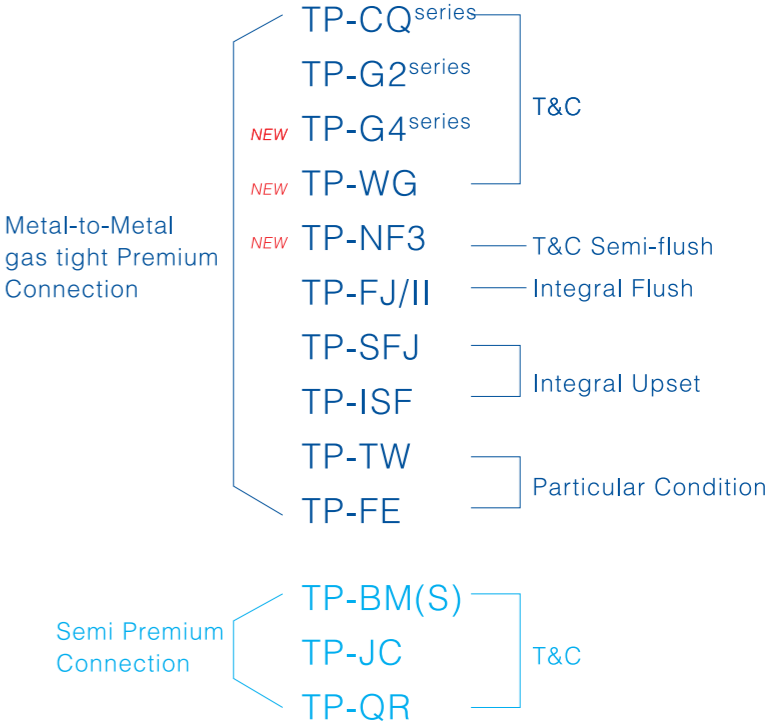


premium connections  
**TP-TW**



Tianjin Pipe Corporation  
 Tianjin Pipe International Economic & Trading Corporation  
 Add.: No.396, Jintang Road, Dongli District, Tianjin, P.R. China  
 Tel.: +86 22 6628 0988  
 Fax: +86 22 6628 0681  
 P.C.: 300301  
[www.tpcointernational.com](http://www.tpcointernational.com)

TP-TW 4-1/2in~13-3/8in

- Sphere-cone seal provide reliable gas-seal ability
- Excellent thread structure, superior structural integrity under high compression
- For Thermal well, complex well and horizontal well
- Easy to repair
- ISO 12835 2013 ASL 350 approved



Flank-to-flank contact thread  
Taper=1 : 16  
4-1/2in ~8-5/8in: 5TPI  
9-5/8in~13-3/8in: 4TPI



Sphere-cone seal  
Reverse angle torque shoulder

1 . Description

1.1 Threaded connection

Flank-to-flank contact thread design offers optimum performance under tension and compression. The excellent structural integrity including bending and tension resistance makes it suited for SAGD and other complex wells, such as horizontal and deep wells. The thread geometry enhances galling resistance, avoids the trapping of compound inside the threads after make-up.

1.2 Metal to Metal Seal

Sphere-to-cone metal seal system, allows enough contact length and contact stress on contact surface. The metal-to-metal seal offers excellent gas-tight sealing, even under the most severe combined loads, or after repeated make-ups and break-outs. Optimized seal geometry minimizes the risk of galling.

1.3 Reverse Angle Torque Shoulder

The reverse angle torque shoulder provides accurate power tight make-up. The wedge effect caused by the reverse angle and seal system gives the connection a superior structural strength, and also improves sealability. The shoulder design is optimized to resist adverse conditions such as combined compression and external pressure or combined bending and compression.

1.4 Internal profile

The streamlined internal profile minimizes turbulence and energy loss when high-velocity gas flows.

1.5 Coupling Design

Joint efficiency is more than 100% and coupling critical section is greater than pipe body section. Because the coupling covers the vanishing threads, the connection tensile efficiency is maximized.

1.6 Lower stress design

The lower stress design makes the connections reliable in corrosive conditions.

2. Finite Element Analysis for TP-TW

The make-up equivalent stress for K55 9-5/8" 36# TP-TW is shown on fig.1. Finite Element Analysis graphically illustrates the low-stress design which makes TP-TW excellent choices for critical well applications.

