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## طرح نگهداشت و افزایش تولید ۲۷ مخزن

### SPECIFICATION FOR FLARE PACKAGE

## نگهداشت و افزایش تولید میدان نفتی بینک

D04	OCT. 2023	AFD	H. Ghadyani	M.Fakharian	S.Faramarzpour	
D03	MAR. 2022	AFD	H. Adineh	M.Fakharian	M. Mehrshad	
D02	JAN. 2022	IFA	H. Adineh	M.Fakharian	M. Mehrshad	
D01	OCT. 2021	IFA	E.Sadeghi	M.Fakharian	Sh.Ghalikar	
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-708830

**Status:**

IDC: Inter-Discipline Check

AB-R: As-Built for CLIENT Review

AB-A: As-Built –Approved


IFC: Issued For Comment

IFA: Issued For Approval

AFD: Approved For Design

AFC: Approved For Construction


AFP: Approved For Purchase

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوري بینک</p>																									
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## 1.0 INTRODUCTION

Binak oilfield in Bushehr province is 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.

As a part of the Project, a New Gas Compressor Station (adjacent to existing Binak GCS) shall be constructed to gather of 15 MMSCFD (approx.) associated gases and compress & transfer them to Siahmakan GIS.

### GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – Surface Facilities; New Gas Compressor Station
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:	Executer 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 EPD/EPC CONTRACTOR(GC) and approved by CLIENT (in writing) for the inspection

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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 together with relevant data sheets and attachments covers design, materials, fabrication, inspection, testing, preparation for shipment of Elevated type Flare Package.

This general specification will supplement, amend or limit the "American Petroleum Institute Standard 537, March 2017, 3<sup>rd</sup> Edition".

Compliance with the provision of this specification shall not relive the vendor from the responsibility of supplying Flare and accessories suitable for the specified operating conditions.

## 3.0 NORMATIVE REFERENCES

The latest edition of following codes & standards are applicable in this project (unless otherwise mentioned):

### 3.1 LOCAL CODES AND STANDARDS

IPS-G-ME-210	General Standard for Flare Details for General Refinery and Petrochemical Service
IPS-E-EL-100	Engineering Standard for Electrical System Design
IPS-M-EL-131	Material & Equipment Standard for LV Induction Motor
IPS-M-EL-132	Material & Equipment Standard for Medium & High Voltage Induction Motor.


	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																									
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### 3.2 INTERNATIONAL CODES AND STANDARDS


- |   |   |
|---|---|
| • API STD 537(3rd edition, 2017)                    | Flare Details for General Refinery and Petrochemical Service                    |
| • ASME Sec. VIII (2017)                             | Rules for Construction of Pressure Vessels                                      |
| • ANSI/ASME B31.3(2016)                             | Process Piping: ASME Code for Pressure Piping                                   |
| • AWS D1.1/D1.1M(2010)                              | Structural Welding Code-Steel   |
| • BS 2742(2009)                                     | Use of the Ringelmann and Miniature Smoke Charts                                |
| • API STD 521(6th edition,2014)                     | Pressure-Relieving and Depressuring Systems                                     |
| • API STD 520(Part I, 9th edition, 2014)            | Sizing, Selection, and Installation of Pressure-relieving Devices in Refineries |
| • ICAO – Annex 14                                   | Aerodrome Design and Operation  |
| • ASTM (American Society for Testing and Materials) | All related parts   |

### 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-EL-DC-0001 | Electrical System Design Criteria.              |
| ➤ BK-GNRAL-PEDCO-000-ME-DC-0001     | Mechanical Design Criteria                      |
| ➤ BK-GNRAL-PEDCO-000-SA-SP-0002     | Specification For Hazardous Area Classification |

