



10120 Houston Oaks Dr., Houston, TX 77064  
Phone: +1(281) 949 1023 Website: tmk-ipsco.com Fax: +1(281) 445 4040

## Section 1: Executive Summary

**Report Date:** October 17, 2018

**Test Dates:** September 16, 2018 – September 18, 2018

**Client:** TMK–Premium Services  
Morozova Str. 30, Taganrog, RUSSIA 347928

**Project Number:** RDP–105–18–1010

**Pipe Specifications:** 9.625 In. OD–36 lb.–L80

### Connection Identification:

Connection Specifications and Ratings		
Connection OD:	9.625 in.	
Make – Up Loss:	5.783 in	
Drift:	8.765 in	
Connection ID:	8.642 in	
Thread Compound Used:	BESTOLIFE 72733	
Torque (min. /opt. /max.):	26,500 / 29,500 / 32,400 ft–lbs	
	Connection data sheet ratings	Min. Test Rating (% of PBYS)
API Burst Pressure:	5,120 psi	N/A
API Collapse Pressure:	2,380 psi	N/A
Tensile Load:	820,000 lbs	N/A
Compression Load:	820,000 lbs	N/A
Bending (Dogleg):	38° / 100 ft	N/A

Table 1-1: Connection Specifications



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## Specimen Preparation & Test Locations

<b>Specimen Machining:</b>	Custom Threading (CTI), 5835 Cheswood, Houston, TX 77087
<b>Specimen Surface Treatments:</b>	Custom Threading (CTI), 5835 Cheswood, Houston, TX 77087
<b>Make and Breaks:</b>	TMK-IPSCO R&D Center, 10120 Houston Oaks Dr., Houston, TX 77064

Table 1-2: Specimen Preparation and Test Locations

## Test Procedure

<b>Test Type:</b>	API RP 5C5: 2017 CAL IV M&B Only
<b>Planned deviations from API RP 5C5:</b>	Make and Break testing only Additional Make and Break Cycle (see section 4.2 of the test protocol)
<b>Number of Specimens:</b>	2 (Specimen 3,5)
<b>Test Temperatures:</b>	96°F (35.5°C) for Ambient Temperature Testing

## Testing Dates & Location

Specimen	Make & Break
	TMK IPSCO
3	09/16/2018
5	09/18/2018

Table 1-3: Test Schedule

## Identification of Test Personnel

<b>Engineer in Charge (EIC):</b>	Alexey Prokofyev
<b>Project Manager:</b>	Manish Nawal
<b>Test Engineer:</b>	Kevin Henry
<b>Technicians:</b>	Donald Anderson, Chris Coode

## 3<sup>rd</sup> Party Monitoring

Not Applicable

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## Deviations and Anomalies

None

## Testing Summary

### Specimen Preparation

Test specimens were machined from Vallourec (Heat# I20105) casing stock and Tenaris (Heat# 70421) coupling stock. The pins were machined according to drawing no: TMK UP CENTUM 9 5/8.001V894, Revision 1 and couplings were machined according to drawing no: TMK UP CENTUM 9 5/8.002V894, Revision 1. All test specimens satisfied the thread and seal interference ranges outlined in API RP 5C5:2017.

Specimen/Side	Box Finish	Pin Finish
3A	Zn Phosphate	As Machined
3B	Zn Phosphate	Bead Blast & Moly
5A	Zn Phosphate	As Machined
5B	Zn Phosphate	Bead Blast & Moly

Table 1-4: End Surface Finish

### Make & Break Testing

Test specimens were made up using horizontal tongs with 2.0 RPM max. API modified thread compound (BestOLife 72733) per the quantities listed in Table 1-5 were used.

	Dope Quantity on Pin (g)	Dope Quantity on box (g)
Minimum	20±1	40±1
Maximum	24±1	48±1

Table 1-5: Make & Break Dope Quantity

Recommended torque values ranged between 26,500 and 32,400 ft-lb (36,000 and 44,000 N.m). A detailed description of the recommended make-up torque ranges are indicated in Table 1-6. The shoulder torques on all specimens were within acceptable limits. Details of all Make and Breaks are shown in Table 1-8 through Table 1-11 below.

