critical to adhere to during the initial running of an XT/XT-M string. Most XT/XT-M connections are made and broke during manufacturing. This make & break operation is done horizontally while the tool joints are loose and not attached to the drill pipe tube. As a result, it differs from rig make-up because axial compressive loading is not placed on the connection during make-up. Therefore, the manufacturing make & break operation successfully work hardens the thread load flanks, but the thread stab flanks are not as work hardened as the load flanks. At the rig site, the stand and portion of the top drive weight are placed on the connection during make-up providing an axial compressive load on the stab flanks. With continued rig make-up, the thread stab flanks of the XT/XT-M connection will gradually work harden and their propensity for thread damage will decrease.

12. When pipe is laid down, ensure thread protectors are installed.



Certificate of Chemistry and Mechanical Testing for Integral Heavyweights

Mill Chemistry (Wt. %)

Mill	Heat No.	Type	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Al	Nb/Cb	Ca	Sn	As	Sb	Ti	H	N
TIMKENSTEEL CORPORATION	21786	Heat	.46	1.08	.01	.01	.27	.21	.1	1.12	.26	0	.022	0	0	0			0	0	.0087

Tensile

Position	Heat No.	Size (in.)	Tensile (Psi)	Yield (Psi)	Elong (%)	RA(%)
1R	21786	.5	154140	136001	19	56
22	21786	.5	154560	135181	18	56
37	21786	.5	147800	127819	18	60
42	21786	.5	156110	134654	18	56
57	21786	.5	152200	134443	19	56
7	21786	.5	155220	135329	18	55
72	21786	.5	153130	132870	18	54
87	21786	.5	152890	135219	19	52
			Min: 140000	Min: 120000	Min: 13%	Min: 40%

Impact Charpy-V Notch

Position	Heat No.	Size (mm)	Orientation	Temp (°F)	A (Ft-lb)	B (Ft-lb)	C (Ft-lb)	Avg (Ft-lb)	Avg Shear (%)
1R	21786	Full Size	Longitudinal	70	54.5	53.4	53.7	53.9	50
22	21786	Full Size	Longitudinal	70	52.7	53	52.1	52.6	50
37	21786	Full Size	Longitudinal	70	57.7	61	64.7	61.1	60
42	21786	Full Size	Longitudinal	70	51.7	52.6	52	52.1	50
57	21786	Full Size	Longitudinal	70	43	64	54	53.7	70
7	21786	Full Size	Longitudinal	70	51	52.4	52.2	51.9	50
72	21786	Full Size	Longitudinal	70	48.3	49.3	51.3	49.6	50
87	21786	Full Size	Longitudinal	70	56.4	54.9	55.9	55.7	60
		Full Size			Min. Single: 35		Min. Average: 40		

Hardness

Position	Heat No.	Surface Hardness (HBW)
1R	21786	321
22	21786	321
37	21786	321
42	21786	321
57	21786	321
7	21786	321
72	21786	321

Specifications:

In Accordance API Specification 7-1, Latest Edition
NOV Grant Prideco Spec 346, Rev. 8 dated 08/02/2010

All Properties meet the requirements of SPECIFICATION. I Certify that these tests were conducted in accordance with applicable specifications and that the data contained herein is true and correct.

NOV Grant Prideco Representative

03/30/2016

Date

Customer: NATIONAL OILWELL VARCO - DUBAI

Date: 03/30/2016

NOV GP Sales Order Number: 10000811

Customer Purchase Order #: JAPT7604

Description: 4" OD X 2.438" ID X ' LONG Tri-Spiral HEAVYWEIGHT DRILL PIPE W/ 4.75" OD X 2.438" ID X 0" ID Chamfer 27" TONG TOOL JOINTS W/ XT38 Bevel 4.5625 Standard PIN X XT38 Bevel 4.5625Standard BOX CONNECTIONS, TCS-8000 HARDBANDING , Smooth X WEARPAD HARDBANDING TK-34XT COATING (GRADE TUBE: TOOL JOINTS: 120 KSI)





Certificate of Chemistry and Mechanical Testing for Integral Heavyweight

87

21786

321

Range: 285 - 341

Specifications:

In Accordance API Specification 7-1, Latest Edition
NOV Grant Prideco Spec 346, Rev. 8 dated 08/02/2010

All Properties meet the requirements of SPECIFICATION. I Certify that these tests were conducted in accordance with applicable specifications and that the data contained herein is true and correct.

NOV Grant Prideco Representative

03/30/2016

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Serialization Log

Total Joints: 45
Total Length: 1411.2

NOV GP Sales Order Number: 10000811

Line Number: 2

Serial Number	Heat Number	Customer Sequence Number	Length
NHAB07760	21786	15P2YG44	31.4
NHAB07761	21786	15P2YG43	31.4
NHAB07762	21786	15P2YG42	31.4
NHAB07763	21786	15P2YG41	31.4
NHAB07764	21786	15P2YG40	31.3
NHAB07765	21786	15P2YG39	31.4
NHAB07766	21786	15P2YG38	31.4
NHAB07767	21786	15P2YG37	31.4
NHAB07768	21786	15P2YG36	31.4
NHAB07769	21786	15P2YG35	31.4
NHAB07770	21786	15P2YG34	31.4
NHAB07771	21786	15P2YG33	30.9
NHAB07772	21786	15P2YG32	31.4
NHAB07773	21786	15P2YG31	31.4
NHAB07774	21786	15P2YG30	31.4
NHAB07775	21786	15P2YG29	31.4
NHAB07776	21786	15P2YG28	31.4
NHAB07777	21786	15P2YG27	31.4
NHAB07778	21786	15P2YG26	31.4
NHAB07779	21786	15P2YG25	31.2
NHAB07780	21786	15P2YG24	31.4
NHAB07781	21786	15P2YG23	31.4
NHAB07782	21786	15P2YG22	31.4
NHAB07783	21786	15P2YG21	31.4
NHAB07784	21786	15P2YG20	31.4
NHAB07785	21786	15P2YG19	31.4
NHAB07786	21786	15P2YG18	31.4
NHAB07787	21786	15P2YG17	31.4
NHAB07788	21786	15P2YG16	31.4
NHAB07789	21786	15P2YG15	31.4
NHAB07790	21786	15P2YG14	31.4
NHAB07791	21786	15P2YG13	31.4

Customer: NATIONAL OILWELL VARCO - DUBAI

Date: 03/30/2016

NOV GP Sales Order Number: 10000811

Customer Purchase Order #: JAPT7604

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Grant Prideco

NOV Wellbore
Technologies

Serialization Log

Total Joints: 45
Total Length: 1411.2

NOV GP Sales Order Number: 10000811
Line Number: 2

Serial Number	Heat Number	Customer Sequence Number	Length
NHAB07792	21786	15P2YG12	31.4
NHAB07793	21786	15P2YG11	30.9
NHAB07794	21786	15P2YG10	31.4
NHAB07795	21786	15P2YG09	31.4
NHAB07796	21786	15P2YG08	31.4
NHAB07797	21786	15P2YG07	31.4
NHAB07798	21786	15P2YG06	31.4
NHAB07799	21786	15P2YG05	31.4
NHAB07800	21786	15P2YG04	31.4
NHAB07801	21786	15P2YG03	31.4
NHAB07802	21786	15P2YG02	31.4
NHAB07803	21786	15P2YG01	30.9
NHAB08053	21786	15P2YG45	31.4

Customer: NATIONAL OILWELL VARCO - DUBAI

Date: 03/30/2016

NOV GP Sales Order Number: 10000811

Customer Purchase Order #: JAPT7604

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Grant Prideco

NOV Wellbore
Technologies



Hardness Test Results - Ring Samples Integral Heavyweight

NOVGP Sales Order Number: 10000811
 Specifications: In Accordance API Specification 7-1, Latest Edition
 NOV Grant Prideco Spec 346, Rev. 8 dated 08/02/2010
 Spec. Requirements: 285-341