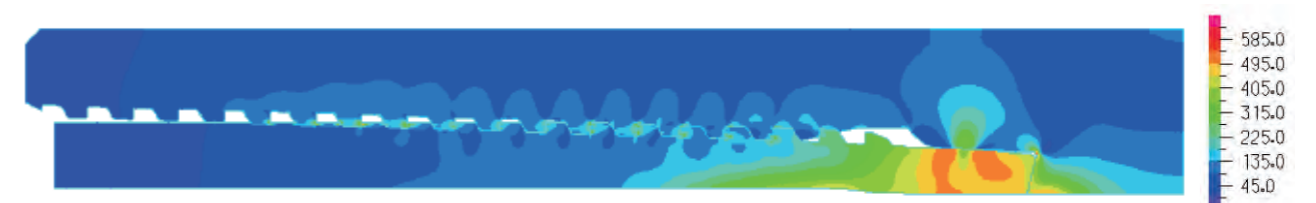


Fig.1 make-up equivalent stress

Loading is according to ISO12835(2013) ASL290. The Contact stress for seal is shown on fig.2. The conclusion is that the sealing ability of the sealing surface is reliable.



Table 1 Load steps

Step	Temperature (°C)	Pressure (MPa)
Make-up Complete	5	0
Pressure Applied	5	7.4
Temperature Applied	290	7.4
Pressure Removed	290	0
Temperature Removed	5	0

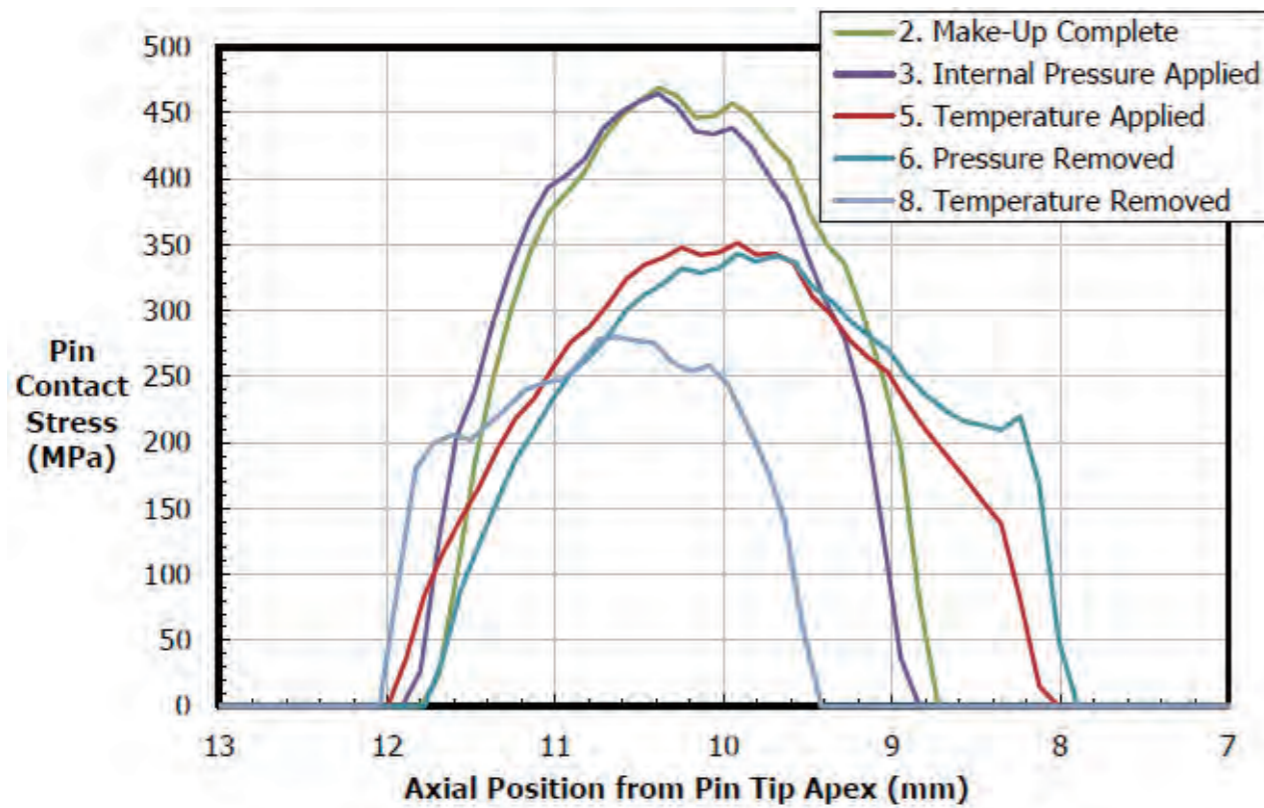


Fig.2 Contact stress for seal

3. TP-TW Qualification Test

The completed test is shown in the table 2.

Table 2 Brief introduction of test

Steel grade	OD	Size	Lab.	Specification	TPI	Result
K55	9-5/8 in	36# (244.48×8.94 mm)	TPCO	ISO 12835(2013) ASL290	Moddy& Noetic	Pass
L80	9-5/8 in	40# (244.48×8.94 mm)	TPCO	ISO 12835(2013) ASL290		Pass
K55	11 3/4	54# (298.45×11.05 mm)	TPCO	ISO 12835(2013) ASL290	Moddy& Noetic	Pass

The test load envelope tests results are summarized in table 3.

Table 3 Test load envelope tests result summary

Specimen No.	M&B Test		Thermal cycle test	Bend test	Limit-strain test
	A	B			
			ASL290°C Pi : 7.4MPa(Gas) LCEI = 1407mm LtestHS = 101mm SRI = 126µε LTTS = 268µε	pmax:20°/30m Pi : 7.4MPa(Gas) Δρ= 4°/30m	Local strain value:1.5% Tensile strain threshold:3% Pi : 7.4MPa(Gas) Pi : 0.1MPa(Gas) LCEI = 1407mm LtestHS = 101mm
1#	MBG(A) 3M/3B Min dope/Max Tq.	MBG(B) 3M/3B Min dope/Max Tq.			No Leak, No seepage, No structural failure was observed up to average displacement of 44.363 mm (3.4%)
	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)	FMU 1M Min dope/Max Tq. GTS bef.FMU(B)			Passed
	No Gallig	No Gallig	N/A	N/A	
2#	MBG(A) 3M/3B Min dope/Max Tq.	MBG(B) 3M/3B Min dope/Max Tq.		No Leak, No seepage 36 deg/30m is OK Upon further loading, the dogleg severity in the bottom pup increased to 44 deg/30m	
	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)	FMU 1M Min dope/Max Tq. GTS bef.FMU(B)			Passed
	No Gallig	No Gallig	N/A		N/A
3#	MBG(A) 2M/2B Min dope/Max Tq.	MBG(B) 2M/2B Min dope/Max Tq.			
	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)	FMU 1M Min dope/Max Tq. GTS bef.FMU(B)			N/A
	No Gallig	No Gallig	No Leak Passed	N/A	N/A
4#	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)	No Leak Seepage in high temp.: A:0.076ml/min; B:0.016 ml/min Seepage in low temp.: A:1.69ml/min; B:0.017ml/min	Average seepage: A:No seepage B:0.009ml/min No structural failure Terminate the test after up to dogleg of 40 deg/30m	
	No Gallig	No Gallig	Passed	Passed	N/A
5#	MBG(A) 2M/2B Min dope/Max Tq.	MBG(A) 2M/2B Min dope/Max Tq.			
	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)			N/A
	No Gallig	No Gallig	No Leak Passed	N/A	N/A
6#	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)	FMU 1M Min dope/Max Tq. GTS bef.FMU(A)	No Leak No seepage in high temp.: Seepage in low temp.: A:1.909ml/min; B:1.164ml/min		Average seepage: A:No seepage B:12.1ml/min No structural failure was observed up to average displacement of 42.72 mm (3.27%)
	No Gallig	No Gallig	Passed	N/A	Passed

Test result:

- No galling was observed on any specimen throughout the make-up/break-out test program;
- The connection remained the seal integrity and structural integrity throughout the thermal cycle test.;
- The connection met threshold performance requirements in the bend test and limit-strain test.