



**CONCEPTUAL, BASIC and DETAIL DESIGN  
ENGINEERING OF STYRENE PARK OFFSITE**

**TECHNICAL CLARIFICATION-DAMAFIN**

Contractor Job No.:

**Technical Clarification Reference No:**

**Rev. 00**

Project No :

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**REQUISITION NO.: Email Dated 20-Feb-2024**

**VENDOR'S PROPOSAL NO.: 02612N**

**REQUISITION SUBJECT: Air Cooler**

**VENDOR'S PROPOSAL DATE: 24.Feb.2024**

Item	Purchaser's Comment	Vendor's Reply <b>(Note-1)</b>	Conclusion (to be filled by Purchaser)
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<b>A</b>	<b>General Items</b>		
1	<p>VENDOR is sole responsible to consider this clarification and modify his offer based on this TCL. All modifications considered on the next revision of offer based on this clarification should be clearly marked with revision and cloud marks. All consequences due to changes without cloud mark are in VENDOR's responsibilities. Anyway this clarification has priority over the offer.</p>		
2	<p>In case of deviation from project documents, vendor should specify during bid stage.</p>		
3	<p>In case of order, VENDOR should provide his quality control plan (VQCP) based on requirements specified on MR and its attachments and also VENDOR's experiences and send for approval. PURCHASER's ITP and relevant specifications attached to MR is a minimum requirement and VENDOR should consider it as a base and provide comprehensive Quality Control Plan. In case of order, VENDOR should provide complete NDE Map based on requirements specified on MR and its attachments and also VENDOR's experiences and send for approval. Approved VENDOR quality control plan (VQCP) and approved VENDOR procedures/NDE Map will be the base for carrying out all required inspection and test.</p>		

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4	In case of order, PURCHASER would not review documents sent by VENDOR before receiving VENDOR Print Index and Schedule. VENDOR Print Index and Schedule (VPIS) shall be prepared as first document after PO. All documents shall be issued after getting final approval of this mentioned document.		
5	Chemical Cleaning, Pickling & Passivation For Stainless Steel Parts, if any, are in VENDOR's scope.		
6	Positive Material Identification (PMI) For Non-Carbon Steel Material is in VENDOR's scope.		
7	All welds should be applied based on approved WPS/PQR.		
8	Guarantee of the suitability of all used materials (chemical composition, mechanical properties and origin of materials) should be confirmed. All materials shall be new and un-corroded.		
9	Packing, shipping preparation and preservation should be done according to approved procedure.		
10	In case of order, all drawings and calculation books should be issued along with relevant native file.		

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11	Regarding Sub-VENDORS/sub-suppliers, VENDOR shall note that Contractor / PURCHASER have the right to reject sub-VENDORS/sub-suppliers if his capability is judged poor or not proven.		
12	All necessary devices for transportation (including adequate saddles, nozzle covers, bolts, nuts, temporary gaskets for shipping, cradle, wooden belts for sling the equipment, packing boxes, fitting, etc... any one applicable ) should be supplied by VENDOR.		
13	Surface preparation and Painting should be performed based on relevant specifications. Primer, intermediate and final coat should be carried out based on approved painting procedure in VENDOR's shop before shipment.		
14	VENDOR to provide Lifting / Transportation / Erection calculations & drawings.		
15	Tubes , pipes plates and flanges shall be free of varnish and other internal coatings.		
16	Vendor shall note that N2 Purging with 1 barg Pressure for preservation of Air Coolers shall be performed. VCI or Silica Gel is not acceptable for preservation of Air Coolers		
17	Spare part list for Commissioning and 2 years to be issued by vendor after PO.		
18	Material test certificate for all parts shall be provided in accordance with requirements of BS EN 10204 (3.1).		
19	Welded tubes should not be used in any case.		

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20	Considering specified Minimum Design Temperature (-45 C), Impact Test /Normalizing Requirements should be taken into account, if necessary.		
21	Vendor shall confirm that all welded carbon steel plate headers shall be stress relieved after completion of header but prior to tubing installation and also where ever necessary according calculation.		
22	Vendor should confirm that mechanical/thermal guarantee		
23	Vendor to note that Hazardous area classification is Zone 2 IIB T3		
24	Ladders, platforms with relevant galvanized gratings (as per relevant standard drawings) including bolts, nuts & washers for header services should be provided by vendor.		
25	All fabrication drawings shall be drawn in specific scale.		
26	All required NDT should be performed by vendor.		
27	Vendor shall note that Trial assembly is in vendor scope and is not an option and to be considered in his main price.		
28	Vendor shall note that Wiring from Junction Box to vibration switch is in her scope of supply.		

