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# INSPECTION AND TEST PLAN FOR AIR COOLERS

02	28/MAY/18	FI				
01	17/MAY/18	IFA				
00	04/MAY/18	IFA				
<b>REV.</b>	<b>DATE</b>	<b>Purpose of Issue</b>	<b>PRE'D</b>	<b>CHK'D</b>	<b>APP'D</b>	<b>AUT'D</b>

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6	X		X				
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8	X		X				
9	X		X				
10	X	X	X				
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## 1. SCOPE

This Inspection and Test Plan covers the minimum extent of inspection and test activities to be performed by CLINET and/or CLIENT's Inspection Agency inspector (THIRD PARTY INSPECTOR).


The Inspection level and witness / hold points may be changed at the CLIENT's direction during the course of the work to ensure the quality of equipment and materials. The extent of inspection and test activities for the equipment and materials which are not covered by this Inspection and Test Plan shall be decided after obtaining approval from CLIENT prior to the start of fabrication.

If any conflict arises between this Inspection & Test Plan and specification in the engineering requisition and/or Purchase Order, supplier shall submit its deviation list to CLIENT for approval prior to work start.

## 2. DEFINITIONS AND ABBREVIATIONS

- PROJECT Southern Adish Gas Condensate Refinery Project
- CLIENT Southern Adish Gas Condensate Refinery Company
- VENDOR Shall mean any person, firm or company contracted to manufacture or supply any materials, equipment or services for the performance of any item in connection with this PROJECT.
- THIRD PARTY INSPECTOR Shall mean any person, firm or company assigned by CLIENT to inspect the specified services, equipment or system being provided by Vendor.
- INSPECTION POINT
  - R (Document Review) Review means Review document, which includes of material test certificates, WPS, PQR, NDT Procedures and etc.
  - H (Hold Point) Hold on the production till Third Party Inspector performs inspection and supervises the required test  

The Manufacturer must notify Client of the dedicated inspection activity at least twenty (20) Calendar days in advance. The VENDOR cannot deviate from this rule unless written approval has been given by Client.

								
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W (Witness Point)

Manufacturer shall notify Client and Third Party Inspector but there is no hold on the production; Client can waive this inspection based on his discretion and informs Third Party Inspector accordingly. **If Client does not elect to be present, the Manufacturer may proceed with his own inspection, provided controls and test records are made available to Client for review.**



A

Approval

**The Manufacturer has either to submit to Client for comments and approvals the documents required prior to the performance of the dedicated activity or to transmit or make available for the approval of Client the result of the controls and tests conducted, as the case may be. Manufacturer is not allowed to proceed the work before receipt of Client approval on the required documents.**

SW (Spot Witness)

for items with spot witness manufacturer shall notify Third Party Inspector as fulfilling the monitoring.

#### Notes:

1. Inspection item "Material Identification for Alloy" means to check chemical analysis of all alloy materials including chemical analysis of all welding for all alloy materials"


### 3. INSPECTION LEVEL

The inspection levels defined below are CLIENT's inspection guidelines. Inspection and Test Plan which indicates inspection and test requirements to be witnessed shall be developed and established based on the below inspection levels.

#### 3.1 LEVEL 1

Regular inspection visit including Pre-Inspection Meeting (PIM)

- Initial visit to a pre-inspection meeting at Vendor's facilities, as defined in Level No. 2 shall be required if necessary.

								
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- Periodic surveillance and visit to monitor, verify and/or audit shall be required.
- Inspection of the Goods and specified quality documents when items are completed and before they are packed for shipment to the Plant Site shall be required.
- Inspection of packaging and/or crating prior to shipment shall be required
- **The frequency of visits will depend on the complexity and size on the order and the quality history of the Manufacturer.**



### 3.2 LEVEL 2

One or more in-progress surveillance inspection visit including Pre-Inspection Meeting (PIM).

- Initial visit to a pre-inspection meeting conducted at VENDOR's facilities, if necessary, to review, notification at required hold point(s), if any, and surveillance visits may be required.
- The Goods and specified quality documents will be inspected at VENDOR's facilities when items are completed and before they are packed for shipment to the Plant Site.

