

 <b>NISOC</b>	<b>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</b>						 شرکت توسعه نیروی ایران		
	<b>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</b>								
<b>MECHANICAL DATA SHEETS FOR 2nd STAGE GAS AIR COOLERS</b>									
شماره پیمان:	پروژه	بسته کاری	صادرکننده	تهیهات	رشته	نوع مدرک	سریال	نسخه	شماره صفحه: ۱ از ۵
۰۵۳ - ۰۷۳ - ۹۱۸۴	BK	GCS	PEDCO	120	ME	DT	0005	D04	

## طرح نگهداشت و افزایش تولید ۲۷ مخزن

### MECHANICAL DATA SHEETS FOR 2nd STAGE GAS AIR COOLERS

#### نگهداشت و افزایش تولید میدان نفتی بینک

Rev.	Date	Purpose of Issue / Status	Prepared by:	Checked by:	Approved by:	CLIENT Approval
D04	SEP.2023	AFC	S.Salehi	M.Fakharian	A.M.Mohseni	
D03	JAN.2023	IFA	H.Adineh	M.Fakharian	M.Mehrshad	
D02	OCT.2022	IFA	H.Adineh	M.Fakharian	M.Mehrshad	
D01	JUN. 2022	IFA	H.Adineh	M.Fakharian	M.Mehrshad	
D00	DEC.2021	IFC	H.Adineh	M.Fakharian	M.Mehrshad	

Class: 1      CLIENT Doc. Number: F0Z-708836

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



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



شماره پیمان:



۰۵۳ - ۰۷۳ - ۹۱۸۴

نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادرکننده	بسته کاری	پروژه
D04	0005	DT	ME	120	PEDCO	GCS	BK

شماره صفحه: ۲ از ۵

REVISION RECORD SHEET

Page	D00	D01	D02	D03	D04	Page	D00	D01	D02	D03	D04
1	X	X	X	X	X	65					
2	X	X	X	X	X	66					
3	X	X	X			67					
4	X	X	X	X		68					
5	X	X	X			69					
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 <b>NISOC</b>	<b>نگهداشت و افزایش تولید میدان نفتی بینک</b> <b>سطح الارض</b> <b>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</b>								
	<b>MECHANICAL DATA SHEETS FOR 2nd STAGE GAS AIR COOLERS</b>								
شماره پیمان:	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	شماره صفحه: ۵ از ۳
۰۵۳ - ۰۷۳ - ۹۱۸۴	BK	GCS	PEDCO	120	ME	DT	0005	D04	

### 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 based on ITP. The test procedure shall comply with the code & spec. requirements and it should be confirmed by CLIENT.
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
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, IPS-MPM-200
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 acc. to "Hazard Source List" Doc. No. BK-GCS-PEDCO-120-SA-LI-0001 and "Hazardous Area Classification Layout" Doc. No. BK-GCS-PEDCO-120-SA-PY-0002
20. Air Cooler shall also be checked for Winter Case.
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.
25. It will be finalized after receiving compressor supplier data.
26. vendor is responsible to provide vibration switch (10A@110VAC rating )suitable for 24 VDC Signal.  
The switches shall be EExd, IIB T4 and the weatherproof requirements of IP-65 as per IEC-60529.
  - Switch element shall be of the micro switch snap action type Micro-switches shall be two double pole double throw (DPDT) type
  - Repeatability shall be ±1% or better of full scale
  - The accuracy of the pressure switch assembly shall be at least 1% of the span



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MECHANICAL DATA SHEETS FOR 2nd STAGE GAS AIR COOLERS

شماره پیمان:

۰۵۳ - ۰۷۳ - ۹۱۸۴

پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه
BK	GCS	PEDCO	120	ME	DT	0005	D04

شماره صفحه: ۵ از ۴

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

Rev	DATA SHEET		Rev	
	Plant location	Bushehr (Binak)	Heat exchanged, (Normal x Overdesign) kW	493 x 1.1 (Note 6)
	CLIENT	NISOC	Surface/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 x L) , m	*	Bare tube, clean, W/m2	*
	No. of bays/items	*		
<b>Basic Design Data</b>				
	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
<b>Performance Data – Tube Side</b>				
	Fluid name	Hydrocarbon	Line (Pipe) size, in	In 6 Out 6
	Total fluid entering, kg/h	8664.0	Temperature, °C	142.3 (Note 25) 60
	Dew/bubble point, °C	/	Total flow rate (liq./vap.), kg/h	8664 /- 8626.3 / 37.4
	○ Pour point ○ Freeze point, °C		Water/Steam, kg/s	- -
	Latent heat, KJ/Kg		Noncondensable, kg/s	- -
	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	- / 42.92 981.9 / 59.39
	Velocity (allow./calc.), m/s	/*	Specific heat (liq./vap.), KJ/kg.mol.C	- / 59.25 77.81 / 58.95
	Inside foul res., m2.K/W	0.0002	Thermal conductivity (liq./vap.), W/m.K	- / 0.047 0.652 / 0.037
			Viscosity (liq./vap.), cP	- / 0.016 0.494 / 0.014
<b>Performance Data – Air Side</b>				
	Air inlet temperature, °C	50.26	Face velocity, m/s	*
	Air flow rate/item, (m3/s)	*	Min. ambient air temp., °C	5
	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
<b>Design, Materials &amp; Construction</b>				
	Design pressure, Barg	62	Heating Coil	○ Yes ● No
	Test pressure, Barg	Per Code & Spec. Requirements	No. of tubes	O.D., mm
	Vacume 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
	<b>Tube bundle</b>		Heating fluid	Flowrate, kg/s
	Size (W x L), m	*	Temperature (in/out), °C	/
	No./bay	*	Inlet pressure, Bar	
	No. of tube rows	*	Pressure drop (allow./calc.), Bar	/
	Bundles in parallel	In series	Design temp., °C	
	Structure mounting	● Grade ○ Pipe rack ○ Other	Design Press., Bar	
	Structural material	SA 36 H.D.G	Inlet/Outlet nozzle, DN	/
	Pipe-rack beams (distance C-C)		<b>Header</b>	
	Ladders, walkways, platforms	● Yes ○ No	Type	Plug (*)
	Ladders, walkways, platforms material	SA 36 H.D.G	Material	SA 240 Gr 316L
	Structure surf. Prep./coating		Corr. Allow., mm	-
	Header surf. Prep./coating		No. of passes	(Note 2)
	Tube / Tubesheet Connection	Expanded + Strength welded	Radiography	Full (100% RT)
	Bundle Frame	H.D.G.	Post Weld Heat Treatment	-
	Vibration Switches	Yes (Explosion Proof, 24 VDC, IP 65) (Note 26)		
	Steam Coil	○ Yes ● No		
	Recirculation System	○ Yes ● No		
	<b>Louver</b>			
	Material	SA 283 (H.D.G)		
	Action type:	○ Opposed ○ Parallel		
	Action control:	○ Auto ● Manual		