HEAT#	HEAT CODE Mill Heat Number	POSITION	PRODUCT	LOC	QUADRANT 1				QUADRANT 2				QUADRANT 3				QUADRANT 4			
					1	2	3	Avg	1	2	3	Avg	1	2	3	Avg	1	2	3	Avg
21786		1R		OD	33.9			33.90	34.9			34.90	33.9			33.90	33.8		33.80	
				MID	35.4			35.40	34.9			34.90	35.2			35.20	35.2		35.20	
				MOD																
21786		37		OD	32.4			32.40	33.1			33.10	35			35.00	35.4		35.40	
				MID	35.1			35.10	34.5			34.50	35			35.00	35.4		35.40	
				MOD																
21786		72		OD	34			34.00	34.5			34.50	32.7			32.70	35.7		35.70	
				MID	35.7			35.70	35.2			35.20	35.6			35.60	35.6		35.60	
				MOD																
21786		57		OD	34.8			34.80	34.5			34.50	34			34.00	34.4		34.40	
				MID	35			35.00	35			35.00	34.5			34.50	34.8		34.80	
				MOD																
21786		42		OD	35.8			35.80	33.1			33.10	34.9			34.90	34.9		34.90	
				MID	34.9			34.90	35.3			35.30	34.9			34.90	35.1		35.10	
				MOD																
21786		22		OD	34.2			34.20	35.4			35.40	34.6			34.60	34.4		34.40	
				MID																
				MOD																

Customer: NATIONAL OILWELL VARCO - DUBAI

Date: 03/30/2016

NOV GP Sales Order Number: 10000811

Customer Purchase Order #: JAPT7604

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Hardness Test Results - Ring Samples for Integral Heavyweight

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					1	2	3	Avg	1	2	3	Avg	1	2	3	Avg	1	2	3	Avg
				MID	35.4			35.40	35.9			35.90	35.7			35.70	35.5		35.50	
				MOD																
				ID	34.6			34.60	35.4			35.40	35.7			35.70	35.5		35.50	
21786		87		OD	34.7			34.70	34.4			34.40	34.9			34.90	34.7		34.70	
				MID	34.6			34.60	35.6			35.60	34.3			34.30	33.6		33.60	
				MOD																
				ID	35.6			35.60	34.4			34.40	30.8			30.80	33.6		33.60	
21786		7		OD	34.6			34.60	35.4			35.40	34.8			34.80	35		35.00	
				MID	36			36.00	35.3			35.30	35.4			35.40	36.2		36.20	
				MOD																
				ID	35.7			35.70	35.4			35.40	34.5			34.50	36.2		36.20	

Customer: NATIONAL OILWELL VARCO - DUBAI

Date: 03/30/2016

NOV GP Sales Order Number: 10000811

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Steel Certificate of Test

TIMKEN
Where You Turn

1835 DUEBER AVE. S.W.
CANTON, OHIO 44706

ID #0293752-1

Page 1 of 2

10/12/2011

S Grant Prideco
C T PO BOX 1310
L O
D Navasota TX 77868 USA

S GRANT PRIDECO
H T MILLER INDUSTRIAL PARK #1
I O
P NAVASOTA TX 77868 USA

Customer Order: 1157490 Customer Part Number: 23000009
Timken Order: 23795-A (1754282) Heat Number(s): 21786

Description of Material

DIAMETER: 5.000 in (127.000 mm)
Shape: RD
Sales Type: 4145M
Int Quality: ELECTRIC FURNACE-VACUUM DEGAS
Condition: HOT ROLL

Specification

- GRANT PRIDECO 346 Rev. 8 8/2/2010 EXCEPT STRAIGHTNESS

Chemistry Information

	%C	%Mn	%P	%S	%Si	%Cr	%Ni	%Mo	%Cu	%Al	%N
SPEC Ladle Min:	.42	1.00			.15	1.05		.20			
SPEC Ladle Max:	.49	1.10	.020	.013	.30	1.20		.28	.35		
21786 Ladle:	.46	1.08	.010	.010	.27	1.12	.10	.26	.21	.022	.0087

Metallurgy Information

SPEC: Chemistry DI ASTM-A255 6.5 Min

Heat 21786 DI ASTM-A255: 8.62

SPEC: Grain Size SIZE 6/FINER

6/FINER

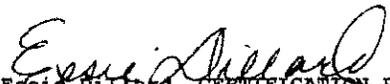
When shipping document is attached it becomes part of this certification.

We certify the above materials have been inspected and tested in accordance with the methods prescribed in the governing specifications and consistent with our Standard Commercial Terms and Conditions for Sale, Manufacture, and Shipping, which are incorporated into and made part of this certification. The results of such inspections and tests conform with the applicable requirements including the purchase order, specification(s) and exception(s). This certificate or report shall not be reproduced except in full, without the written approval of the Timken Corporation.