 NISOC	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																									
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| ➤ BK-GNRAL-PEDCO-000-ST-DC-0001     | Structural Design Criteria  |
| ➤ BK-GNRAL-PEDCO-000-PI-DC-0001     | Piping Design Criteria  |
| ➤ BK-GNRAL-PEDCO-000-PI-SP-0005     | Specification for Fittings, Flanges , Gaskets and Bolts                                     |
| ➤ BK-GNRAL-PEDCO-000-PL-SP-0002     | Specification for Metallic Pipes  |
| ➤ BK-GNRAL-PEDCO-000-PI-SP-0011     | Specification for Welding of  |
| ➤ BK-GNRAL-PEDCO-000-IN-SP-0004     | Plant Piping System<br>Specification For Instrument and Control of package Unit System (PU) |
| ➤ BK-GNRAL-PEDCO-000-EL-SP-0006     | Specification for Earthing & Lightning System   |
| ➤ BK- GNRAL - PEDCO -000-PI-SP-0006 | Specification For Painting.   |
| ➤ BK-GCS-PEDCO-120-PI-SP-0001       | Piping Material Specification.  |
| ➤ BK-GNRAL-PEDCO-000-IN-SP-0001     | Specification For Instrumentation.  |
| ➤ BK-GNRAL-PEDCO-110-IN-DB-0001     | Instrument & Control System Basis of Design.  |
| ➤ BK-GNRAL-PEDCO-000-ME-SP-0001     | Specification For Pressure Vessels.   |
| ➤ BK-GNRAL-PEDCO-000-IN-SP-0004     | Specification for Instrumentation and Control for Packages.                                 |
| ➤ BK-GNRAL-PEDCO-000-EL-SP-0017     | Specification For MV Electro Motors.  |
| ➤ BK-GNRAL-PEDCO-000-EL-SP-0010     | Specification For LV Electro Motors.  |
| ➤ BK-GNRAL-PEDCO-000-EL-SP-0011     | Specification For<br>Electrical Requirements of Packaged Units.                             |
| ➤ BK-GCS-PEDCO-120-PI-RT-0001       | Corrosion Study & Material Selection Report.  |
| ➤ BK-GNRAL-PEDCO-000-PI-SP-0008     | Specification For Material  |

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Requirements in Sour service.  
Specification for Lining.

- BK-GNRAL-PEDCO-000-PI-SP-0007
- Piping & Instrumentation Diagrams

### 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 Purchaser. The final decision in this situation will be made by Purchaser.

## 4.0 TECHNICAL SPECIFICATION

### 4.1 Units

SI metric system of measurement including "°C" and "bar" shall be used in design of the equipment except for flange ratings which shall be psi and pipes, pipe fitting sizes and nozzle dimensions which shall be inches.

### 4.2 Acceptability Criteria

VENDOR shall not offer prototype design or a design with less than 2 years of successful operation in similar service.

A reference equipment/ CLIENT list shall be submitted together with proposal.



The VENDOR may offer alternative designs for CONTRACTOR's consideration and approval. Obviously the proposed equipment should have similar performances and the supplier will guarantee them.

### 4.3 Deviations

No deviations from project specifications, this general specification or the API standards are allowed, without prior written approval of the CONTRACTOR.

The VENDOR shall submit a complete deviations list, for approval, before ordering.



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#### 4.4 Guidelines

**Sub. (Substitution):** “The paragraph in API shall be deleted and replaced by the new paragraph in this specification”.

**Del. (Deletion):** “The paragraph in API shall be deleted without any replacement”.

**Add. (Addition):** “The new paragraph with the new number shall be added to the relevant section of API”.

**Mod. (Modification):** “Part of the paragraph in API shall be modified and/or the new description and/or statement shall be added to that paragraph as given in this Specification”.

#### Amendments to API 537:

#### 4. Design, Construction and Installation (Add.)

##### 4.1.4 (Add.)

Suitable lifting lugs shall be provided on each component (stack / tip).

##### 4.1.5 (Add.)

Vendor shall be responsible for ensuring that the supplied equipment and services meet all applicable regulations on health, safety and environmental issues.

##### 4.1.6 (Add.)

Noise levels shall conform to those specified in data sheet.

##### 4.1.7 (Add.)

Radiation limits shall conform to those specified in data sheet.



#### 4.2 System Design (Mod.)

It is intended that API STD 521 together with this standard shall be used for design and supply of Flare Stacks.

