
	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																	
شماره پیمان: 053 – 073 – 9184	<p>Specification For Air Cooled Heat Exchangers</p> <table><tr><td>پروژه</td><td>بسته کاری</td><td>صادر کننده</td><td>تسهیلات</td><td>رشته</td><td>نوع مدرک</td><td>سریال</td><td>نسخه</td></tr><tr><td>BK</td><td>GCS</td><td>PEDCO</td><td>120</td><td>ME</td><td>SP</td><td>0001</td><td>D02</td></tr></table>	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	BK	GCS	PEDCO	120	ME	SP	0001	D02	شماره صفحه : 1 از 14
پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه											
BK	GCS	PEDCO	120	ME	SP	0001	D02											

طرح نگهداشت و افزایش تولید 27 مخزن

Specification For Air Cooled Heat Exchangers

نگهداشت و افزایش تولید میدان نفتی بینک



D02	JAN.2023	AFD	H.Adineh	M.Fakharian	M.Mehrshad	
D01	OCT.2022	AFD	H.Adineh	M.Fakharian	M.Mehrshad	
D00	AUG. 2021	IFC	M.Asgharnejad	M.Fakharian	Sh.Ghalikar	
Rev.	Date	Purpose of Issue/Status	Prepared by:	Checked by:	Approved by:	CLIENT Approval

Class: 2

CLIENT Doc. Number: F0Z-708818

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

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																	
شماره پیمان: 053 - 073 - 9184	<p>Specification For Air Cooled Heat Exchangers</p> <table><tr><td>نسخه</td><td>سریال</td><td>نوع مدرک</td><td>رشته</td><td>تسهیلات</td><td>صادر کننده</td><td>بسته کاری</td><td>پروژه</td></tr><tr><td>D02</td><td>0001</td><td>SP</td><td>ME</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table>	نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه	D02	0001	SP	ME	120	PEDCO	GCS	BK	شماره صفحه : 2 از 14
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه											
D02	0001	SP	ME	120	PEDCO	GCS	BK											

REVISION RECORD SHEET



PAGE	D00	D01	D02	D03	D04
1	X	X	X		
2	X	X	X		
3	X		X		
4	X		X		
5	X		X		
6	X		X		
7	X		X		
8	X		X		
9	X		X		
10	X		X		
11	X		X		
12	X		X		
13	X		X		
14	X		X		
15	X				
16	X				
17	X				
18	X				
19	X				
20	X				
21	X				
22	X				
23	X				
24	X				
25	X				
26	X				
27	X				
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61					
62					
63					
64					
65					

PAGE	D00	D01	D02	D03	D04
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					
81					
82					
83					
84					
85					
86					
87					
88					
89					
90					
91					
92					
93					
94					
95					
96					
97					
98					
99					
100					
101					
102					
103					
104					
105					
106					
107					
108					
109					
110					
111					
112					
113					
114					
115					
116					
117					
118					
119					
120					
121					
122					
123					
124					
125					
126					
127					
128					
129					
130					

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																									
شماره پیمان: 053 – 073 – 9184	<table><tr><th colspan="8">Specification For Air Cooled Heat Exchangers</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادر کننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D02</td><td>0001</td><td>SP</td><td>ME</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table>	Specification For Air Cooled Heat Exchangers								نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه	D02	0001	SP	ME	120	PEDCO	GCS	BK	شماره صفحه : 3 از 14
Specification For Air Cooled Heat Exchangers																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D02	0001	SP	ME	120	PEDCO	GCS	BK																			

CONTENTS

1.0	INTRODUCTION	4
2.0	SCOPE	4
3.0	NORMATIVE REFERENCES.....	5
4.0	GENERAL (IPS CLAUSE 4)	8
5.0	DOCUMENTATION (IPS CLAUSE 6).....	9
6.0	DESIGN	10
7.0	FABRICATION OF TUBE BUNDLE (IPS CLAUSE 9)	11
9.0	INSPECTION, EXAMINATION AND TESTING (IPS CLAUSE 10).....	12
10.0	PREPARATION FOR SHIPMENT (IPS CLAUSE 11)	13
11.0	SUPPLEMENTAL REQUIREMENTS (API 661 CLAUSE 12).....	13
12.0	GUARANTEE (ADDITION.)	13
13.0	CONTROLS AND INSTRUMENTATION (ADDITION.).....	14

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>								
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 4 از 14	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	ME	SP	0001	D02	

1.0 INTRODUCTION

Binak oilfield in Bushehr province, a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.

