



Toase-eh Park Sanati Gohar Ofogh
Petrochemical Co.
**CONCEPTUAL, BASIC and DETAIL DESIGN
ENGINEERING OF STYRENE PARK OFFSITE**



Document Title: Hydrostatic Test Procedure

Document No.: EI027-DMF-VD-QC-PRO-028

Rev. R0

Page 1 of 9

STYRENE PARK OFFSITE

Document Title:
Hydrostatic Test Procedure

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Page 2 of 9

REVISION RECORD SHEET

Page	Revisions							Page	Revisions						
	R0	R1	R2	R3	R4	R5	R6		R0	R1	R2	R3	R4	R5	R6
1	X							41							
2	X							42							
3	X							43							
4	X							44							
5	X							45							
6	X							46							
7	X							47							
8	X							48							
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10								50							
11								51							
12								52							
13								53							
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37								77							
38								78							
39								79							
40								80							









 	Toase-eh Park Sanati Gohar Ofogh Petrochemical Co. CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING OF STYRENE PARK OFFSITE		 	
	Document Title: Hydrostatic Test Procedure			
	Document No.: EI027-DMF-VD-QC-PRO-028		Rev. R0	Page 3 of 9

Table of Contents

- 1.0 PURPOSE
- 2.0 SCOPE
- 3.0 REFERENCES
- 4.0 FLUID MEDIUM AND TEMPERATURE
- 5.0 PRESSURE GAUGES
- 6.0 PREPARATION
- 7.0 TESTING PROCEDURE AND APPLYING PRESSURE
- 8.0 ACCEPTANCE CRITERIA
- 9.0 RE-TEST
- 10.0 ACTION AFTER TEST

 	Toase-eh Park Sanati Gohar Ofogh Petrochemical Co. CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING OF STYRENE PARK OFFSITE	 	
	Document Title: Hydrostatic Test Procedure		
	Document No.: EI027-DMF-VD-QC-PRO-028	Rev. R0	Page 4 of 9

1.0. PURPOSE

This procedure covers the requirements and instructions to be followed by the DAMAFIN for Hydrostatic test of Air-cooled heat exchangers that will be procured in “Toase-eh Park Sanati Gohar Ofogh Petrochemical Co. CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING OF STYRENE PARK OFFSITE” project.

2.0. SCOPE

-Pressure testing shall be performed after completion of following operation on the Tube bundle.

- After non – destructive examination of weld seam.

- After fastening of the name plate.

- After shop inspection (dimensional check & visual examination)

-After completion of welding

-After any PWHT (According to ASME Sec.VIII UW-40(e))

-After painting or pickling of header boxes (Because the hydrostatic test will be done after assembly the tube bundle and fixing the finned tubes, Surface preparation and painting stage is before the hydrostatic test.)

3.0. REFERENCES





3.1. API 661 - 7 EDITION, 2019

3.2. ASME SEC VIII DIV.1-2010

3.1. API 661-7th Edition R2018
3.2. ASME SEC.VIII DIV.1(2019)

4.0. FLUID MEDIUM AND TEMPERATURE

4.1. Testing medium shall be clean and fresh potable water.

 	Toase-eh Park Sanati Gohar Ofogh Petrochemical Co. CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING OF STYRENE PARK OFFSITE	 
	Document Title: Hydrostatic Test Procedure	
	Document No.: EI027-DMF-VD-QC-PRO-028	Rev. R0

4.2. The metal temperature during hydrostatic test be maintained at least 17°C above the Minimum Design Metal Temperature (MDMT), but need not exceed 48°C, to minimize the risk of brittle fracture.

4.3. The temperature of the test water shall never be less than 10°C.

4.4. Water used for hydrostatic testing shall be potable. The chloride content of the test water used for equipment with austenitic stainless steel or Ni-Cu alloy materials that would be exposed to the test fluid, shall not exceed 30 mg/kg (30 parts per million by mass). Upon completion of the hydrostatic test, the equipment shall be promptly drained.

