|  |
| --- |
| **طرح نگهداشت و افزایش تولید 27 مخزن** |
| **CALCULATION NOTE FOR FLOW ELEMENT SIZING** **نگهداشت و افزایش تولید میدان نفتی بینک** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| D02 | JUN.2023 | IFA | M.Aryafar | M.Fakharian | A.M.MOHSENI |  |
| D01 | DEC.2022 | IFA | M.Aryafar | M.Fakharian | M.Mehrshad |  |
| D00 | JUN.2022 | IFC | M.Aryafar | M.Fakharian | M.Mehrshad |  |
| **Rev.** | **Date** | **Purpose of Issue/Status** | **Prepared by:** | **Checked by:** | **Approved by:** | **CLIENT Approval** |
| **Class:2** | **CLIENT Doc. Number:** **F0Z-708741** |
| **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** |

**REVISION RECORD SHEET**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |  | **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |
| **1** | X | X | X |  |  | **66** |  |  |  |  |  |
| **2** | X | X | X |  |  | **67** |  |  |  |  |  |
| **3** | X |  |  |  |  | **68** |  |  |  |  |  |
| **4** | X |  |  |  |  | **69** |  |  |  |  |  |
| **5** | X |  | X |  |  | **70** |  |  |  |  |  |
| **6** | X | X | X |  |  | **71** |  |  |  |  |  |
| **7** | X | X | X |  |  | **72** |  |  |  |  |  |
| **8** | X | X | X |  |  | **73** |  |  |  |  |  |
| **9** | X |  |  |  |  | **74** |  |  |  |  |  |
| **10** | X |  |  |  |  | **75** |  |  |  |  |  |
| **11** | X |  |  |  |  | **76** |  |  |  |  |  |
| **12** |  |  |  |  |  | **77** |  |  |  |  |  |
| **13** |  |  |  |  |  | **78** |  |  |  |  |  |
| **14** |  |  |  |  |  | **79** |  |  |  |  |  |
| **15** |  |  |  |  |  | **80** |  |  |  |  |  |
| **16** |  |  |  |  |  | **81** |  |  |  |  |  |
| **17** |  |  |  |  |  | **82** |  |  |  |  |  |
| **18** |  |  |  |  |  | **83** |  |  |  |  |  |
| **19** |  |  |  |  |  | **84** |  |  |  |  |  |
| **20** |  |  |  |  |  | **85** |  |  |  |  |  |
| **21** |  |  |  |  |  | **86** |  |  |  |  |  |
| **22** |  |  |  |  |  | **87** |  |  |  |  |  |
| **23** |  |  |  |  |  | **88** |  |  |  |  |  |
| **24** |  |  |  |  |  | **89** |  |  |  |  |  |
| **25** |  |  |  |  |  | **90** |  |  |  |  |  |
| **26** |  |  |  |  |  | **91** |  |  |  |  |  |
| **27** |  |  |  |  |  | **92** |  |  |  |  |  |
| **28** |  |  |  |  |  | **93** |  |  |  |  |  |
| **29** |  |  |  |  |  | **94** |  |  |  |  |  |
| **30** |  |  |  |  |  | **95** |  |  |  |  |  |
| **31** |  |  |  |  |  | **96** |  |  |  |  |  |
| **32** |  |  |  |  |  | **97** |  |  |  |  |  |
| **33** |  |  |  |  |  | **98** |  |  |  |  |  |
| **34** |  |  |  |  |  | **99** |  |  |  |  |  |
| **35** |  |  |  |  |  | **100** |  |  |  |  |  |
| **36** |  |  |  |  |  | **101** |  |  |  |  |  |
| **37** |  |  |  |  |  | **102** |  |  |  |  |  |
| **38** |  |  |  |  |  | **103** |  |  |  |  |  |
| **39** |  |  |  |  |  | **104** |  |  |  |  |  |
| **40** |  |  |  |  |  | **105** |  |  |  |  |  |
| **41** |  |  |  |  |  | **106** |  |  |  |  |  |
| **42** |  |  |  |  |  | **107** |  |  |  |  |  |
| **43** |  |  |  |  |  | **108** |  |  |  |  |  |
| **44** |  |  |  |  |  | **109** |  |  |  |  |  |
| **45** |  |  |  |  |  | **110** |  |  |  |  |  |
| **46** |  |  |  |  |  | **111** |  |  |  |  |  |
| **47** |  |  |  |  |  | **112** |  |  |  |  |  |
| **48** |  |  |  |  |  | **113** |  |  |  |  |  |
| **49** |  |  |  |  |  | **114** |  |  |  |  |  |
| **50** |  |  |  |  |  | **115** |  |  |  |  |  |
| **51** |  |  |  |  |  | **116** |  |  |  |  |  |
| **52** |  |  |  |  |  | **117** |  |  |  |  |  |
| **53** |  |  |  |  |  | **118** |  |  |  |  |  |
| **54** |  |  |  |  |  | **119** |  |  |  |  |  |
| **55** |  |  |  |  |  | **120** |  |  |  |  |  |
| **56** |  |  |  |  |  | **121** |  |  |  |  |  |
| **57** |  |  |  |  |  | **122** |  |  |  |  |  |
| **58** |  |  |  |  |  | **123** |  |  |  |  |  |
| **59** |  |  |  |  |  | **124** |  |  |  |  |  |
| **60** |  |  |  |  |  | **125** |  |  |  |  |  |
| **61** |  |  |  |  |  | **126** |  |  |  |  |  |
| **62** |  |  |  |  |  | **127** |  |  |  |  |  |
| **63** |  |  |  |  |  | **128** |  |  |  |  |  |
| **64** |  |  |  |  |  | **129** |  |  |  |  |  |
| **65** |  |  |  |  |  | **130** |  |  |  |  |  |

**CONTENTS**

[1.0 INTRODUCTION 4](#_Toc136959514)

[2.0 Scope 5](#_Toc136959515)

[3.0 NORMATIVE REFERENCES 5](#_Toc136959516)

[3.1 Local Codes and Standards 5](#_Toc136959517)

[3.2 International Codes and Standards 5](#_Toc136959518)

[3.3 The Project Documents 5](#_Toc136959519)

[3.4 ENVIRONMENTAL DATA 5](#_Toc136959520)

[4.0 software 5](#_Toc136959521)

[5.0 Diameter of orifice 5](#_Toc136959522)

[6.0 ORIFICE SIZEs 6](#_Toc136959523)

[7.0 attachment 8](#_Toc136959524)

1. **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 Fcilities; New Gas Compressor Station |
| EPD/EPC 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 EPD/EPC CONTRACTOR (GC) and approved by 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. |

1. **Scope**

The purpose of this document is to provide report for sizing of all orifices used in the BINAK Gas compressor station.

1. **NORMATIVE REFERENCES**

## Local Codes and Standards

* IPS-E-IN-130 Engineering Standard for flow instruments.

## International Codes and Standards

* AS 2360.1.1/ISO 5167-1 Measurement of fluid flow in closed conduits.

## 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-GCS-PEDCO-120-PR-PF-0001 Process Flow Diagram (PFD)

## ENVIRONMENTAL DATA

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

1. **software**

D02

The software using for sizing flow elements is CONVAL (version 11).

1. **Diameter of orifice**

The diameter ratio β= d/D is always greater than or equal to 0.15 and less than or equal to 0.70. (Base on IPS-E-IN-130).

1. **ORIFICE SIZEs**

Below is a table that contains the sizing details for the orifices to be installed in BINAK Gas compressor station.

