OIL & GAS DEVELOPMENT COMPANY LIMITED
KPD-TAY PLANT.

Phone#022-2789200 & Fax#022-2761410

Annexure-A

Schedule of Requirement

Tender Enquiry No. TE/MECH/WT/KPD-0007/EA-4401/2023

"Web Tender for Supply & Installation of 400 Sleeves for inlet tube ends of 02 Nos. of tube bundles of Lean Amine Air Cooler (EA-4401) Installed at Amine Unit-01 of KPD-TAY Plant"

Sr #	Description	QTY	UOM
1	Supply and installation of seamless Stainless steel 316L Sleeves, Size: minimum 8"length, thickness: 0.020" to 0.028".	400	No

TERMS AND CONDITIONS (TECHNICAL):

a. The sleeve should be fit in tube having 1"ODX 0.1181"wall thickness. The detail specifications / Drawing dimensions of existing tube and exchanger are attached.
b. Supplier shall be responsible for verifying provided Heat Exchanger drawings as per site so that Sleeves can be manufactured accordingly.
c. Material of sleeve should be resistant to any type of corrosion when installed in carbon steel tubes
d. The sleeve should be able to work at minimum pressure of 97.5 psi and at minimum temperature 200°F with working fluid Hydrocarbon Lean Amine.
e. Supply & Installation of 400 Sleeve from SS316L ASME SA 249 specification minimum 8" lengths x 0.020" to 0.028" to fit in 1" OD x 0.1181" wall thickness Carbon Steel material tubes having Aluminum fins.
f. Dimension of sleeve should be minimum 8" in length to fit in tube having 1" OD x 0.1181" wall thickness Carbon Steel material having Aluminum fins for 400 inlet tube ends of tube bundles of Lean Amine Air Cooler (EA-4401)
g. The installed sleeve should be capable of providing sealing to at least 4 times of design pressure for tubes. Test certificate should be provided prior to delivery.
h. Single sleeve piece should be capable of bearing hydro test pressure of 97.5 psi. Third party hydro test certificate to be provided before delivery.
i. Sleeve material should be of foreign well known manufacturer having experience of at least 10 years, MTC of material must be provided before Installation.
j. Bidder shall prepare his own drawings for fabrication & same shall be handed over to OGDCL along with delivery of Sleeves.
k. Supervision of supplier will be required during installation.
l. Bidder should submit at least 03 work orders of similar nature job along with satisfactory work completion certificate.
m. The supplier shall be responsible for safe transportation of the sleeves to the KPD-TAY Plant.
n. In case of any non-conformance observed during inspection, Supplier shall immediately rectify / replace the same. Any delay in rectification will be liable to LDs as per OGDCL standard tender document.

o. Delivery of material is to be completed in 90-120 days from the date of receipt of firm purchase order.
p. The master set of tender documents (Local) available on OGDCL website (www.ogdcl.com) is the integral part of this tender.
q. Installation of sleeves along with all required tools will be the responsibility of supplier and will complete the job in 60 days after delivery of material.
r. All tools required for installation and testing of sleeves will be responsibility of supplier
s. Removal of plugs and cleaning of tubes will be the responsibility of supplier.
t. Hydro test will be responsibility of supplier / Contractor.
u. In case of any damage to sleeve during installation and hydro testing the contractor will be responsible to provide and replace with new sleeve on free of cost /without additional charges.

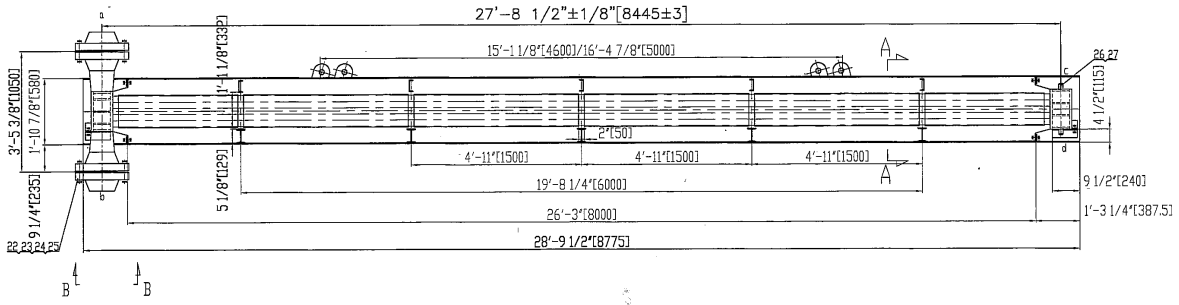
OGDCL RESPONSIBILITIES:

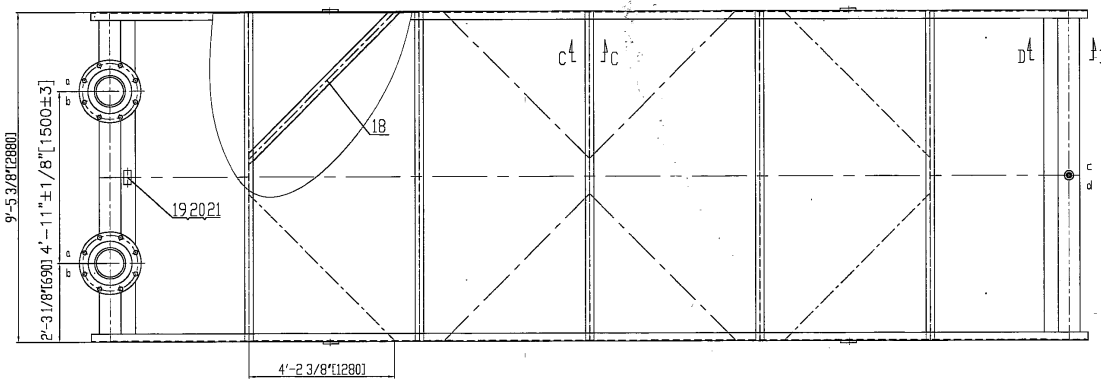
OGDCL will provide the following facilities during installation & hydro testing of tube bundles at KPD-TAY Plant.

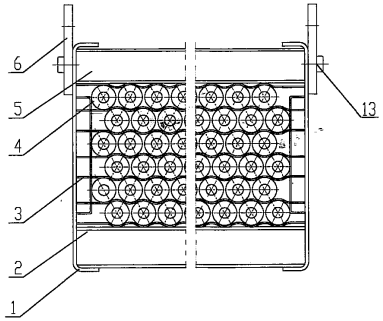
i. Isolation of the existing heat exchanger & purging.
ii. Provide electricity & demineralized water for hydro testing of tube bundles.
iii. Provide gaskets and plugs for Hydro testing of tubes.
iv. All spiral wound gaskets for isolation & hydro testing of heat exchanger shall be arranged by OGDCL.
v. Boarding and lodging of contractor staff.

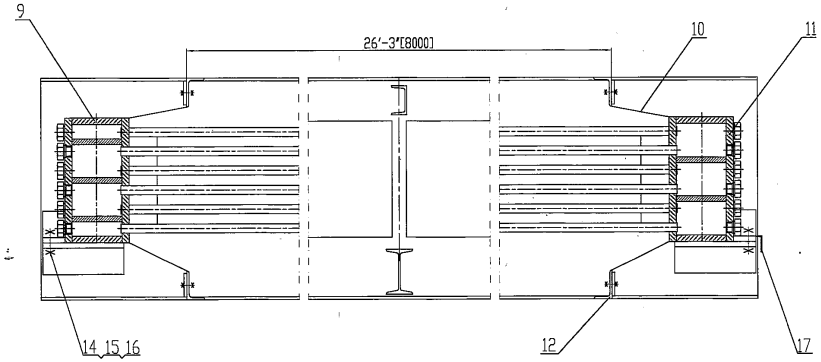
GENERAL TERMS AND CONDITIONS:

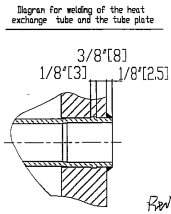
A. BIDS MUST BE SUBMITTED UNDER **SINGLE STAGE TWO ENVELOPES BIDDING SYSTEM** i.e. TECHNICAL & FINANCIAL BID SEPARATELY ON DUE DATE.
B. FINANCIAL BIDS OF ONLY TECHNICALLY RESPONSIVE BIDDERS WILL BE OPENED PUBLICLY.
C. AFTER TENDER OPENING "TECHNICAL BIDS" WILL BE REVIEWED. THE BIDS WILL BE BROUGHT TECHNICALLY AT PAR BY SEEKING CLARIFICATIONS. THE BIDDERS WILL **NOT** BE ASKED FOR ANY PRICE CHANGE IN THEIR FINANCIAL BIDS DUE TO CERTAIN CLARIFICATIONS AND SUBSEQUENT CHANGE IN THEIR TECHNICAL PROPOSALS. THE BIDDERS WILL **NOT** BE ALLOWED TO SUBMIT SUPPLEMENTARY PRICE PROPOSALS IN A SEPARATE SEALED ENVELOPE TO MAKE IT A PART OF THE ALREADY SUBMITTED UNOPENED FINANCIAL BIDS AND TO ADJUST THEIR QUOTED PRICE SUBSEQUENTLY AFFECTED DUE TO CHANGE IN TECHNICAL PROPOSALS.
D. SEALED FINANCIAL BIDS OF TECHNICALLY NON-RESPONSIVE BIDDERS WILL BE RETURNED UN-OPENED.
E. OGDCL RESERVES THE RIGHT TO REJECT ANY OR ALL THE BIDS WITHOUT ASSIGNING ANY REASON.
F. PRICES MUST BE QUOTED IN PKR INCLUSIVE OF ALL TAXES AND DUTIES, INDICATING UNIT PRICE AND TOTAL BID PRICES. GST MUST BE QUOTED SEPARATELY ALONG WITH COPY OF GST CERTIFICATE.
G. QUOTED PRICES SHALL BE VALID FOR **90 DAYS** FROM THE OPENING DATE OF THE TECHNICAL BID.
H. OGDCL RESERVES THE RIGHT TO EVALUATE THE BID(S) EITHER ITEM-WISE OR FULL PASKAGE BASIS WITHOUT ASSIGNING ANY REASON. TO QOUTE COMPETITIVE PRICES FOR ALL OR ANY ITEMS ENABLE COMPANY TO DECIDE PURCHASE**.**
I. BIDDERS TO SUBMIT THEIR COMPANY PROFILES, EXPERIENCE OF SIMILAR SUPPLIES IN PAKISTAN ALONG WITH TECHNICAL BIDS.

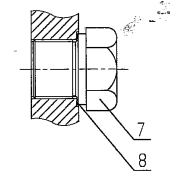












Reviewed by A/I
Oct.10.2014

Building standards and specifications		ASME VIII-1 2013 + API 661 06 ed.			
medium		Lean Amine	Speci al Environment		Corrosion,nonlethal
Operating Pressure	psi	50	design pressure	psi	75
Operating Temperature	F	174.6/130	design temperature	F	200
Maximun Operating Pressure	psi	75 psi @ 200 F	MDMT	psi	32 F @ 75 psi
joint efficiency(Lg/St)		em0.507;eb0.72/1.0	Corrosion allowance	in	0.118DCC(case tube & nozzles)
tube rows		6	surface/base tube	ft²	1991
tube passess		VI	surface/Fining	ft²	46597
hydrostatic test MT	F	39.2-122	hydrostatic test pressure	psi	97.5
NDE REQ.		SEE TECHNICAL REQ	Impact test requirements		not need
heat treatment regine		need	Surface treatment requirement		Acc. customer specification
NB register		not need	volun	ft³	32.5
ASME stamp		need	weight	lb	20571

list of nozzles

Symbol	Name	nominal diameter	pressure rating	Standard For connection	Sealing face	REMARKS
a	medium inlet	8"	class150	ASME B16.5-2009	WN/RF	
b	medium outlet	8"	class150	ASME B16.5-2009	WN/RF	
c	vent	RC3/4"	class150		thread	plug
d	drain point	RC3/4"	class150		thread	plug