5.0. PRESSURE GAUGES

5.1. Two (2) dial-indication pressure gauges shall be used in hydrostatic test.

5.2. The gauges shall be selected such that the intended maximum test pressure falls in the midrange of the instrument, but in no case shall the range be less than one and half (1 1/2) nor more than four (4) times the test pressure.

5.3. All gauges shall be calibrated against a standard dead weight tester or a calibrated master gage. Gauges shall be recalibrated at any time that there is reason to believe that they are in error. The gauges shall have valid certificate for calibration.

5.4. A globe valve shall be used before each pairs of gauges.

5.5. Gauges are connected to the highest location of the tube bundle for correct indication of the test pressure.






6.0. PREPARATION

6.1. Prior to testing, the all parts of tube bundle shall be thoroughly cleaned and free from dirt, debris, loose scale and slag, pieces of metal, weld spatter, oil and grease, etc.

6.2. Tube bundle outside shall be dried completely.

6.3. Temporary support skids for equipment shall be enough to retaining the total weight. In order to be able to inspect all the welded joints, no supports shall be placed on or over any welded joints of the tube bundle.

6.4. The gaskets used for hydro test shall be of the same type as those used for operation.

 	Toase-eh Park Sanati Gohar Ofogh Petrochemical Co. CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING OF STYRENE PARK OFFSITE	  
	Document Title: Hydrostatic Test Procedure	
	Document No.: EI027-DMF-VD-QC-PRO-028	Rev. R0 Page 6 of 9

Damaged gaskets or gaskets of the joints which are dis-assembled shall be replaced for vessel retest (if applicable).

6.5. All necessary precautions shall be taken to avoid the risk of brittle fracture during hydrostatic test in the shop.

6.6. The tube bundle will be filled with water by any suitable low pressure filling lines.

6.7. Before applying pressure, the test equipment (including pressure gauges, pressure pump and globe valves) shall be examined to see that it is tight and that all low-pressure filling lines and other appurtenances that should not be subjected to the test pressure have been disconnected.

6.8. Venting at the highest point of the pressure chamber shall be provided.

6.9. Approved relative documents (drawing, weld and testing plan,) which specify the method and test pressure.

6.10. Advanced notice for inspection to the inspection agency.

6.11. Calibrated measuring instruments (pressure gauges).

6.12. Sufficiently dimensioned parts for sealing the pressure chamber such as blind flanges, pressure test device, possibility for venting and draining.

6.13. Denomination of a responsible for coordination and permanent supervision of all measure.





7.0. TESTING PROCEDURE AND APPLYING PRESSURE

7.1. Venting Method:

At the first water should be applied tube bundle by special pump with opened vent and drain, until Water steadily exodus from top most vent. This water steadily exodus shows that there is no air in to the bundle.

After that, vent(s) shall be closed and pressure gauges shall be fixed on bundle and pressure shall be applied according to this procedure.

7.2. Hydrostatic test pressure which at highest point in the tube bundle is at least equal to 1.3 times the design pressure.

 	Toase-eh Park Sanati Gohar Ofogh Petrochemical Co. CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING OF STYRENE PARK OFFSITE	 
Document Title: Hydrostatic Test Procedure	Rev. R0	Page 7 of 9
Document No.: EI027-DMF-VD-QC-PRO-028		

7.3. The pressure in the vessel shall be gradually increased to not more than 1/2 of the test pressure and held 20 minutes in this pressure.

There after the test pressure shall be increased in steps of approximately one-tenth of the test pressure until the required test pressure has been reached and tube bundle shall be at least one (1) hour at this pressure to permit inspection of the tube bundle.

7.4. At the pressure test, inspection for leakage shall be made on the whole body of vessel, especially on weld seams and all areas of high stress concentration.