With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.


GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – General Facilities
GENERAL CONTRACTOR (GC):	Petro Iran Development Company (PEDCO)
EPC CONTRACTOR:	Joint Venture of : Hirgan Energy – Design & Inspection(D&I) Companies
VENDOR:	The firm or person who will fabricate the equipment or material.
EXECUTOR:	Executor is the party which carries out all or part of construction and/or commissioning for the project.
THIRD PARTY INSPECTOR (TPI):	The firm appointed by EPC CONTRACTOR and approved by GC & CLIENT (in writing) for the inspection of goods.
SHALL:	Is used where a provision is mandatory.
SHOULD:	Is used where a provision is advisory only.
WILL:	Is normally used in connection with the action by CLIENT rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR.
MAY:	Is used where a provision is completely discretionary.

2.0 SCOPE

This specification outlines the minimum technical requirements for design, material supply, fabrication and test of Air Cooled Heat Exchangers and it is intended to amend and supplement of the IPS-G-ME-245, "ENGINEERING AND MATERIAL STANDARD FOR AIR COOLED HEAT EXCHANGER" First Edition, and November 2012. However, Generally Air Cooled

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>								
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 5 از 14	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	ME	SP	0001	D02	

Heat Exchangers should meet requirements of ASME code “Unfired Pressure Vessel, Sec. VIII, Div.1”

The following paragraphs specifying the modifications follow the IPS-G-ME-245 numbers and each paragraph denotes an addition, modification, substitution or deletion:

- (Substitution):

The IPS standard clause is deleted and replaced by the new clause.

- (Deletion):

The IPS standard clause is deleted without any replacement.

- (Addition):

A new clause with a new number is added.


- (Modification):

Part of the IPS Standard clause is modified, and/or a new description and/or condition is added to that clause.

3.0 NORMATIVE REFERENCES

3.1 LOCAL CODES AND STANDARDS


- | | |
|--------------------|--|
| • IPS-G-ME-245 | Engineering & Material Standard for Air Cooled Heat Exchangers |
| • IPS-E-GN-100 | Engineering Standard for Units |
| • IPS-G-ME-220 | General Standard for Shell and Tube Heat Exchangers |
| • IPS-M-PM-320 | Materials and Equipment Standard for Lubrication Shaft Sealing and Control Oil Systems for Special Purpose |
| • IPS-E-EL-100 | Engineering Standard for Electrical System Design |
| • IPS-M-EL-131 (2) | Materials and Equipment Standard for Low Voltage Induction Motors |
| • IPS-M-EL-161 (2) | Material & Equipment Standard for Electrical Items |
| • IPS-G-SF-900 | General Standard for Noise and Vibration Control |
| • IPS-E-TP-100 | Engineering Standard for Paints |
| • IPS-M-PI-150 | Material and Equipment Standard for Flanges & Fittings |
| • IPS-E-CE-120 | Engineering Standard Foundations |

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																									
شماره پیمان: 053 – 073 – 9184	<table><tr><th colspan="8">Specification For Air Cooled Heat Exchangers</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادر کننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D02</td><td>0001</td><td>SP</td><td>ME</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table>	Specification For Air Cooled Heat Exchangers								نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه	D02	0001	SP	ME	120	PEDCO	GCS	BK	شماره صفحه : 6 از 14
Specification For Air Cooled Heat Exchangers																										
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه																			
D02	0001	SP	ME	120	PEDCO	GCS	BK																			

- IPS-E-CE-500 Engineering Standard for Loads
- IPS-G-GN-210 General Standard for Packing and Packages
- IPS Standard drawings
- NIOC Standard Drawings
- NIOEC Standard Drawings