Technical Requirements

1.The ASME SA516 Gr 70 materials for fabrication of channels shall comply with the provisions stated in ASME SA516 and shall be used in the as-rolled condition.,
2.Forgings shall comply with the provisions stated in ASME SA105 and shall be used in the as-rolled condition;
3.No cracking, bumping or collapse is allowed for fins; the bolt holes of flanges shall be evenly distributed along the centerline of channel;
4.In winter, when a bundle is not used, the standing liquid inside must be removed to prevent finned tubes from cracking due to freezing;
5.For field installation, the lifting shall be operated slowly, avoiding an abrupt rise and fall .
6.Pipe plugs shall be lubricated with molybdenum disulfide before installed; after completion of hydrostatic test, the liquid inside them shall be thoroughly removed and dried with compressed air;
7.After completion of field installation of bundles and before commissioning, the connecting bolts shall be removed from mobile channels according to the requirements stated on the signboard .;
8.The seal surfaces of flanges shall conform to the provisions stated in ASME B16.5-2009.
9.The tolerances not marked in all drawings and those not specifically required by applicable standards and specifications shall comply with class IE of ISO 13920;
10.The lifting eye shall be located equally as per the internal and external dimensions in bracket as stated in drawings and the remaining dimensions of them shall not be altered;
11.Strength calculation according to ASME VIII-1 2013.

REV.	CODE NO.	DENOMINATION	QUT.	MATERIAL	unit weight	TOTAL weight	REMARKS
27		tube plug RC3/4"	2	SA105	2.2	4.4	
26		tube noz RC3/4"	2	SA105	2.2	4.4	L=2"
25	ASME B16.20-2007	spiral wound gasket NPS 8 class 150 RF	4	SS316L-F.G			
24	ASME B18.2.2-2010	nut 3/4" UNC	64	SA194 Gr.7		39.5	
23	ASME B18.2.1-2010	all threaded stud bolt 3/4" UNC,L=110	32	SA193-B7		67	
22	ASME B16.5-2009	flange WN 8"-150 RF	8	SA105	42.1	336.8	
21		rivet Ø2X5	4	AL	0.022	0.088	
20		name plate support	1	Q235-B		0.44	
19	JKL-DGDCL01-10-07	name plate	1	S31608		0.35	
18		inclined strctL75x75x7	8	Q235-B	28.7	229.6	L=6'-2"
17	JKL-TLMH6-10-07	sign plate	2	AL			borrow
16		Gasket d5/8"[16]	20	65Mn		0.07	
15		nut d5/8"[16]	20	SA194 Gr.7		0.022	
14		bolt M5/8"X1.5/8"(16x44)	20	SA193-B7		3.1	
13		bolt M3/4"X2"(20X50)	16	SA193-B7	0.44	7.04	
12	JKL-DGDCL01-10-06	Ring beam	4	unit	43	172	
11	JKL-DGDCL01-10-05	float header	1	unit		1127	
10	JKL-DGDCL01-10-04	wind screen	4	Q235-B	31	124	
9	JKL-DGDCL01-10-03	Regular header	1	unit		1314	
8	SKL.JB.1-02	gasket	552	copper	0.011	6.073	
7	SKL.JB.1-01	hex head plug M30X2	552	SA105	0.3	165.6	L=3/4"
6	JKL-SNL09-10-03	lifting eye	4	Q235-B	11	44	borrow
5		upper beam I-10	5	Q235-B	64	320	L=9'-4 3/4"
4	JKL-DGDCL01-10-02	fining tube	276	unit	50	13800	
3		Batten	35	Q235-B	9.7	339.5	L=9'-4 3/4"
2		support beam 12#	5	Q235-B	90.4	452	L=9'-4 3/4"
1	JKL-DGDCL01-10-01	side beam	2	UNIT	1007.5	2015	

MARK	LOCA	DESIGNATION	SIGNATURE	DATE
[redacted]				

Lean Amine Air Cooler
Items EA-4401/EA-5401
Bundle parts assembly drawing

DRAWING	MARK	SHEET	WEIGHT	SCALE
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TOTAL		SHEET	OF	

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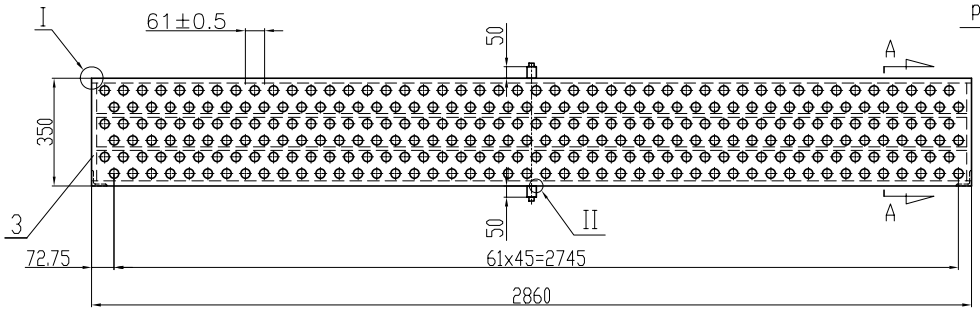

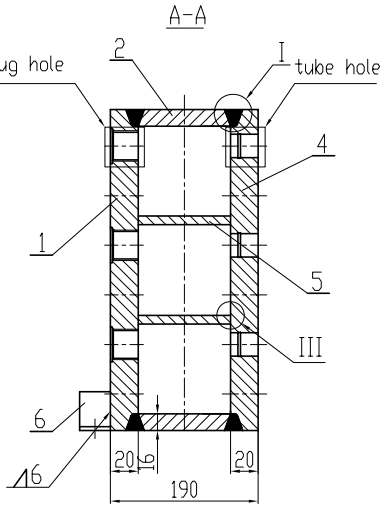

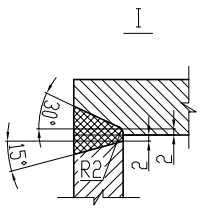

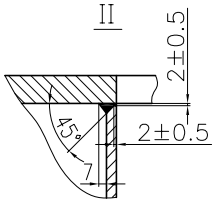

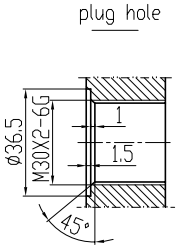

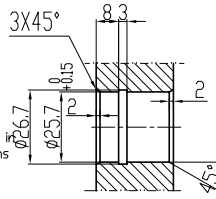

Technical Requirements

1.All materials for fabrication of channels shall be accompanied by material certificates and incorporated into quality certificates;

2.All pressure-bearing welds of channels shall be full penetration and full fusion ones;

3.Stress relieving treatment shall be performed to the welded channels and the heat treatment shall strictly follow relevant procedures.

4.For channels, a 100PT% inspection before welding and 100%UT+100%PT inspections after welding shall be conducted for grooves of all their main pressure-bearing welds respectively; a 100PT% inspection before welding and 100%PT after welding shall be conducted for grooves of welds between nozzles and flanges and those between nozzles and channels respectively; a 100%PT inspection shall be performed to the rest welds after welding; the acceptance for PT inspection shall be in accordance with Appendix 8 of ASME Sec. VIII-1 and that for UT shall be in accordance with Appendix 12 of ASME Sec. VIII-1; the records of all above inspections shall be retained.

5.The verticality between the seal surface of a pipe hole and the centerline of a pipe plug shall not be greater than 0.15mm.

6.After heat treatment, a thorough rust removal shall be done to channels.

REV.	CODE NO.	DENOMINATION	QUT.	MATERIAL	UNIT WEIGHT(kg)	TOTAL WEIGHT(kg)	REMARKS
6	JKL-CCS2.10-03-08	connected plate	2	SA516 Gr70	0.5	1	Borrow
5	JKL-OGDCL01-10-03-05	clapboard	2	SA516 Gr70	39	78	Borrow
4	JKL-OGDCL01-10-03-04	tube sheet	1	SA516 Gr70		157	Borrow
3	JKL-OGDCL01-10-03-03	end plate	2	SA516 Gr70	6	12	Borrow
2	JKL-OGDCL01-10-03-02	top/bottom plate	2	SA516 Gr70	53	106	Borrow
1	JKL-OGDCL01-10-03-01	plug sheet	1	SA516 Gr70		157	Borrow

MARK	ITEM	DESIGNATION	SIGNATURE	DATE
DESIGNED			STANDARDIZE	
CHECKED			EXAMINED	
REVIEWED			APPROVED	
PROCEDURE			DATE	

float header

Material: unit Qty.: 1/set

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TOTAL SHEET SHEET OF

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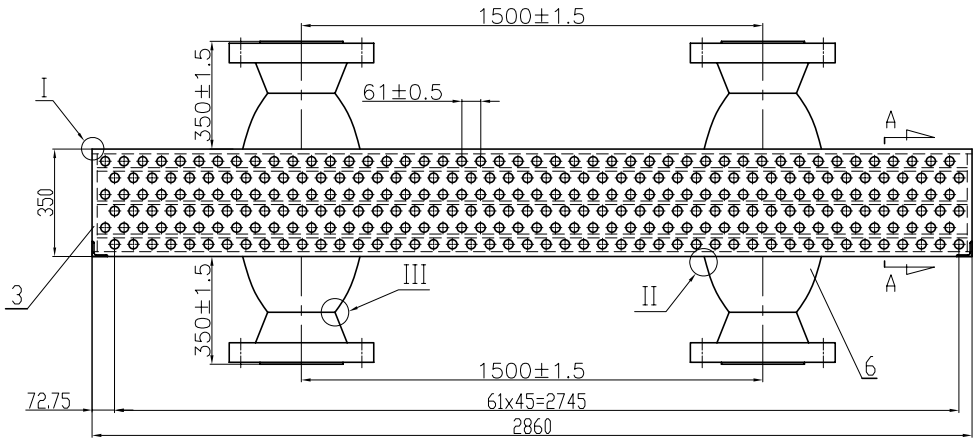

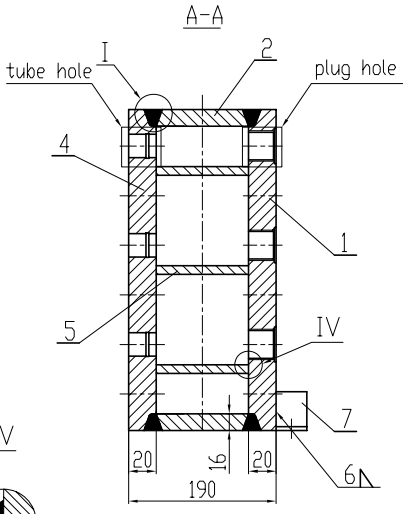

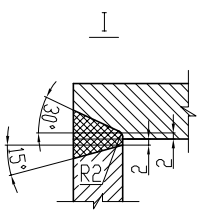

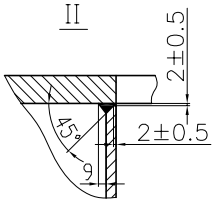

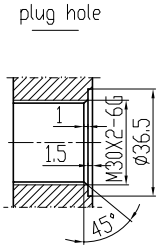

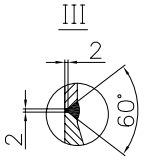

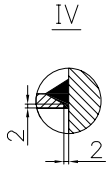

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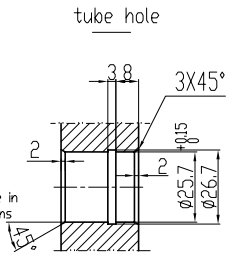

REV.	CODE NO.	DENOMINATION	QUT.	MATERIAL	UNIT WEIGHT(kg)	TOTAL WEIGHT(kg)	REMARKS
7	JKL-CCS2.10-03-08	connected plate	2	SA516 Gr70	0.5	1	Borrow
6	JKL-DGDCL01-10-03-06	nozzle pipe	4	SA106 GrB	11.5	46	
5	JKL-DGDCL01-10-03-05	clapboard	3	SA516 Gr70	39	117	
4	JKL-DGDCL01-10-03-04	tube sheet	1	SA516 Gr70		157	
3	JKL-DGDCL01-10-03-03	end plate	2	SA516 Gr70	6	12	
2	JKL-DGDCL01-10-03-02	top/bottom plate	2	SA516 Gr70	53	106	
1	JKL-DGDCL01-10-03-01	plug sheet	1	SA516 Gr70		157	

MARK	ITEM	DESIGNATION	SIGNATURE	DATE
DESIGNED		STANDARDIZE		
CHECKED		EXAMINED		
REVIEWED		APPROVED		
PROCEDURE		DATE		

Regular header

Material: unit Qty.: 1/set

[redacted]

DRAWING MARK	SHEET	WEIGHT	SCALE
S	A3	596	1:12

TOTAL SHEET SHEET OF

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[redacted]	[redacted]	
	Project No.	[redacted]
	Document No.	**A44-01-PRO-DAS-06**

Datasheet for Lean Amine Air Cooler

EA-4401 / EA-5401

AS-BUILT

Rev.	Date	Description	Prepared by	Checked by	Reviewed by	Approved by
[redacted]0	11-08-2015	AS-BUILT	WJH	ZY	SQ	GJF
0	23-04-2014	Approved	WJH	ZY	SQ	GJF
E	08-04-2014	For Approval	WJH	ZY	SQ	GJF

[redacted] | [redacted] | [redacted] | [redacted]

Doc. Name	Datasheet for Lean Amine Air Cooler	Unit	44/54	Sheet	1 of 1

Document No.: A44-01-PRO-DAS-06

Client: OIL & GAS DEVELOPMENT COMPANY LTD.
Plant: Amine Sweetening Plant
Req. No.:
Bid:
Bid Dwg. No.:

Unit: 44 (Train-1)/54 (Train-2)
No. of Unit: 2
Order No.:
Job No. : 165-4
Model No.:

1	Equipment Tag No.	**EA-4401 / EA-5401**		Manufacturer	Sichuan Jianyang Air Cooler Manufacturing Co., Ltd.		
2	Type forced draft	Bay Width/Length, ft. 19.685x28.796		Sq. ft/Unit (Bare) 15988.9	(Finned) 366756.3		
3	Bays per Unit 4	Bundles per Bay 2		Service 1			
4	**PERFORMANCE OF ONE UNIT**						
5	Operating Conditions	**TUBE SIDE**		**AIR SIDE**			
6	Fluid Circulated	**Hydrocarbon**		Flow, lb/hr 5291006	ALTITUDE., ft 69		
7		**Lean Amine**		Des. Temp., ºF: In 118	Out 140.52		
8	Total Flow lb/hr	**674500 ×1.1**		Ambient Temp, ºF 36~118	Static Press., psi 0.034		
9	Vapor (In/Out) lb/hr	**0**	**0**	Air flow Rate/FAN, ACFM	163176.5		
10	Liquid lb/hr	**674500 ×1.1**	**674500 ×1.1**	**MECHANICAL EQUIPMENT**			
11	Steam lb/hr	**0**	**0**	Fan Manufacturer/Model	Cofimco/3600-4-24L/45UT		
12	Water lb/hr	**0**	**0**	No. per Bay 2	Diameter, ft 11.811		
13	Density (Vapor/Liquid) lb/ft3	**62.57**	**63.77**	No. Blades 4	Material aluminum alloy		
14	Mol. Wt., (Vapor/Liquid)	**29.17**	**29.17**	HP/Fan 32.18	Hub Material forged CS + Galvanized		
15	Thermal Cond. (Vapor/Liquid) Btu/hr-ft-ºF	**0.233**	**0.221**	RPM 300	Auto/Man Pitch 2.02		
16	Latent Heat (Vapor/Liquid) Btu/lb			Pitch Min./Max. W/Air Fail			
17	Viscosity (Vapor/Liquid) cP	**1.335**	**2.5**	Driver Model No. M2JA 225M6A BP /M2JA 225M6A			
18	Specific Heat (Vapor/Liquid) Btu/lb-ºF	**0.88**	**0.85**	Manufacture ABB	Type		
19	Operating Temperature ºF	**174.6**	**130**	HP Each 40.23	RPM 980		
20	Dew Point Temperature ºF			Volts/pH/Hz 400/3/50	Enclosure IP55 EX d IIBT4		
21	Bubble Point Temperature ºF			Variable Speed Yes	2 Speed		
22	Operating Pressure psig	**50**		Fan Noise Level (Allow/Calc) dB(A)@ft **85/82.1db(a)@1m**			
23	Fluid Velocity ft/s	**2.66**		Speed Reducer Type			
24	Pressure Drop Allowable psi	**5**		Manufactur	Model		
25	Pressure Drop Calculated psi	**4.14**		HP Rating	Speed Ratio		
26	Atmospheric Pressure psia	**14.52**		Support Type			
27	Fauling Factor hr-ft2- F/Btu	**0.002**		Service Factor	Frame		
28	Heat Exchanged MMBtu/hr	**26.02 × 1.1**		Insulation F			
29	EMTD ºF	**20.94**					
30	Heat Release Curve				Clean	Dirty	Service
31				Bare Tube	113.36		85.48
32				Finned Tube	4.94	3.79	3.73
33	**CONSTRUCTION**						
34	Tube Design Pressure, psig **75**	Tube Bundle Size (ft) 9.449x28.796		**TUBES (per Bundle)**			
35	Test Pressure, psig 97.5	Tube Rows 6		Material: **Carbon Steel**			
36	Design Temp.,ºF **200**			OD, inch 1	Thk., inch 0.1181		
37	Source Service	Corr./Eros. Due to		No. 276	Length, inch 326.77		
38	Wind Velocity, mph 100 (max.)	Mounted(PR/Grade)		Pitch (in) 2.4016 / 2.1139			
39	Design Code (ASME Sec VIII Div) YES	Prov. Of		Fin Type L-type tension	Thk., inch 0.0157		
40	Code Symbol Req'd. YES, U-Stamped	TEMA Class N/A		Fin OD, inch 2.2441	Material Aluminum 3003		
41	Other Specs.	API 661 YES		Fin Pitch, No./inc 11.02			
42	Seismic Zone 2A of Uniform Building Code- UBC-1997	Top/Btm. Access					
43	**TUBE BUNDLE (per Bay)**			**ACCESSORIES**			
44	Size, ft 9.449x28.796	No. 2		Bug Screens Yes	Hail Screens No		
45	No. Tube Rows 6	Frame		Auto Louvres --	Turbulators No		
46				Manual Louvres Yes	Winterize No		
47	**HEADER**			Temp. Controllers	Galvanizing		
48	Type Plug	Corr. Allowance (in) **3 mm**		Recirculation Type	Handrail Yes		
49	Material **CS + Galvanized**	Plugs		Vibration Switch **Yes**	Fan Guard Yes		
50	Pipe	Nozzles		Steam Coil Self No	Ladders/Walkways Yes		
51	Gaskets	Slope (in/ft)		Draining Top/Btm Yes	Primer Yes		
52	No. Passes 6	Stress Relief/Radiography **Area contact with amine.**		Access Primer Yes	Finish		
53	Stock thickness (in)	Tube Hole		Shipping Area 19.685x28.796 ft^2 (per Bay)			
54	Slope			Total Shipping(lb) 291596.6	Bundle wt. (lb) 18099		

55	**STRUCTURE**	**NOTES**
56	CS + Galvanized or Sand Blast + Coated (as per Tender Spec. 165-4-SPM-058, Rev.2)	1- Vibration switch on motor is to stop motor on high high vibration.
57	**NOZZLE SCHEDULE**	2- Full Radiography and Joint Efficiency of 100 % is required.
58	Mark / Size / Rating / Facing / Service	3- The selection of fans has been optimized by the manufacturer.
59	IN / **8"** / **150#** / **RF** / **Lean Amine**	
60	OUT / **8"** / **150#** / **RF** / **Lean Amine**	