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MECHANICAL DATA SHEETS FOR 2nd STAGE GAS AIR COOLERS

شماره پیمان:

۰۵۳ - ۰۷۳ - ۹۱۸۴

پروژه	بسته کاری	صادر کننده	تهیهات	رشته	نوع مدرک	سریال	نسخه
BK	GCS	PEDCO	120	ME	DT	0005	D04

شماره صفحه: ۵ از ۵

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

Rev.	DATA SHEET		Rev.
<b>Header (continued)</b>			
Slope, mm/m		*	No./bundle
Plug material		*	Length, (m)
Gasket material		*	Pitch, (mm)
<b>Nozzle</b>			Layout
No.	Size, (in)	Rating / Facing	<b>Fin</b>
Inlet (Note 3)	1	6 *	Type
Outlet (Note 3)	1	6 *	Material
Vent	1	2	Stock thickness, (mm)
Drain	1	2	Selection temperature, °C
Misc. Conn's TI	PI	600#, R.F.	O.D. (mm)
Min. wall thickness (mm)		600#, R.F.	Fin Density (fin / meter)
<b>Tube</b>			Design Code
Material	SA 213 Gr 316L		Customer Specification
O. D., (mm)	*		P&ID Number
Min. wall thickness, (mm)	*		BK-GCS-PEDCO-120-PR-PI-0011
<b>Mechanical Equipment</b>			
<b>Fan</b>		<b>Enclosure</b>	
Manufacturer & model	*	Volt	400
No./Bay		Phase	3
Diameter, m	*	Cycle	50 HZ
Angle, Degrees		Fan noise level (allow./calc.), dB(a), @ m	75 dB @ 15m
Pitch adjustment: <input type="radio"/> Manual <input checked="" type="radio"/> Auto (Note 4 & 7)		Fan max. sound pressure level	85 dBA
Blade material Aluminum (ASTM B179)	Hub material	Fan Area Classification	Zone 2, IIB, T3 (Note 19)
kW/ fan. @ des. temp.	@ min. amb. temp.	<b>Speed reducer</b>	
Max. allow. / calc. tip speed, m/s	/	Type	*
<b>Driver</b>		Manufacturer & model	*
Type Electric Motor		No./bay	
Manufacturer, model & Installation type	*	Service factor	
No./bay	Driver kW	Speed ratio	
Speed, r/min	Service factor	Support: <input checked="" type="radio"/> Structure <input type="radio"/> Pedestal	
		Vib. Switch: <input checked="" type="radio"/> Yes (Eexd,IIB,T4) <input type="radio"/> No	
		Enclosure	
<b>Controls - Air Side</b>			
Air recirculation: <input type="radio"/> None <input type="radio"/> Internal <input type="radio"/> External		Louvres: <input type="radio"/> Inlet <input type="radio"/> Outlet <input type="radio"/> Bypass	
Over: <input type="radio"/> Slide <input type="radio"/> End		Positioner: <input type="radio"/> Yes <input type="radio"/> No	
Degree control of outlet process temp. (max. cooling), +/- °C	/	Signal air pressure, Barg	
Action on control signal failure		From	To
Fan pitch: <input type="radio"/> Minimum <input type="radio"/> Maximum <input type="radio"/> Lockup		From	To
Louvres: <input type="radio"/> Open <input type="radio"/> Close <input type="radio"/> Lockup		Supply air pressure, Barg	
Actuator air supply		Max.	Min.
Fan: <input type="radio"/> None <input type="radio"/> Positioner <input type="radio"/> Bias relay		Max.	Min.
<b>Shipping</b>			
Plot area (W x L), m	*	Total, kg	*
Bundle mass, kg	*	Shipping, kg	*
Bay, kg	*		
<b>Winter Case</b>			
Fluid name	Hydrocarbon	Temperature, °C	149.5 (Note25) 60
Total fluid entering, kg/h	7585	Total flow rate (liq./vap.), kg/h	- / 7585 - / 7585
Dew/bubble point, °C	/	Water/Steam, kg/s	- -
<input type="radio"/> Pour point <input type="radio"/> Freeze point, °C		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 conductivity (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