### 3.3 LEVEL 3

Final Inspection prior to shipment

- The Goods and specified documents will be inspected at Vendor's facilities when items are completed and before they are packed for shipment to the Plant Site.
- **The inspector shall provide specific instructions to the Manufacturer defining the activities to be witnessed or the details to be verified.**



### 3.4 LEVEL 4

No additional inspection is required. (Receiving inspection only)

- This inspection level is normally provided on standard equipment or relatively simple items. CLIENT's shop inspection including review of Vendor's inspection record will not be provided.
- **The inspector shall review and accept Manufacturer's certifications, test reports and QC data book documentation.**



## 4. ITP TABLE

Following ITP table shall be applied for the Air Coolers

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### **INSPECTION TEST PLAN TABLE**

**COMMODITY :** Air Coolers

This ITP indicates the minimum extent of inspection to be performed by Client and the inspection and test requirements specified on the data sheets, project specifications, codes, regulations & etc. included in the MR/Purchase order shall be also performed and included in vendor scope of supply and incorporated in to vendor/sub-vendor's ITP/Quality Control Plan.

NO.	Part Name/ Component (Note1)	Inspection Activity (Note2)	Reference Document / Standard (Note1)	Acceptance Criteria (Note1)	Verifying Document (Note 1)	ACTIVITY BY			Remark
						V	TPI	C	
<b>1</b>	<b>Relevant document Confirmation</b>	<ul style="list-style-type: none"> <li>- Inspection Test plan</li> <li>- NDE procedure</li> <li>- Drawing Approval</li> <li>- WPS/PQR with weld maps</li> <li>- Welder Qualification list</li> <li>- Heat Treatment Procedure</li> <li>- Hydrostatic Test Procedure</li> <li>- Fabrication procedure</li> <li>- Surface preparation</li> <li>- Painting Procedure</li> <li>- PMI procedure</li> <li>- NDE procedure</li> <li>- Shop Run-in Test procedure</li> <li>- etc.</li> </ul>				<b>H</b>	<b>A</b>	<b>A</b>	
<b>2</b>	<b>Pre Inspection meeting</b>					<b>H</b>	<b>H</b>	<b>H</b>	

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<b>3</b>	<b>Material Receiving</b>	<ul style="list-style-type: none"> <li>- Material Inspection &amp; MTC Review for Pressure Parts (BS EN 10204 (3.1))</li> <li>- Material Inspection &amp; MTC Review for Non-pressure Parts (steel Structure Part &amp; Fasteners)</li> <li>- Motor &amp; Electrical Equipment Inspection</li> <li>- ATEX Certification for Electrical Equipment</li> <li>- Calibration Certificate for Instruments</li> <li>- Impact test requirement</li> <li>- Material Traceability</li> <li>- Inspection of sub ordered components</li> <li>- Storage of materials and welding consumables</li> <li>- PMI (where applicable)</li> <li>- Pickling and passivation (where applicable)</li> </ul>				<b>R</b>	<b>R</b>	<b>R</b>	
<b>4</b>	<b>Finned Tube</b>	- Finning Inspection				<b>H</b>	<b>SW</b>	<b>R</b>	
<b>5</b>	<b>Fabrication for Header box</b>	<b>1)</b> Plate Marking & Cutting				<b>H</b>	<b>R</b>	<b>R</b>	
		<b>2)</b> Perform PT or MT on bevel parts for cuted plate				<b>W</b>	<b>R</b>	<b>R</b>	
		<b>3)</b> WPS, PQR				<b>H</b>	<b>R</b>	<b>R</b>	
		<b>4)</b> Qualification a. Welder / Operator Qualifications b. NDE Operator Qualifications c. Welding Consumable Check				<b>H</b>	<b>R</b>	<b>R</b>	
		<b>5)</b> Fit - up & Opening on Header box inspection							
		a. Tube/Plug sheets to Partition/stiffener plate / Top/bottom plate				<b>W</b>	<b>SW</b>	<b>R</b>	