3.2 INTERNATIONAL CODES AND STANDARDS



- API American Petroleum Institute
 - 673 Centrifugal Fans for Petroleum, Chemical and Gas Industry Services
 - 613 Special Purpose Gear Units for Petroleum, Chemical and Gas Industry Services
 - 671 Special Purpose Couplings for Petroleum, Chemical and Gas Industry Services
 - 614 Lubrication, Shaft-Sealing, and Control- Oil System and Auxiliaries
- ASME American Society of Mechanical Engineers
 - A14.3 Ladders – Fixed – Safety Requirements
 - A1264.1 Safety Requirements for Workplace Walking/Working Surfaces and their Access; Workplace Floor, Wall and Roof Openings; Stairs and Guardrails systems
 - B16.1 Gray Iron Pipe Flanges and Flanged Fitting Classes 25,125 and 250
 - B16.11 Forged Steel Fittings, Socket Welding and Threaded
 - B16.9 Steel Butt Welding Fittings
 - B16.21 Non- Metallic Gaskets For Pipe Flanges
 - B16.25 Butt Welding Ends
 - B16.5 Standard for Pipe Flanges and Fittings
 - B31.3 Process Piping
 - Section II Materials
 - Section V Non-destructive Examination
 - Section VIII, Div. 1 Rules for Construction of Pressure Vessels
 - Section IX Welding and Brazing Qualifications
- TEMA Tubular Exchanger Manufacturers Association
- AGMA American Gear Manufacturer Association
 - 6011 Specification for High Speed Helical Gear Units
- BSI British Standard Institution

 NISOC	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																	
شماره پیمان: 053 – 073 – 9184	<p>Specification For Air Cooled Heat Exchangers</p> <table><tr><td>پروژه</td><td>بسته کاری</td><td>صادر کننده</td><td>تسهیلات</td><td>رشته</td><td>نوع مدرک</td><td>سریال</td><td>نسخه</td></tr><tr><td>BK</td><td>GCS</td><td>PEDCO</td><td>120</td><td>ME</td><td>SP</td><td>0001</td><td>D02</td></tr></table>	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه	BK	GCS	PEDCO	120	ME	SP	0001	D02	شماره صفحه : 7 از 14
پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه											
BK	GCS	PEDCO	120	ME	SP	0001	D02											

- EN 14399-1 High-Strength Structural Bolting Assemblies for Preloading - Part 1: General Requirements
- EN 1993 -1-8 Euro code 3: Design of Steel Structures – Part 1-8: Design of Joints
- PD-5500 Unfired Fusion Welded Pressure Vessels
- ASCE 7-10 American Society of Civil Engineers 7-10
- Welding Research Council (WRC)
 - 107 Local Stresses in Spherical & Cylindrical Shells Due to External Loading
 - 297 Local Stresses in Cylindrical Shells Due to External Loading on Nozzles – Supplement to WRC Bulletin No. 107
- AWS American Welding Society
 - D1.1 Structural Steel Welding Code
- ASTM American Society for Testing and Materials
 - Applicable Material Standards.
- AISC American Institute of Steel Construction
 - Applicable Standards.
- EEMUA 143 Engineering Equipment And Materials Users Association
 - Publication No. 135 Heat Exchanger Tubes
- ISO 13706 International Organization for Standardization
 - Air Cooled Heat Exchangers

3.3 THE PROJECT DOCUMENTS

- BK-GNRAL-PEDCO-000-PR-DB-0001 Process Basis of Design
- BK-GNRAL-PEDCO-000-PR-DC-0001 Process Design Criteria
- BK-GNRAL-PEDCO-000-ME-DC-0001 Mechanical Design Criteria
- BK-GNRAL-PEDCO-000-ST-DC-0001 Structural Design Criteria
- BK-GNRAL-PEDCO-000-EL-SP-0010 Specification For LV Electro Motors
- BK-GNRAL-PEDCO-000-PI-SP-0005 Specification For Fittings, Flanges, Gaskets and Bolts
- BK-GNRAL-PEDCO-000-PI-SP-0006 Specification For Painting
- BK-GNRAL-PEDCO-000-PI-SP-0008 Specification For Material Requirements in Sour Service

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>								
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 8 از 14	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	ME	SP	0001	D02	

- BK-GNRAL-PEDCO-000-PI-SP-0011 Specification For Welding of Plant Piping System
- BK-GCS-PEDCO-120-PI-RT-0001 Corrosion Study & Material Selection Report
- BK-GNRAL-PEDCO-000-IN-SP-0001 Specification For Instrumentation
- BK-GNRAL-PEDCO-000-IN-SP-0004 Specification For Instrument and Control of Package Unit System (PU)
- BK-GNRAL-PEDCO-000-EL-DC-0001 Electrical System Design Criteria
- BK-GNRAL-PEDCO-000-EL-SP-0011 Specification For Electrical Requirements of Packaged Units
- BK-GNRAL-PEDCO-000-SA-SP-0001 Specification For Fire Fighting Equipment
- BK-GNRAL-PEDCO-000-SA-SP-0002 Specification For Hazardous Area Classification
- BK-GCS-PEDCO-120-PR-PI-0011 P&ID- 2nd Stage Gas Compression Air Coolers
- BK-GCS-PEDCO-120-PR-PI-0008 P&ID- 1st Stage Gas Compression Air Coolers

3.4 ENVIRONMENTAL DATA

Refer to "Process Basis of Design; Doc. No. BK-GNRAL-PEDCO-000-PR-DB-0001".