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	Nm		ft-lb	
Minimum recommended torque	36000		26500	
Optimum recommended torque	40000		29500	
Maximum recommended torque	44000		32400	
Minimum shoulder torque	2000		1500	
Maximum shoulder torque	32000		23600	
	Min	Max	Min	Max
High Make-Up Torque range	42400	44000	31300	32500
Low Make-Up Torque range	36000	37600	26600	27800
Speed of Make-up/Break- out	Not more than 1.8 RPM (at the last turn before shouldering)			

Table 1-6: V1 Make-Up Torque Ranges

Specimens 3A, 3B, and 5A exhibited galling that was acceptable and reparable during make and break trials. Repairs were conducted by TMK Premium authorized personnel. A short summary on the observed galling and the repair action is included in Table 1-7 and Figure 1-1.

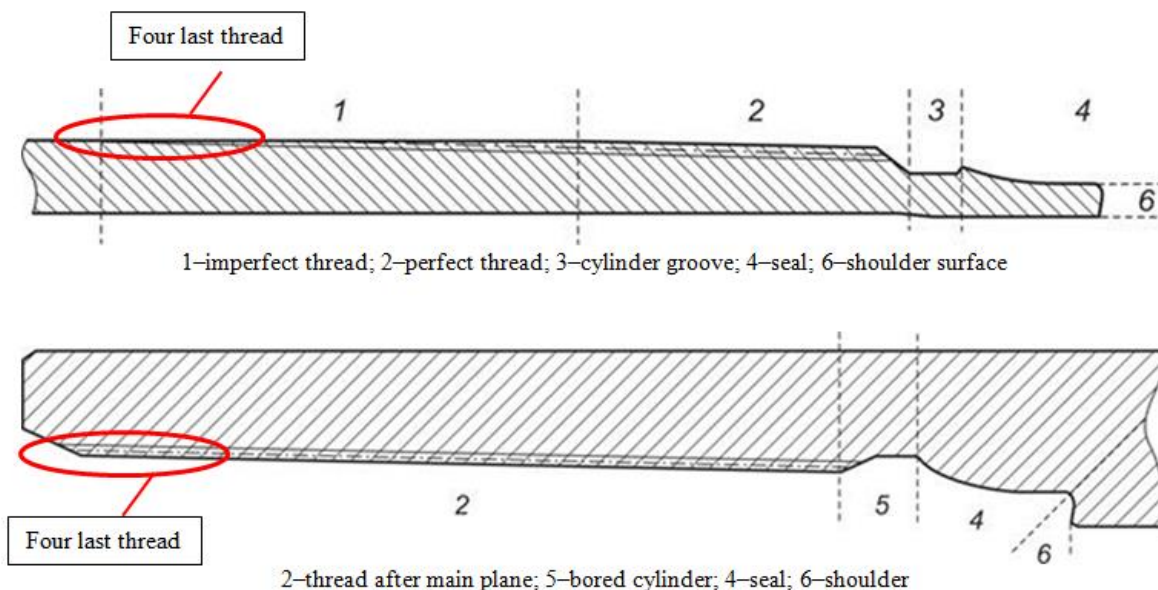


Figure 1-1: Thread Galling Locations

Specimen	Cycle #	Galling Severity	Location (Refer Figure 1-1)		Repair Area	Repair Equipment	Repair Time (min.)
			Pin	Box			
3A	2-6	Light	Area 1	Area 2	Pin/Box	Sand paper	10
3B	8	Light	Area 1	Area 2	Pin/Box	Sand paper	10
5A	2-6	Light	Area 1	Area 2	Pin/Box	Sand paper	10

Table 1-7: Make and Break Galling Summary

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Specimen 3 Make & Break Side A							
BOX: 1001A/ PIN:101							
Make Up	MU Torque ft-lbs	BO Torque ft-lbs	Galling (Y/N)	Dope Pin grams	Dope Box grams	Delta Turns	Shoulder Torque
1	32,172	32,086	N	20.4	40.9	0.022	15,920
2	32,194	32,514	Y	20.7	40.9	0.022	14,503
3	32,376	33,807	Y	19.5	39.7	0.025	12,806
4	32,535	32,543	Y	20.6	39.6	0.025	16,346
5	32,286	32,789	N	20.2	39.4	0.021	16,720
6	32,439	32,477	Y	19.6	40.2	0.024	14,293
7	32,292	32,726	N	20.4	39.9	0.022	14,797
8	32,614	33,424	N	19.2	40.1	0.024	12,954
9	32,219	32,572	N	20.9	39.6	0.024	14,779
10	32,414	31,929	N	20.4	39.4	0.022	14,512
11	32,269	32,175	N	19.9	40.4	0.023	13,957
12	32,841	32,125	N	20.8	39.3	0.029	12,932