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		b. Tube/Plug sheets & Top / bottom to End plate				<b>W</b>	<b>SW</b>	<b>R</b>	
		c. Header box to nozzle fit up				<b>W</b>	<b>SW</b>	<b>R</b>	
		d. Flange to nozzle fit-up				<b>W</b>	<b>SW</b>	<b>R</b>	
		e. Plug sheet hole & Tube sheet hole machining				<b>W</b>	<b>R</b>	<b>R</b>	
		<b>6) Welding inspection (Before PWHT)</b>							
		a. NDE for Completed welding (RT/UT/MT/PT)				<b>R</b>	<b>R</b>	<b>R</b>	
		b. Visual & Dimensional inspection on completed welding				<b>W</b>	<b>SW</b>	<b>R</b>	
		<b>7) Thickness measurement of top/bottom plate of each head box</b>				<b>W</b>	<b>R</b>	<b>R</b>	
		<b>8) Post Weld Heat Treatment</b>				<b>R</b>	<b>R</b>	<b>R</b>	
		<b>9) Hardness test ( after PWHT)</b> - Nozzle to shell for Hydrogen, Lethal and sour service				<b>R</b>	<b>R</b>	<b>R</b>	
		<b>10) Drilling &amp; grooving / tapping for tube/plug sheets</b>				<b>W</b>	<b>SW</b>	<b>R</b>	
		<b>11) NDE of Header box after PWHT (RT/UT/MT/PT)</b>				<b>R</b>	<b>R</b>	<b>R</b>	

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6	<b>Tube Bundle Assembly &amp; Fabrication</b>	12) Final Visual & Dimensional Inspection for Header BOX				W	SW	R	
		13) Shot blasting & Painting				W	R	R	
		1) Tube Expanding Inspection and 100% PT after Expanding and <b>expanding ratio check</b>				W	R	R	
		2) Final Visual & Dimensional Inspection after assembly before hydro. Test				H	SW	R	
		3) Hydro Test & Air leak test				H	H	H	
		4) Drain, Dryness (Dry out), Preservation & Test Water Quality immediately after hydrotest				W	R	R	
		5) Rust Prevention (N2 sealing)				W	R	R	
		6) Painting Inspection				W	R	R	
		7) Tube to Tubesheet Strength Welding Inspection				W	R	R	
		8) PT for External Pressure Retaining Welds (Accessible Area without Disassembly)				W	R	R	
		9) Name Plate (ASME Code and Company Name Plate)				W	R	R	
7	<b>Fabrication for Steel</b>	1) Material Identification with MTC				R	R	R	

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	<b>Structure Parts</b>	2) Welding monitoring and Visual & Dimensional Inspection				W	SW	R	
		3) MT + UT				W	R	R	
		4) Visual inspection after Galvanized				W	SW	R	
		5) Spreader Beam Inspection & Load Test (when Applicable)				w	R	R	
8	<b>Painting and HDG for steel Structure</b>	1) Surface Preparation & Roughness Inspection				W	R	R	
		2) DFT, Visual & Final Inspection				W	R	R	
9	<b>Driving Mechanical Parts</b>	1) Fan				W	R	R	
		2) Motor				W	R	R	
		3) Louver				W	R	R	
10	<b>Run in test at Site</b>	1) Dimension Inspection before Run-in Test - Setting, calibration of instruments and controls				W	R	R	
		2) Trial Ass'y and run-in test at site (each item per 1 bay)				W	R	R	

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		<b>3) Run-in Test (Including Vibration, Fan Tip Clearance, Noise and Performance Test</b> - Dynamic balance for rotating parts - Wind speed				<b>W</b>	<b>SW</b>	<b>R</b>	
<b>11</b>	<b>Packing &amp; Marking</b>	<b>1) Packing &amp; marking inspection with packing list</b>				<b>W</b>	<b>R</b>	<b>R</b>	
		<b>2) Final Dimensional Inspection for packing (Louver, Sprare Parts, Spreader Beam)</b>				<b>W</b>	<b>R</b>	<b>R</b>	
<b>12</b>	<b>IRC(Inspection release certificate) &amp; Final Document Packing</b>	<b>1) Manufacture data book review</b>				<b>R</b>	<b>H</b>	<b>H</b>	

## NOTE

- Vendor shall fill-out above ITP table and submit the detail fabrication and quality control plan (Inspection and Test Plan) in Bid document for CONTRACTOR review including following ;
- In the inspection and test plan table, activities shall be sorted by time priority by Vendor.
  - Inspection activity shall be detaily re-arranged as per "Part Name / Components" by Vendor.
- For control & instrumentation, auxiliary parts, local gauge board and main control valves seperated ITP shall be submitted by Vendor.