#### 4.3 Process Definition

##### 4.3.4 (Add.)

Radiation limits shall conform to those specified in project specification that it shall be agreed during bid stage. Dispersion and emission study for flare shall be performed in order to meet project

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																									
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criteria.

#### 4.3.5 (Add.)

As a minimum, followings shall be guaranteed by vendor:

- Flaring capacity
- Smokeless operating capacity
- Pressure drop
- Radiation level
- Noise level
- Material compliance with the specification
- Mechanical integrity
- Gas dispersion
- Flue gas emission
- Steam, air, fuel gas, purge gas, pilot gas consumption

#### 4.5 Flare-Burners (Mod.)

The flare tip shall be fabricated from stainless steel. Type / Grade of material has been specified on relevant datasheets or duty specifications.

#### 4.6 Mechanical Design

##### 4.6.1 (a) (Mod.)

ASME Sec. VIII and the relevant project specification for pressure parts and ANSI/ASME B31.3 for piping shall be considered and followed as the pressure design code. ASME B 16.5 "Pipe Flanges and Flanged Fittings" shall be followed.


##### 4.6.1 (b) (Mod.)

Project specification for civil and structural design criteria shall be considered as structural design code.

##### 4.6.1 (c) (Mod.)

Vendor shall be responsible for ensuring that the supplied equipment and services meet all applicable local/project specification that mentioned in section 3.1 (project documents) as below:

- Site condition

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوري بينك</p>																									
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- Consequence analysis / radiation limits
- Specification for painting
- Environmental regulations
- Noise control specification
- Specification for instrument and control
- Specification for air craft warning light
- Inspection and test specification / procedure
- Inspection and test plan
- Ladder and platform design data

#### 4.6.1 (d) (Mod.)

Design pressure and design temperature shall be selected as per process design criteria in each project.

### 4.10 Piping

#### 4.10.1 (Mod.)

All piping and pipe fittings shall be designed in accordance with project Piping Material Specification.

Allowable nozzle loads shall conform to Specification for Nozzle loads; Doc. No “BK-GNRAL-PEDCO-000-PI-SP-0020”. (as a minimum)

#### 4.12 Hazop (Add.)

Finalizing of flare system will be subject to HAZOP meeting. Vendor shall incorporate all HAZOP comments as required for safe and reliable operation and maintenance of the package. Vendor is expected to participate in Project HAZOP meeting. Vendor shall be responsible for ensuring that the supplied equipment and services meet all applicable regulations on health, safety, and environmental issues.

#### 4.13 Purging System (Add.)

Vendor shall minimize purge gas flow required based on seal selection and flare design data. Through an understanding of the process, performance and operability needs requirements for the flaring, and with consideration of the mechanical and maintenance implications for each, the

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designer shall specify the most appropriate type of purge systems to meet the safety, operability and the functional requirements established through use of this standard. Vendor shall discuss the possibility of using portable system / N2 bottle as the source of purge gas during bid stage.

Vendor shall discuss a continuous fuel gas purge at the end of the main header and the end of any major sub-header.

#### 4.14 Spare Part (Add.)

Spare part list shall be provided as per Annex 11 of the EPC contracture and finalizing of it is subjected to client approval.

#### 4.15 Shipping Limit (Add.)

Vendor shall propose the degree of shop fabrication during bid stage. Project transportation limits mentioned in Material Requisition for weight and dimensions shall be used to maximize shop fabrication.

### 5.0 MECHANICAL DETAILS – ELEVATED FLARES

#### 5.1 Mechanical Design – Design Loads

##### 5.1.d Internal Pressure (Mod.)

The words “when specified in the datasheets” to be replaced by “unless otherwise specified in the data sheets”.

##### 5.1.e (2) Jet Loads (Mod.)

The requirement for vibration and fatigue analysis shall be referred to structural design code.

##### 5.1.i (5) Erection and/or Maintenance Loads (Mod.)

The words “when specified in the datasheets” to be replaced by “unless otherwise specified in the data sheets”.