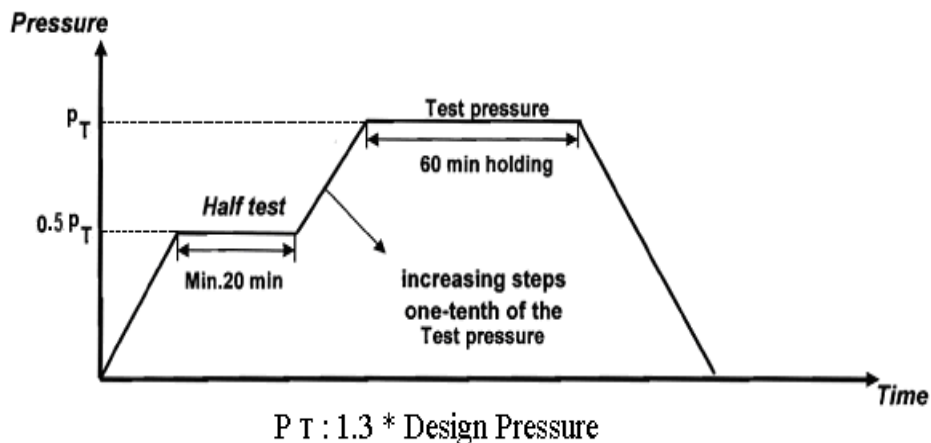
7.5. Safety zone




After applying of water and pressure to bundle, front zone of headers are at risk and these zones shall be separated by a divider for prevent from damage that may happen because of plug ejaculation.

8.0. ACCEPTANCE CRITERIA:

8.1. Except for leakage that might occur at temporary test closures, leakage is not allowed at the time of the required visual inspection.

8.2. Any leaks or other defects found during the inspection shall be reported in Non-Conformance Report (N.C.R).



	Toase-eh Park Sanati Gohar Ofogh Petrochemical Co. CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING OF STYRENE PARK OFFSITE		 		
	Document Title: Hydrostatic Test Procedure			Rev. R0	Page 8 of 9
	Document No.: EI027-DMF-VD-QC-PRO-028				

ITEM NUMBER	DESIGN PRESSURE (barg)	TEST PRESSURE (barg)
Air Cooler	22	28.6

9.0. RE-TEST

9.1. Any leaks that are present shall be corrected in accordance with the rules and all necessary N.D.T shall be done, and the vessel shall be retested in accordance with this requirement.

9.2. Heating shall be avoided when vessel is being hydrostatic tested. No welding is permitted when the vessel is under pressure and after hydrostatic test.

10.0. ACTIONS AFTER TEST

After the hydrostatic test finished, the vessel shall be immediately and carefully drained and all parts where wet, could collect shall be dried.

10.1. DRYING METHOD:

- Horizontal bundle to be lifted by 1 or 2 Cranes, each of them to hold one header.
- Unit to be alternatively tilted to one side and to the other (30 degrees).
- Then bundle to be laid down horizontally.
- Then bundle to be dried by hot air circulation for at least 3 hours.



HYDROSTATIC TEST REPORT



Project Name / DTT Job No:

Reference Document Name / No:

Item No:

Tube Bundle No: B

Front Header No: F

Rear Header No: R

Design Pressure = Bar

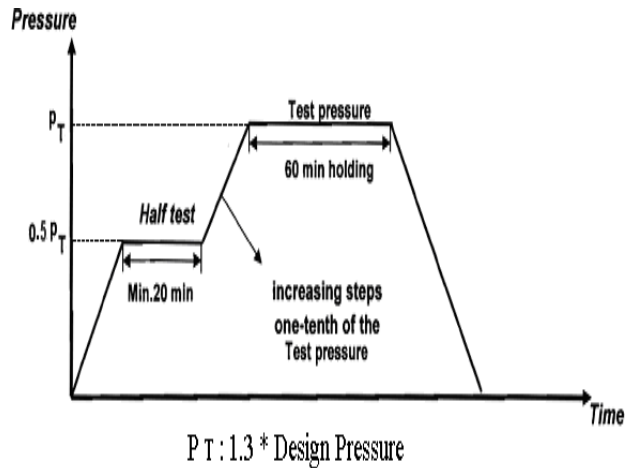
Test Pressure = Bar

Test Duration = Minutes

Test Medium =

Test Temperature =

Manometers Code =



The undersigned hereby certifies that the item as described above, has been visually inspected and the test has not shown any leak or distortion, therefore it has been judged acceptable.

DTT	CLIENT	TPA	OWNER / MC
Name : Date : Sign:	Name : Date : Sign:	Name : Date : Sign:	Name : Date : Sign: