طرح نگهداشت و افزایش تولید ۲۷ مخزن

MECHANICAL DATA SHEETS FOR 2nd STAGE GAS AIR COOLERS

نگهداشت و افزایش تولید میدان نفتی بینک

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status:

IDC: Inter-Discipline Check

IFC: Issued For Comment

IFA: Issued For Approval

AFD: Approved For Design

AFC: Approved For Construction

AFP: Approved For Purchase

AFQ: Approved For Quotation

IFI: Issued For Information

AB-R: As-Built for CLIENT Review

AB-A: As-Built –Approved

NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک MECHANICAL DATA SHEETS FOR 2nd STAGE GAS AIR COOLERS	شرکت توسعه پتروایران HIRGAN ENERGY

شماره پیمان:	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	شماره صفحه: ۲ از ۵
۰۵۳ - ۰۷۳ - ۹۱۸٤	BK	GCS	PEDCO	120	ME	DT	0005	D01	

REVISION RECORD SHEET

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شماره پیمان:	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	شماره صفحه: ۳ از ۵
۰۵۳ - ۰۷۳ – ۹۱۸٤	BK	GCS	PEDCO	120	ME	DT	0005	D01	

General Notes

1. The Asterisk * denotes information and/or confirmation required from VENDOR.
2. VENDOR shall give tube count of each pass if irregular.
3. Inlet/Outlet nozzles' size and number shall be defined by VENDOR at the same side of aircooler (even pass numbers are allowed).
4. I/P converter & pneumatic actuator for fan blades shall be provided by VENDOR as per P&ID.
5. Hydro Test shall be done for Tube-Side by VENDOR. The test procedure shall comply with the code & spec. requirements.
6. 10 % over design on duty / flow rate shall be considered.
7. Half of fans shall be equipped with variable pitch automatic system to control fluid outlet temperature.
8. Electrical motor shall be rated according to project site condition.
9. For LV induction motor the relevant electrical data sheet shall be filled in and submitted by Vendor acc. to IPS-M-EL-131(2) and "Data Sheets For LV Induction Motors" Doc. No.: BK-GCS-PEDCO-120-EL-DT-0008.
10. Ground and bonding facilities shall be provided by Vendor (at least 2 points) on air coolers' structure.
11. Instrument selection, connection & cabling shall be acc. to "Specification For Instrumentation" Doc. No. BK-GNRAL-PEDCO-000-IN-SP-0001
    "Specification For Instrument and Control of Package Unit System (PU)" Doc. No. BK-GNRAL-PEDCO-000-IN-SP-0004
    "Specification For Instrument/F&G Cables" Doc. No. BK-GNRAL-PEDCO-000-IN-SP-0010
    instrumentation design criteria for unit 120
    D01
12. Surface preparation & coating shall be acc. to "Specification for Painting" with Doc. No. BK-GNRAL-PEDCO-000-PI-SP-0006
13. Allowable nozzle load shall be acc. to "Specification For Air Cooled Heat Exchangers" Doc. No. BK-GCS-PEDCO-120-ME-SP-0001
14. Vendor shall be responsible for mechanical, process and thermal performance of the equipment
15. Bundle to be self draining. The last row should 1% sloped.
16. For maximum, minimum and average temperature, also relative humidity refer to "BK-GNRAL-PEDCO-000-PR-DB-0001".
17. Material requirement should be in compliance with NACE MR 0175/ISO 15156 and Technical Specification for Material Requirements in Sour service Doc. No. BK-GNRAL-PEDCO-000-PI-SP-0008
18. Pipe flanges and flanged fittings shall be according to ANSI B16.5, large diameter steel flange shall be according to ANSI B16.47 series A

    Flange Material
    Flange material shall be SA 182 Gr 316L

    Pipe Material
    Pipe material shall be SA 312 Gr 316L
19. Hazardous classification, all instrumentation and electrical devices shall be suitable for; TC:T3, GR:IIB, zone:2
20. Air Cooler shall also be checked for Winter Case. D01
21. The prepared data sheets are for one train.
22. Gasket shall be spiral wound type, graphite filled with inner ring S.S.316 and outer ring S.S 316.
23. All external bolts and nuts shall be hot dip galvanized.
24. Minimum requirement for pre-commissioning, commissioning, start up and two years operation and spare parts shall be in accordance with document E&C-QC-SP-1.
    D01

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٠٥٣ – ٠٧٣ – ٩١٨٤	BK	GCS	PEDCO	120	ME	DT	0005	D01	

Mechanical Data Sheets For 2nd Stage Gas Air Coolers (AE-2102 A/B/C) / sheet 1 of 2

DATA SHEET

	Plant location	Bushehr (Binak)	Heat exchanged, (Normal x Overdesign) kW	493 x 1.1 (Note 6)	D01
	CLIENT	NISOC	Surfacec/item-Finned tube, m2	*	
	Tag No.	AE-2102 A/B/C	Bare tube, m2	*	
	No. Req'd	Total 3 Working 2 Standby 1	MTD, eff., °C	*	
	Service	Sour Service	Transfer rate-finned, W/m2.K	*	
	Type of draught	● Induced ○ Forced	Bare tube, service, W/m2.K	*	
	Bay size (W × L) , m	*	Bare tube, clean, W/m2	*	
	No. of bays/items	*			

D01

Basic Design Data

Code Requirements	API 661 / ASME Code, Sec. VIII, Div. 1	Structural code		
Local Standard	IPS-E-PR-785 / IPS-G-ME-245	Flammable service	● Yes	○ No
Tube bundle code stamped	○ Yes ● No	Lethal/Toxic service	○ Yes	● No
Heating coil code stamped	○ Yes ● No	Sour service	● Yes	○ No
Winterization control	○ Yes ● No	Cyclic service	○ Yes	● No
Chemical cleaning	○ Yes ● No	Mechanical cleaning	○ Yes	● No

Performance Data – Tube Side

			In	Out	
	Fluid name	Hydrocarbon	Line (Pipe) size, in	6	6	
D01	Total fluid entering, kg/s	2.4067	Temperature, °C	149.5	60	D01
	Dew/bubble point, °C	/	Total flow rate (liq./vap.), kg/s	- / 2.3962	- / 0.01039	D01
	○ Pour point ○ Freeze point,°C		Water/Steam, kg/s	-	-	
	Latent heat, KJ/Kg		Noncondensable, kg/s	-	-	
D01	Inlet pressure, Barg	54.8	Molecular Wt.(cond./vap.)	- / 24.52	18.05 / 24.56	
	Pressure drop (allow./calc.), Bar	0.7 / *	Density (liq./vap.),kg/m3	- / 42.92	54.82 / 981.9	
	Velocity (allow./calc.), m/s	/ *	Specific heat (liq./vap.),KJ/kg.mol.C	- / 58.79	57.94 / 77.82	
	Inside foul res., m2.K/W	0.0002	Thermal concuctivity (liq./vap.), W/m.K	- / 0.047	0.652 / 0.037	
			Viscosity (liq./vap.), cP	- / 0.016	0.494 / 0.014	

D01 D01 D01

Performance Data – Air Side

Air inlet temperature, °C	50.26	Face velocity, m/s	*	
Air flow rate/item, (m3/s)	*	Min. ambient air temp.,°C	5	D01
Mass velocity (net free area), kg/s.m2		Altitude, m	12.5	
Air outlet temperature, °C	*	Static pressure, Bar	*	
Air flowrate/fan, m3/s	*	Airside foul res., m2.K/W	0.00035	

D01

Design, Materials & Construction

Design pressure, Barg	62	**Heating Coil**	○ Yes ● No
Test pressure, Barg	Per Code & Spec. Requirements	No. of tubes	O.D., mm
Vaccume pressure	-	Tube material	
Design temperature, °C	175	Fin material and type	
Min. design metal temperature, °C	-28	Thickness, mm	
NACE Requirement	● Yes ○ No	Pressure design code	ASME Code, Sec. VIII, Div. 1
HIC / SSC Test Requirements	○ Yes ● No	Stamp	○ Yes ● No
Tube bundle		Heating fluid	Flowrate, kg/s
Size (W × L), m	*	Temperature (in/out), °C	/
No./bay *	No. of tube rows *	Inlet pressure, Bar	
Bundles in parallel *	In series	Pressure drop (allow./calc.), Bar	/
Structure mounting ● Grade	○ Pipe rack ○ Other	Design temp, °C	
Structural material	SA 36 H.D.G	Design Press., Bar	
Pipe-rack beams (distance C-C)		Inlet/Outlet nozzle, DN	/
Ladders, walkways, platforms	● Yes ○ No	**Header**	
Ladders, walkways, platforms material	SA 36 H.D.G	Type	Plug (*)
Structure surf. Prep./coating		Material	SA 240 Gr 316L
Header surf. Prep./coating		Corr. Allow., mm	-
Tube / Tubesheet Connection	Expanded + Strength welded	No. of passes	(Note 2)
Bundle Frame	H.D.G.	Radiography	Full (100% RT)
Vibration Switches	Yes (Explosion Proof, 24 VDC, IP 65)	Post Weld Heat Treatment	-
Steam Coil	○ Yes ● No		
Recirculation System	○ Yes ● No		
Louver			
Material	SA 283 (H.D.G)		
Action type:	○ Opposed ○ Parallel		
Action control:	○ Auto ● Manual		

D01

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۰۵۳ - ۰۷۳ - ۹۱۸٤	BK	GCS	PEDCO	120	ME	DT	0005	D01	

Mechanical Data Sheets For 2nd Stage Gas Air Coolers (AE-2102 A/B/C) / sheet 1 of 2

DATA SHEET

Header (continued)

Slope, mm/m	*		
Plug material	*		
Gasket material	*		

Nozzle

	No.	Size, (in)	Rating / Facing
Inlet (Note 3)	1	6 *	600# , R.F.
Outlet (Note 3)	1	6 *	600# , R.F.
Vent	1	2	600# , R.F.
Drain	1	2	600# , R.F.

Misc. Conn's TI — PI

Min. wall thickness (mm) — D01

Tube

Material: SA 213 Gr 316L

O. D., (mm): * — Min. wall thickness, (mm): *

No./bundle	*	Length, (m)	*
Pitch, (mm)	*		
Layout	*		

Fin — D01

Type	*
Material	*
Stock thickness, (mm)	*
Selection temperature, °C	*
O.D. (mm)	*
Fin Density (fin / meter)	*

Design Code	ASME Code, Sec. VIII, Div. 1
Customer Specification	
P&ID Number	BK-GCS-PEDCO-120-PR-PI-0011

Mechanical Equipment

Fan

Manufacturer & model	*		
No./Bay		Speed, r/min	
Diameter,m	*	No. of blades	
Angle, Degrees			
Pitch adjustment:	❍ Manual	● Auto	(Note 4 & 7)
Blade material	Aluminum (ASTM B179)	Hub material	
kW/ fan. @ des. temp.		@ min. amb. temp.	
Max. allow. / calc. tip speed, m/s		/	

Driver

Type	Electric Motor		
Manufacturer, model & Installation type	*		
No./bay		Driver kW	*
Speed, r/min		Service factor	

Enclosure			
Volt	400	Phase 3	Cycle 50 HZ
Fan noise level (allow./calc.), dB(a), @ m	75 dB @ 15m		
Fan max. sound pressure level	85 dBA		
Fan Area Classification	Zone 2, IIB, T3		

Speed reducer

Type	*		
Manufacturer & model	*		
No./bay			
Service factor		Speed ratio	
Support:	● Structure	❍ Pedestal	
Vib. Switch:	● Yes (Eexd, IIB,T4)	❍ No	
Enclosure			

Controls - Air Side

Air recirculation:	❍ None	❍ Internal	❍ External	Louvres:	❍ Inlet	❍ Outlet ❍ Bypass
Over:	❍ Slide	❍ End		Positioner:	❍ Yes	❍ No
Degree control of outlet process temp.				Signal air pressure, Barg		
(max. cooling), +/- °C	/			From		To
Action on control signal failure				From		To
Fan pitch:	❍ Minimum	❍ Maximum	❍ Lockup	Supply air pressure, Barg		
Louvres:	❍ Open	❍ Close	❍ Lockup	Max.		Min.
Actuator air supply				Max.		Min.
Fan:	❍ None	❍ Positioner	❍ Bias relay			

Shipping

Plot area (W × L), m	*	Total , kg	*
Bundle mass, kg	*	Shipping, kg	*
Bay, kg	*		

Winter Case

Fluid name	Hydrocarbon		Temperature, °C	149.5	60
Total fluid entering, kg/s	2.107	D01	Total flow rate (liq./vap.), kg/s	- / 2.107	- /2.107
Dew/bubble point, °C	/		Water/Steam, kg/s	-	-
❍ Pour point	❍ Freeze point,°C	D01	Noncondensable, kg/s	-	-
Latent heat, KJ/Kg			Molecular Wt.(cond./vap.)	- / 21.56	- / 21.56
Inlet pressure, Barg	54.8		Density (liq./vap.),kg/m3	- / 36.11	- / 49.41
Pressure drop (allow./calc.), Bar	0.7 / *		Specific heat (liq./vap.),KJ/kg.mol.C	- / 53.12	- / 51.31
Velocity (allow./calc.), m/s	/ *		Thermal concuctivity (liq./vap.), W/m.K	- / 0.05	- / 0.039
Inside foul res., m2.K/W	0.0002		Viscosity (liq./vap.), cP	- / 0.016	- / 0.014