

LFI – April 2020: Leak on S&T Exchanger Flange



LFI: Incident Description

- During plant inspection of operator, he noticed a gas leak and fire onto XES102 dome flange. He informed the Supervisor.
- The situation was investigated and the decision was to shutdown the Unit X, depressurised and purged it with HPN.



LFI: Flange Inspection

FLANGE DETAILS		GASKET DETAILS		TORQUE DETAILS				
COMPONENT TYPE	South Side Dome	GASKET TYPE	Double Jacket	STREAM PROPERTY		Hydrogen		
FLANGE SIZE	Special	GASKET MATERIAL	Graphite/Soft Iron	DESIGN PRESSURE		2040kPa		
FLANGE RATING	Male 2 Female	GASKET THICKNESS	4mm	DESIGN TEMPERATURE		465 °c		
FLANGE FACING	Special	GASKET OD	1079mm	WRENCH TYPE			S/N	
FLANGE MATERIAL	SA105	GASKET ID	1053mm	PUMP TYPE			S/N	
STUD SIZE	1"	GASKET SEALING OD	1079mm	TORQUE (Nm)				
STUD MATERIAL	B7M	GASKET SEALING ID	1053mm	PUMP PRESSURE(Bar)				
STUD LENGTH	-	P.C.D.	-	FLANGE GAP MEASUREMENT				
QUANTITY OF STUDS	60	NUMBER OF BARS	-		N	E	S	W
A/F SIZE	41	BAR WIDTH	-	Flange Alignment(B)				
NUT MATERIAL	2H			Flange Alignment(A)				
WASHER MATERIAL	No Washers Used			Torque Initial				
LUBRICANT USED	Nikkel Anti Seize			Torque Complete				

LFI: Flange Inspection

Action Carried Out	YES	NO	COMMENTS
Has the flange faces been examined for defects and corrosion?	X		Inspection done by [REDACTED]
			Damage found on the fixed tube bundle flange on the OD of the sealing face. Damaged area is 6,5mm across the sealing area where the gasket seats on the flange. The double Jacketed gasket used is only 12mm wide, thus more than 50% of the effective seal area has been compromised. I recomend either the damage be repaired accordingly or replacing the Double Jacketed gasket with a slightly wider more suitebale gasket as recommended by the
Is the surface finish within the specified range?		X	[REDACTED]
Is the correct gasket and ring been fitted and is the gasket in a good and dry condition?			-
Is the gasket centralized on the stud/bolts?			-
Are new bolts/studs used?			-
Have the old bolts been examined for re-use, have the grooves of studs and nuts been cleaned and free of rust and debris?			-
Is the plant approved lubricant been used?			-
Has the lubricant been applied to the studs, nuts and the face of the nut to be tightened?			-
Has the correct size, length and stud material been fitted?			[REDACTED] recommends changing from B7 stud material to B16 to accommodate the extreme temperature.
Are the same number of stud/bolt threads exposed through both its nuts? (between 2-5 stud/bolt threads)			-
Was [REDACTED] at gasket installation and final box-up?			-
Has the studs/bolts been tightened to the recommended torque or tension?			-
Are the flange faces parallel. Is the flange gaps within the specific range of 0.5mm?			-

LFI: Flange QCP

FLANGE DETAILS		GASKET DETAILS		TORQUE DETAILS				
COMPONENT TYPE	Dome inlet	GASKET TYPE	Spiral	STREAM PROPERTY				
FLANGE SIZE	18"	GASKET MATERIAL	SRP	DESIGN PRESSURE				
FLANGE RATING	300H	GASKET THICKNESS	4.8mm	DESIGN TEMPERATURE				
FLANGE FACING	RIF	GASKET OD		WRENCH TYPE			S/N	
FLANGE MATERIAL	SA 105	GASKET ID		PUMP TYPE			S/N	
STUD SIZE	1 1/4"	GASKET SEALING OD		TORQUE (Nm)		1560 Nm		
STUD MATERIAL	B7	GASKET SEALING ID		PUMP PRESSURE(Bar)		248 bar		
STUD LENGTH		P.C.D.		FLANGE GAP MEASUREMENT				
QUANTITY OF STUDS	24	NUMBER OF BARS			N	E	S	W
A/F SIZE	50mm	BAR WIDTH		Flange Alignment(B)	57,0	57,2	56,0	56,4
NUT MATERIAL	2H			Flange Alignment(A)				
WASHER MATERIAL				Torque Initial				
LUBRICANT USED				Torque Complete	54,6	53,9	54,8	54,5

LFI: Flange QCP

Action Carried Out	YES	NO	COMMENTS
Has the flange faces been examined for defects and corrosion?	✓		
Is the surface finish within the specified range?	✓		
Is the correct gasket and ring been fitted and is the gasket in a good and dry condition?	✓		
Is the gasket centralized on the stud/bolts?	✓		
Are new bolts/studs used?	✓		
Have the old bolts been examined for re-use, have the grooves of studs and nuts been cleaned and free of rust and debris?		✓	
Is the plant approved lubricant been used?	✓		
Has the lubricant been applied to the studs, nuts and the face of the nut to be tightened?		✓	Only on the studs
Has the correct size, length and stud material been fitted?	✓		
Are the same number of stud/bolt threads exposed through both its nuts? (between 2-5 stud/bolt threads)	✓		
Was Klinger Present at gasket installation and final box-up?		✓	Petro SA
Has the studs/bolts been tightened to the recommended torque or tension?	✓		248 Nm
Are the flange faces parallel. Is the flange gaps within the specific range of 0.5mm?	✓		Gaps is by 0,9mm

Thank You...