Approved: _____

NOTARY PUBLIC

by


Essie Dillard, CERTIFICATION PROCESSOR

THE TIMKEN CORPORATION

Steel Certificate of Test

1835 DUEBER AVE. S.W.
CANTON, OHIO 44706

TIMKEN
Where You Turn

ID #0293752-1

Page 2 of 2

10/12/2011

Customer Order: 1157490 Customer Part Number: 23000009
Timken Order: 23795-A (1754282) Heat Number(s): 21786

Metallurgy Information (cont.)

SPEC: MacroEtch Std

MACROETCH RATINGS EQUAL TO OR BETTER THAN STATED REQUIREMENTS BASED ON PERIODIC TESTING.

SPEC: NonMet JK A HEAVY 2.5 Max B HEAVY 2.5 Max C HEAVY 2.5 Max D HEAVY 2.5 Max

JK TYPE NONMETALIC INCLUSION RATINGS EQUAL TO OR BETTER THAN STATED
REQUIREMENTS BASED ON PERIODIC TESTING.

Heat 21786 Melt Source: USA
Manufacturing: USA

REDUCTION RATIO - 8.3:1

THE TIMKEN CORPORATION

SOLID BAR ULTRASONIC INSPECTION REPORT



CUSTOMER NOV GRANT PRIDECO INVENTORY		S/O ORDER 292547	
TUBULAR GOODS INSPECTED	#OF PIECES 96	SIZE 5"	WEIGHT SOLID BAR
	RANGE Solid Bar	TYPE INSPECTION FLUT	
TYPE INSPECTION			

SUMMARY OF INSPECTION RESULTS

92	LENGTH-BANDED	WHITE	(ACCEPTED LENGTH)	FOOTAGE: _____
4	LENGTH-BANDED	YELLOW/RED	(REJECT/PAR)	FOOTAGE: _____
	LENGTH-BANDED			FOOTAGE: _____
	LENGTH-BANDED			FOOTAGE: _____
96	TOTAL LENGTHS INSPECTED			TOTAL FOOTAGE: _____

COMMENTS

Serial Number Range 242026-242121 is heat number 21786. This material was used to manufacture the Integral Heavy Weight for I0000811-2

OPERATOR M.R. – T.G.	SPEC(S) USED API SPEC 7-1
PROVE-UP INSPECTOR T.G. – M.R.	
SIGNED TONY GONZALES	REPORT DATE 03/20/2014



Tuboscope, Navasota Coating
9574 FM 1227
Navasota TX 77868
PHONE: 936-870-3680
FAX: 936-870-3750

Certificate of Internal Plastic Coating

Date: March 30,2016

This is to certify that the following material has been coated to Tuboscope's specifications and complies with the customer's specifications.

Customer: NOV Grant Prideco

Work Order: 7449591

Shop/Purchase Order: 10000811-2

Quantity: 47 Joints

Description: 4" X 2.438" X 31' Long Tri-Spiral HWPD with XT38 Connections

Coating: TK34XT

Thread Compound: ZN50

Hardbanding: N/A

A handwritten signature in blue ink that reads 'Maria Morales'.

Maria Morales, Inspector – Quality Control



Export Classification

ECCN #: EAR99

HTS #: 8431.43.8040

SCHEDULE B: 8431.43.8010

COUNTRY OF ORIGIN: USA

Customer: NATIONAL OILWELL VARCO - DUBAI

NOV GP Sales Order Number: 10000811

Customer Purchase Order Number: JAPT7604

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These commodities, technology, or software are subject to the laws of their country of export and may also be subject to the laws of their country of origin. Re-export or diversion contrary to the applicable law may be prohibited, especially with respect to commodities, technology, or software exported from the U.S.A.

All ECCN and HTS classification information received from National Oilwell Varco (NOV) is for informational purposes only and shall not be constructed as NOV's representation, certification or warranty regarding the proper classification. Use of such classification information is at the Buyer's sole risk and without recourse to NOV. The Buyer is responsible for determining the correct classifications of all items prior to export and Buyer shall make its own export licensing determinations.

NOV Grant Prideco Representative

03/30/2016

Date

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