#### 5.3 Flanges (Mod.)

##### 5.3.3 (Mod.)

The words “when specified in the datasheets” to be replaced by “unless otherwise specified in the data sheets”.

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## 5.4 Materials of Construction

### 5.4.4 (Mod.)

The flare material specification shall be designed to operate for the specified service conditions in the data sheets (i.e. whether sulfide stress cracking is possible) in accordance with NACE MR0175/ISO 15156 (all parts).

### 5.4.8 (Add.)

DIN, BS or any other international standard materials equivalent or superior to ASME/ASTM materials could be used when approved by the Contractor / CLIENT (in such case material certificate 3.2 shall be provided).

## 5.5 Welding

### 5.5.1 (Mod.)

Relief-gas-containing portions of the support structure shall be fabricated in accordance with the welding requirements of the structural design code.

### 5.5.3 (Mod.)

Non-gas-containing portions of the support structure shall be fabricated in accordance with the welding requirements of the structural design code.

### 5.5.6 (Add.)

All joints in riser shall be full penetration. For Joints inaccessible from the inside, the fabricator shall submit for approval an alternative method where full fusion weld can be achieved from one side.

### 5.5.7 (Add.)

When required, preheat and PWHT shall be as per ASME B31.3.

## 5.6 Inspection

### 5.6.1 (a) (Mod.)

The structural design code shall be used for non-destructive testing and inspection procedures, techniques, standards for acceptance, inspector qualification and inspections.

Vendor' s ITP is subjected to the Client approval.

### 5.6.1 (g) (Add.)

Project specification for flare inspection including inspection and test plan shall be followed by the vendor. All inspection and test recommended by pressure design code and structural design code

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shall be performed.

#### 5.6.1 (h) (Add.)

All piping shall be assembled and hydrostatically tested prior to being put to operation.

### 5.7 Surface Preparation and Protection

#### 5.7.1 (Mod.)

All support brackets, etc shall be painted in accordance with the requirements of "Specification For Painting". Surfaces which are inaccessible afterwards shall be painted before installation with fully specified paint system, plant- mounted instruments and stainless steel impulse lines shall not be painted. Final coat of flare structure and riser shall be in accordance with ICAO requirement (red and white).

#### 5.7.4 (Mod.)

Ladders and platforms shall be painted as per Project's specification for painting (BK-GENERAL-PEDCO-000-PI-SP-0006.

### 5.9 Aircraft Warning Lighting

#### 5.9.1 (Mod.)

Aircraft warning lights shall be supplied and installed on flare stack in accordance with ICAO and Project Specification when requested in data sheet. For stack height greater than 45 m aircraft warning light shall be considered.

### 5.10 Platforms and Ladders

#### 5.10.1 (Sub.)


Ladder and platform design shall be as per project specification. A ladder is the preferred means of access to a platform, but alternative access shall be achieved via a crane basket.

#### 5.10.7(Add.)

A painter's trolley ring shall be provided below the tip maintenance platform.

### 5.11. Fabrication Tolerance (Add.)

Fabrication Tolerance for stack shall be as follows;

	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>																									
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- Out of Roundness shall be in accordance with ASME Section VIII Division1 Paragraph UG-80.
- Out of Straightness shall not be in excess of 3mm in 3m.

## 5.12 Instrumentation (Add.)

### 5.12.6 (Add.)

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.



### 5.12.7 (Add.)

Package control type is type A as per Specification for Instrument & control of packaged unit System (PU) as per Specification for Instrument and Control of Package Unit System (PU) (BK-GNRAL-PEDCO-000-IN-SP-0004).

A local control panel(s) suitable for Non-hazard area (under shelter), shall be provided with the facility to start and stop the package locally. Locally mounted control panels shall be supplied by vendor completely prewired to terminal blocks at the bottom of the panel (for bottom entry).


Package control type is type A as per Specification for Instrument & control of packaged unit System (PU).

The panels shall have a complete enclosure of sheet steel and suitable for the location at the site condition.