3.5 ORDER OF PRECEDENCE

In case of any conflict between the contents of this document or any discrepancy between this document and other project documents or reference standards, this issue must be reported to the CLIENT. The final decision in this situation will be made by CLIENT



4.0 GENERAL (IPS CLAUSE 4)

4.1 MODIFICATION TO ARTICLE 4.5

This standard is based on International System of Units (SI) as per **IPS-E-GN-100**, unless otherwise specified. In this international standard, where practical, US customary units are included in the brackets for information.

4.2 ADDITION TO ARTICLE 4

(4.8) If the service is designated as severe sour in accordance with BK-GNRAL-PEDCO-000-PI-SP-0008 for oil and gas production facilities (e.g. petroleum refineries, LNG plants and chemical plants), in which case all materials in contact with the process fluid shall meet the requirements of the project applicable reference document BK-GNRAL-PEDCO-000-PI-SP-0008 to mitigate the

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>								
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 9 از 14	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	ME	SP	0001	D02	

potential for sulfide stress cracking (SSC). Identification of the complete set of materials, qualification, fabrication, and testing specifications to prevent in-service environmental cracking is the responsibility of the user (CLIENT).

5.0 DOCUMENTATION (IPS CLAUSE 6)

5.1 ADDITION TO ARTICLE 6.1.1

(S.) The VENDOR shall provide the detailed drawings and information required by clause 6.1.2 and 6.1.4 of API standard 661, as amended by this specification when submitting outline drawings for approval.

(T.) Tube-to-tubesheet joint and details of joint preparation.

(U.) Maximum and minimum plug torque values with recommended thread lubrication.

(V.) When sour or wet sulfide service is specified by the CLIENT, a certified material test report (CMTR) shall be supplied for all carbon steel materials in contact with the process fluid.

5.2 ADDITION TO ARTICLE 6.1.3



Calculations required by the pressure design code shall be provided for the design of pressure components, including header boxes, tubes, and tube joints. Sufficient detail shall be supplied for any non-standard pressure boundary components, such as swage type transition nozzles. Calculations shall also be provided for restraint relief in accordance with 7.1.6.1.3, and also for the defined external moments and forces on nozzles in accordance with 7.1.10.

5.3 MODIFICATION TO ARTICLE 6.1.4

Weld maps, all proposed welding procedures, including tube to tubesheet welding procedures and qualifications (including impact test results, if applicable) shall be submitted for approval prior to fabrication.

5.4 ADDITION TO ARTICLE 6.1.6

- d) Fabrication drawing, showing weld details with referenced procedures; All proposed Welding Procedure Specifications (WPS), Procedural Qualification Record (PQR) and repair procedures, shall be submitted for review and approval prior to the commencement of fabrication.
- e) Calculations for structural design shall be submitted for review and approval.
- f) List of spare parts, including startup and the first year of operation, including detailed prices and delivery times and full specification of the part or the supplier's part number (e.g. in reference drawings)
- g) List of tools necessary for operation, maintenance, inspection and cleaning air-cooled heat exchanger.
- h) Operation and maintenance manuals.

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>								
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 10 از 14	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	ME	SP	0001	D02	

5.5 ADDITION TO ARTICLE 6.2.1.1

c) for operation, maintenance, inspection and cleaning insofar as not normally found in a refinery

6.0 DESIGN

6.1 TUBE BUNDLE DESIGN

6.1.1 TUBE BUNDLE DESIGN TEMPERATURE

SUBSTITUTION OF ARTICLE 7.1.3.1

7.1.3.1 Design temperature shall be in accordance with "Process Design Criteria; Doc. No. BK-GNRL-PEDCO-000-PR-DC-0001"

6.1.2 TUBE BUNDLE DESIGN PRESSURE

SUBSTITUTION OF ARTICLE 7.1.4

7.1.4 Design pressure shall be in accordance with "Process Design Criteria; Doc. No. BK-GNRL-PEDCO-000-PR-DC-0001".

6.1.3 NOZZLES AND OTHER CONNECTIONS

SUBSTITUTION OF ARTICLE 7.1.9

7.1.9.6 Flanges shall be in accordance with ASME B.16.5 unless specified by CLIENT. The use of DN 65, DN 90 and DN 125 is not permitted.

7.1.10 MAXIMUM ALLOWABLE MOMENTS AND FORCES FOR NOZZLES AND HEADERS

ADDITION TO ARTICLE 7.1.10

7.1.10.1 The components of a nozzle loading on a single header, shall not exceed three times the loads shown in Figure 6 and Table 4 in API Std. 661, 7th Edition (2018).


6.2 AIR SIDE DESIGN

6.2.1 FANS AND FAN HUBS

MODIFICATION OF ARTICLE 7.2.3

7.2.3.11 Fans equipped for pneumatically actuated, automatically controlled pitch adjustment of blades shall comply with the followings:

- Each actuator shall have an integral positioner mechanism and mechanical maximum and minimum stops. These stops shall be adjustable over the full range without dismantling the

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>							
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 11 از 14
	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال	
	BK	GCS	PEDCO	120	ME	SP	0001	
							D02	

mechanism. The positioner shall be EEx(ia) with degree of protection minimum IP65. The positioner shall be designed to operate by 4-20 mA, HART control signal coming from main control system. Each change in the control signal shall result in a corresponding change in the fan blade pitch. The operating range of the positioner shall be adjusted so that the maximum pitch obtained is equal to the selected design blade angle setting. Maximum and minimum blade pitch limit stops shall be set by the fan manufacturer. Unless otherwise specified by the CLIENT, the minimum blade pitch limit will result in essentially zero air flow with hot bundles. Exposed actuator shafts shall be protected with canvas gaiters. The stroking time, from minimum to maximum pitch or reverse, shall be 10 seconds maximum with the fan rotating. Hysteresis shall not exceed 1% of full stroke.

7.2.6.12 materials of fan blades and fan guards shall be a non-sparking combination.

6.2.2 DRIVERS

6.2.7.1 GENERAL

MODIFICATION OF ARTICLE 7.2.7.1.1

7.2.7.1.1 The type of driver will be specified by the CLIENT.

ADDITION TO ARTICLE 7.2.7.1

7.2.7.1.3 All fans shall be electric-motor driven.

6.2.7.2 ELECTRIC MOTOR DRIVERS

SUBSTITUTION OF ARTICLE 7.2.7.2.1

7.2.7.2.1 The specification of the electric motors shall be in general as per “**IPS-M-EL-131**” and “Specification for LV Electro Motors”; Doc. No.: BK-GNRL-PEDCO-000-EL-SP-0010. Insulation class shall be class F with temperature rise of class B.

6.2.3 SCREENS



MODIFICATION OF ARTICLE 7.2.11.1

7.2.11.1 Removable bug screens shall be provided.

7.0 FABRICATION OF TUBE BUNDLE (IPS CLAUSE 9)

8.1 ADDITION TO ARTICLE 9.1.1

(9.1.1.5) Weld procedure qualifications for carbon steel in sour or severe sure service, including tube to tubesheet welds, shall include a micro-hardness survey performed on a weld cross-section and transverse to the weld centerline. The micro-hardness testing and acceptance criteria

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>								
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 12 از 14	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	ME	SP	0001	D02	

shall be in accordance with NACE MR 0103, as applicable. Any additional restrictions on class, grade, residual elements or micro-alloying elements for the qualification test material to be specified by the Purchaser.

8.2 MODIFICATION TO ARTICLE 9.3.4.1

Generally the junction of tube to tubesheet shall be always of the expanded type, except for the following cases, for which special reasons lead to the choice of strength welding type:

When tube thickness is greater than 4.2 mm (8 BWG) with outside diameter 25.4mm.

When the design pressure is greater than 70 barg.

When a discontinuous operation is anticipated. (highly cyclic)

When more than 5000 cycles, during 10 years, are foreseen.

When the heat exchanger is in special service such as lethal service, steam, toxic ...

When the design temperature is higher than:

480 °C with stainless steels, other than low-carbon or stabilized

300 °C with carbon steels

400 °C Cr-Mo/Mo steels

380 °C with 304L stainless steel

400 °C with 316L stainless steel

8.3 DELETION OF ARTICLE 9.3.4.6



8.4 MODIFICATION TO ARTICLE 9.5.1

Plug threads shall be coated with a suitable water resistance and thermal stability thread lubricant when is assembled in header box.