D02

| **Item** | **Tag No.** | **Line No.** | **P&ID No.** | **Phase** | **Max. Flowrate****(kg/hr)** | **Inlet Temp.****(°C)** | **Inlet Pre.****(barg)** | **Outlet Pre.****(barg)** | **Beta Ratio** | **Orifice Dia.****(mm)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | RO-2112  | GAS-111-0225-AN07-3”-PT | BK-GCS-PEDCO-120-PR-PI-0005-1/1 | Gas | 5665.4 | 36.87 | 9 | 4.5 | 0.397 | 29.258(Note 1) |
| 2 | RO-2134A/B/C | GAS-111-0160A/B/C-CN05-2”-PT | BK-GCS-PEDCO-120-PR-PI-0009-1,2,3/3 | Gas | 778.4 | 60 | 22 | 7 | 0.139 | 6.855(Note 1) |
| 3 | RO-2131A/B/C | CDH-112-0023A/B/C-CS00-2”-NP | BK-GCS-PEDCO-120-PR-PI-0009-1,2,3/3 | Liquid | 10000 | 59.88 | 18.1 | 0.2 | 0.158 | 8.674(Note 1) |
| 4 | RO-2133A/B/C | GAS-111-0054A/B/C-FS00-1 1/2”-NP | BK-GCS-PEDCO-120-PR-PI-0011-1,2,3/3 | Gas | 1333 | 60 | 62 | 7 | 0.119 | 4.9(Note 1) |
| 5 | RO-2141 | GAS-111-0065-FN05-1 1/2”-PT | BK-GCS-PEDCO-120-PR-PI-0012-1/1 | Gas | 1722 | 60 | 62 | 7 | 0.163 | 5.57(Note 1) |
| 6 | RO-2144 | CDH-112-0025-FS00-2”-NP | BK-GCS-PEDCO-120-PR-PI-0012-1/1 | Liquid | 11500 | 58.89 | 53.9 | 0.2 | 0.134 | 7.081(Note 1) |
| 7 | RO-2151 | GAS-111-0071-FN05-3”-PT | BK-GCS-PEDCO-120-PR-PI-0013-1/3 | Gas | 4578 | 60 | 62 | 7 | 0.123 | 9.068(Note 1) |
| 8 | RO-2162 | TEG-111-0002-AN04-2"-PT | BK-GCS-PEDCO-120-PR-PI-0014-1/1 | Liquid | 6132.5 | 33 | 2 | HOLD(Note 3) | HOLD(Note 3) | HOLD(Note 1,3) |
| 9 | FE-2101 | GAS-111-0001-AN07-6”-PT | BK-GCS-PEDCO-120-PR-PI-0002-1/1 | Gas | 7220.4 | 46.11 | 6.75 | 6.5 | 0.460 | 67.387(Note 1) |
| 10 | FE-2102 | GAS-111-0001-FN07-8”-PT | BK-GCS-PEDCO-120-PR-PI-0003-1/1 | Gas | 12395.9 | 32 | 6.75 | 6.5 | 0.454 | 90.101(Note 1) |
| 11 | FE-2111 | CDH-112-0014-CN05-4”-PT | BK-GCS-PEDCO-120-PR-PI-0004-2/2 | Liquid | 7873.8 | 23.22 | 19.5 | 19.25 | 0.216 | 22.133(Note 1) |
| 12 | FE-2121A/B/C | GAS-111-0031A/B/C-AN05-8”-ET | BK-GCS-PEDCO-120-PR-PI-0007-1,2,3/3 | Gas | 8923.9 | 36.78 | 4.9 | 4.775 | 0.462 | 95.436(Note 2) |
| 13 | FE-2131A/B/C | GAS-111-0044A/B/C-CN05-6”-ET | BK-GCS-PEDCO-120-PR-PI-0010-1,2,3/3 | Gas | 8923.9 | 59.88 | 18.1 | 17.975 | 0.464 | 71.504(Note 2) |
| 14 | FE-2211 | NIT-112-0021-AN01-2”-PT | BK-GCS-PEDCO-120-PR-PI-0016-1/1 | Gas | 53.78 | 60 | 8 | 7.75 | 0.101 | 5.346(Note 1) |
| 15 | FE-2271 | FLG-112-0110-AN07-4"-PT | BK-GCS-PEDCO-120-PR-PI-0022-1/1 | Gas | 556.38 | 36.78 | 4.9 | 4.65 | 0.221 | 21.491(Note 1) |

D02

NOTES:

D02

1. All the calculated orifice diameter will be finalized by vendor.
2. Orifice diameter will be finalized by compressor supplier.
3. HOLD sections shall be finalized after receiving Dehydration Package supplier data.
4. **attachment**

Please check the attachment.