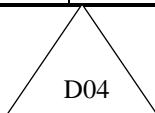
The panels shall contain all items to operate the equipment such as circuit breakers contractors, relays, transformers and conversion units. Pushbutton switches, measuring device, instruments, indicators, etc., shall also be included in the panel's hardware communication facility to be considered between package LCP and plant DCS/ESD, minimum as per project P&ID.

Local MCC (Motor Control Center) is in vendor scope of work. All required to be considered in package LCP.

For electrical requirement detail refer to "Specification for Electrical Requirements of Packaged Units"; Doc. No. BK-GNRAL-PEDCO-000-EL-SP-0011 "Specification for Earthing & Lightning System" Doc.No. BK-GNRAL-PEDCO-000-EL-SP-0006 and Instrument Earthing Typical Diagram, Doc.No. BK-GCS-PEDCO-120-IN-DG-0001

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5.12.8 (Add.)



VENDOR shall supply all field instruments cable to skid edge JB's and Specification for Instrument/F&G Cables Doc.No. BK-GNRL-PEDCO-000-IN-SP-0010 shall be followed for instrument cables. Some signals may be connected to PCS (Process Control System) and ESD (Emergency Shutdown) as per related P&ID. Via hardware connection. Interface cable is out of vendor spec.

All thermocouple cables conduit between ignition panel and stack, and the high voltage electrical cables between panel and igniters shall be in vendor scope of supply. Per Pilot, thermocouple shall be considered by Vendor.

VENDOR has to convert 400/230 VAC power supply to suitable voltage range for flare control panel/instruments.

## 6.4 Pilots



6.4.1 (Mod.)

Each flare shall have three pilots as minimum. Pilots shall be able to remain lit under all environmental / operating & emergency conditions specified in design basis & datasheet or duty specification. The pilot shall remain lit and continue to ignite the flare at wind speeds up to 160 km/h (100 mph) under dry conditions and 140 km/h (85 mph) when combined with 50 mm/h (2 in/h) of rainfall. Pilots shall be capable of being relit under the same environmental conditions. A windshield shall be attached to the burner.

## 8.0 Guaranties and Warranties

### 8.1.(Add.)

As a minimum, followings shall be guaranteed by vendor:

1. Flaring Capacity
2. Smokeless Operating Capacity
3. Pressure Drop
4. Radiation Level
5. Noise Level
6. Emission levels



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7. Dispersion levels
8. Utility Consumption
9. Material Compliance with Specification
10. Mechanical Integrity

## ANNEX A: FLARE EQUIPMENT OVERVIEW

### A.1 Type of Flares and Components



#### A.1.6 Smokeless and Non-smokeless Flares

##### A.1.6.1 Smokeless Flares (Mod.)

Unless otherwise specified, air-assist smokeless operation up to 25% of design flow with Ringelmann < 1 shall be considered. Type of smokeless operation (air or steam) shall be considered by the vendor and approved by the Contractor during bid stage.

### A.2 Flare Burner

#### A.2.7 Mechanical Details of Flare Burners

##### A.2.7.2 Flange Rating (Mod.)

Unless otherwise specified in the data sheets, project specification for flange standards shall be followed.





### A.3 Pilots

#### A.3.2 General Description (Mod.)

Direct ignition of the flare or of a slipstream of the flare gas in lieu of a continuous pilot is not acceptable. Proper operation, safety consideration and performance of pilot system shall be reviewed and guaranteed by the vendor. Vendor shall confirm the type of pilot/ignition systems to meet the safety, operability and the functional requirements established through the use of this standard. Vendor shall discuss the possibility of use LPG bottle as the source of pilot gas during bid stage.

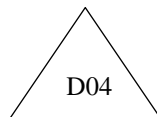
Vendor shall be considered LPG bottles for 24 hour backup.

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#### A.4 Ignition Equipment

##### A.4.2 General Description

##### A.4.2.6 (Add.)



High energy ignition type with auto re-ignition capability shall be considered.

#### ATTACHMENT

#### API 537 AND IPS-G-ME-210 STANDARDS



API 537  
(2017)flare-details-ft



g-me-210.pdf