Table 1-8: Specimen 3 Make & Break Side A

Specimen 3 Make & Break Side B							
BOX: 1001B/ PIN:102							
Make Up	MU Torque ft-lbs	BO Torque ft-lbs	Galling (Y/N)	Dope Pin grams	Dope Box grams	Delta Turns	Shoulder Torque
1	32,521	32,516	N	20.5	40.7	0.027	12,894
2	32,364	32,875	N	19.9	40.1	0.024	13,617
3	32,363	30,692	N	20.1	39.6	0.026	10,018
4	32,485	32,685	N	20.3	40.8	0.025	11,823
5	32,431	32,343	N	20.9	40.5	0.026	11,430
6	32,385	32,811	N	20.0	39.5	0.027	12,270
7	32,493	32,090	N	21.0	40.3	0.025	11,402
8	32,397	32,608	Y	19.3	40.8	0.027	10,887
9	32,495	33,777	N	20.6	40.5	0.026	13,884
10	32,451	32,930	N	20.3	39.9	0.026	11,904
11	32,134	32,674	N	20.8	39.9	0.025	12,755
12	32,375	49,754	N	20.4	40.3	0.031	10,789

Table 1-9: Specimen 3 Make & Break Side B

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Specimen 5 Make & Break Side A							
BOX: 1002A/ PIN:103							
Make Up	MU Torque ft-lbs	BO Torque ft-lbs	Galling (Y/N)	Dope Pin grams	Dope Box grams	Delta Turns	Shoulder Torque
1	32,193	31,782	N	20.5	39.4	0.021	16,650
2	32,264	32,271	Y	19.4	39.4	0.021	15,871
3	32,428	32,690	Y	19.6	40.5	0.022	16,658
4	32,360	32,834	Y	20.1	39.8	0.022	18,594
5	32,194	34,200	Y	20.2	40.3	0.027	17,931
6	32,457	33,719	Y	21.0	40.4	0.025	15,450
7	32,326	33,430	N	20.5	40.3	0.023	15,943
8	32,377	32,210	N	20.2	40.1	0.023	15,553
9	32,402	33,509	N	20.9	39.8	0.022	14,618
10	32,412	32,900	N	20.0	40.4	0.021	14,864
11	32,437	32,341	N	20.9	39.7	0.022	14,945
12	32,552	32,546	N	20.6	40.2	0.024	13,903

Table 1-10: Specimen 5 Make & Break Side A

Specimen 5 Make & Break Side B							
BOX: 1002B/ PIN:104							
Make Up	MU Torque ft-lbs	BO Torque ft-lbs	Galling (Y/N)	Dope Pin grams	Dope Box grams	Delta Turns	Shoulder Torque
1	32,280	37,182	N	20.7	40.7	0.022	14,696
2	32,254	33,366	N	20.1	39.5	0.024	12,763
3	32,297	34,562	N	20.6	40.4	0.026	13,597
4	32,589	33,065	N	20.9	40.0	0.024	12,579
5	32,278	33,182	N	20.8	40.4	0.034	11,801
6	32,366	33,159	N	19.7	39.8	0.026	12,834
7	32,668	32,978	N	19.8	40.8	0.026	12,952
8	32,648	33,162	N	19.8	39.7	0.027	13,821
9	32,512	30,313	N	20.7	40.3	0.023	13,961
10	32,435	32,194	N	20.6	40.6	0.024	14,425
11	32,265	31,458	N	20.8	40.1	0.026	13,847
12	32,350	35,056	N	19.7	40.5	0.022	14,019

Table 1-11: Specimen 5 Make & Break Side B

## Supplemental Testing

Not Applicable

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# TMK UP CENTUM



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## Conclusion

The 9.625 x 36 L80 TMK UP CENTUM V894 connection met the make and break requirements listed in the test protocol (TP PS-27-05-2018, Revision 2).

## Approval Signatures

**Prepared By:**  
**Connection Test Engineer**

\_\_\_\_\_  
Kevin Henry

\_\_\_\_\_  
Date

**Reviewed By:**  
**Design Engineer (EIC)**

\_\_\_\_\_  
Alexey Prokofyev

\_\_\_\_\_  
Date

**Approved By:**  
**General Manager of R&D**

\_\_\_\_\_  
Dhiren Panda

\_\_\_\_\_  
Date

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