9.0 INSPECTION, EXAMINATION AND TESTING (IPS CLAUSE 10)

9.1 MODIFICATION TO ARTICLE 10.1.12

All carbon steel plate in sour or wet hydrogen sulfide service shall be subjected to an ultrasonic lamination check (e.g. to EN 10160 grade S2E2 or ASTM A578, acceptance level A supplementary requirement S1).

 NISOC	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>								
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 13 از 14	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	ME	SP	0001	D02	

9.2 MODIFICATION TO ARTICLE 10.3

Shop run-in tests of the steel structure, driver, the drive assembly, and the fan of shop-assembled for one bay of each item shall be in the vendor's scope of work.

10.0 PREPARATION FOR SHIPMENT (IPS CLAUSE 11)

10.1 SUBSTITUTION OF ARTICLE 11.2.4

All surfaces requiring painting shall be painted in accordance with "Painting Specification" Doc. No. BK-GNRL-PEDCO-000-PI-SP-0006.

11.0 SUPPLEMENTAL REQUIREMENTS (API 661 CLAUSE 12)

11.1 MODIFICATION TO ARTICLE 12.1

In general, these supplemental requirements should be considered if the design pressure exceeds 14 000 kPa gauge (2 000 psig), if the plate thickness of a box-type header of an air-cooled heat exchanger exceeds 50 mm (2 in) or if an exchanger is to be placed in a critical service.

11.2 ADDITION TO ARTICLE 12.2

(12.2.3) Nozzle connections to headers shall be made with full-penetration welds.

12.0 GUARANTEE (ADDITION.)

12.1 GENERAL

12.1.1 The VENDOR shall guarantee the exchanger against improper design and defective workmanship and materials but not against corrosion or erosion.


12.1.2 The manufacturer shall guarantee that the air-cooled heat exchanger shall meet the required design conditions of the specific application.

12.1.3 The VENDOR shall guarantee the noise level will not exceed that specified.

12.1.4 The VENDOR shall guarantee that the materials of construction comply with the material specification established by the purchase order.

12.1.5 The VENDOR shall repair or replace free of charge F.O.B at his shop, any defective parts or workmanship found within the guarantee period. Other charges, if any, shall be subject to negotiation with the purchaser.

12.1.6 The air-cooled heat exchanger supplied shall be free of defects in materials and workmanship. The guarantee period shall be eighteen (18) months from the date of delivery or

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>								
شماره پیمان: 053 – 073 – 9184	Specification For Air Cooled Heat Exchangers							شماره صفحه : 14 از 14	
	پروژه	بسته کاری	صادر کننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	GCS	PEDCO	120	ME	SP	0001	D02	

twelve (12) months from the date of mechanical completion & start-up (if applicable), whichever occurs later.

12.1.7 The VENDOR shall guarantee interchangeability of equal mechanical parts

12.1.8 Commissioning & start-up and two-year normal operation spare parts shall be considered per attachment 11 of the project EPC tender dossier, as a minimum requirement.

13.0 CONTROLS AND INSTRUMENTATION (ADDITION.)

13.1 GENERAL

13.1.1 Design, supply and installation of instrumentations, shall follow the requirements of "Specification for Instrumentation"; Doc. No. BK-GNRAL-PEDCO-000-IN-SP-0001, "Specification for Instrument & Control of Packaged Unit System (PU)"; Doc. No. BK-GNRAL-PEDCO-000-IN-SP-0004 and "Specification for Hazardous Area Classification"; Doc. No. BK-GNRAL-PEDCO-000-SA-SP-0002.

13.1.2 Regarding the type of protection of the control panel (Hazardous Area or Non-Hazardous Area), it is necessary to install the appropriate local control panel according to the installation location (with the approval of the Client).

13.1.3 All instruments shall be tagged with identifying tag numbers which are assigned by Purchaser at time of drawing approval.

13.1.4 An electrical local control panel(s), Suitable for Non-hazard area, shall be provided with the facility to start and stop the package locally. For more detail refer to "Specification for Electrical Requirements of Packaged Units"; Doc. No. BK-GNRAL-PEDCO-000-IN-SP-0011.

13.1.5 VENDOR shall supply all field instruments cable to skid edge JB's. Some signals may be connected to PCS (Process Control System) and ESD (Emergency Shutdown) as per related P&ID.

13.1.6 The VENDOR shall provide wiring/connection details and narratives of any specific regulatory control or safeguarding requirements. This information shall be used by the local control panel (LCP) of the package for pump/motor control.