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29	Vendor shall confirm design/supply of structure for piping loads applied on air cooler structure.		
30	Vendor to note that structures of air cooler are in her scope of work and supply and are not an option but to be quoted separately from original price.		
31	Vendor to note that Walkway With Relevant Galvanized Gratings/ Checker to headers both ends and each side connecting including ladders is in her scope of work and supply and is not an option.		
32	Vendor shall note that Guarantee time to be a period of 12 months after successful start-up or 18 months after shipping whichever comes earlier.		
33	Chinese, Indian and Ukrainian vendors are not acceptable as sub-supplier.		
34	The inspection and test shall be as per provided ITP as the minimum		
35	Vibration switch detail information shall be provided after P.O.		
36	Sub vendor list to be provided at bid stage		

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37	Documentation to be provided as per part 6.3 of material requisition for air cooler.		
<b>B</b>	<b>Specific Items</b>		
<b>B-1</b>	<b>Mechanical and Process</b>		
1	Vent and drain shall be considered for all headers Min. size: 1". Vent and drain connections shall be provided at high and low points, respectively, on each header.		
2	FEA analysis for nozzles load calculation and openings calculation should be provided by Vendor taking into account requirements of ASME Sec. VIII Div. 2 making use of General FEA software like ANSYS.		
3	Gasket material for blinded nozzles to be as per material specified on process data sheet, for plugs requirements of Para. 7.8. of API 661 to be fully met.		
4	85 db at 1 m <u>including any applicable tolerances</u> to be confirmed.		

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5	For fans having a diameter larger than 1,5 m individual fan blades shall be manually adjustable for varying blade pitch.		
6	Every <b>bay</b> shall be supported by P.T F.E.		
7	A characteristic performance curve for each group of identical fans shall be furnished by Vendor.		
8	Noise data sheets for each group of identical drives shall be furnished by vendor. Noise data sheet shall be as per Annex B of API 661.		
9	Belt drives design should fulfill all requirements of Job Spec and design Code esp. <b>section 7.2.8.2</b> pertained to Belt Drives indicated in API 661.		
10	Fan absorbed power in both min. design temperature and max design temp. Should be reported.		
11	Calculated fluid velocity to be specified on process datasheet.		

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12	Exchanger empty and full weight and column loads shall be specified in proposal.		
13	Vendor shall confirm to issue nozzle external loads calculations according to API 661 by Finite Element Analysis. Nozzles loads should be considered three (3) times of the loads have been specified on API 661.		
14	Please confirm that each fan has been sized such that the area occupied by the fan is at least 40 % of the bundle face area served by that fan.		
15	For any item that Piping Support should be considered on air cooler structure, it should be designed / supplied by Vendor. Relevant data including loads, location of supports would be announced at later stages in case of order.		
16	Requirements of Expanded tube to tube sheet joint, No. of grooves should be followed as per clauses 9.3.2, 9.3.3 of API 661 and TEMA Class R requirements.		
17	All welded supports (Including supports for frames, support clips for ladder/platform, pipe supports and piping support structure, and any other required support welded to components of air coolers) is in vendor scope of work/supply and shall be welded in vendor's shop.		
18	Native file of thermal design to be provided by vendor.		

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19	All SA-105 and SA-516 70 materials to be <b>normalized</b> .		
20	Structural analysis shall be done by SAP.		
21	A325 or A490 shall be used for structural bolts		
22	Absolutely, it is not acceptable to consider Bundle frame beam as a part of main air cooler structural framing.		
23	F.V. at 120 °C to be considered in vendor design.		
24	Minimum design temperature is -45 °C		
25	Walkway to be considered in 3 side of the air cooler. Both header ends and one side direction.		

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26	1% slope in last pass shall be considered		
27	Full UT should be performed on nozzle to header junction.		
28	Design relative humidity should be considered as per site condition data attached to material requisition.		
<b>B2</b>	<b>Instrument</b>		
1	Explosion proof EEx"d" shall be applied for Vibration switches.		
2	Vibration switches shall be IP65		
3	Requirements of EI027-000-ED-IN-SPC-004-R2 (Spec. for Package Instrument) should be followed by vendor.		

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<b>B3</b>	<b>Electrical</b>		
1	Enclosure type of all electro motors shall be Exe.		
2	<b>Ladder/Tray Support</b> for Power and Control ladders/tray are in vendor scope of supply and work.		
3	<b>Sub vendor</b> for motor shall be as below:  - Siemens - ABB - WEG - VEM - Schorch  - Helmke		
4	Motor Enclosure and Motor Terminal Box shall be IP55.		
5	Enclosure Explosion Protection to be Exec		

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6	Requirements of Specification For Low Voltage Motors EI027-000-EB-EL-SPC-002-R3 should be followed by vendor.		
7	Insulation class and temperature rise of electro-motors shall be F/B respectively. Please confirm		
<b>B4</b>	<b>Structure</b>		
1	Foundation loading (force and moment due to wind, earthquake & ...) shall be provided by vendor.		
2	Anchor bolts details (Number, Diameter, arrangement, Material &...) shall be provided by vendor.		
3	All ladder and platforms shall be painted in accordance with: "Specification for Painting".		
4	All grating and bolts & nuts for structures shall be hot dip galvanized.		

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5			
<b>B7</b>	<b>Safety</b>		
1	ATEX certificate shall be submitted for fan.		
2	Maximum sound pressure level shall not exceed 85 dB(A) at 1m distance.		

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