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| **طرح نگهداشت و افزایش تولید 27 مخزن** |
| **Pipeline PWPS** **(Preliminary Welding Procedure Specification)****نگهداشت و افزایش تولید میدان نفتی بینک** |
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**REVISION RECORD SHEET**

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| **1** | X | X |  |  |  | **66** |  |  |  |  |  |
| **2** | X |  |  |  |  | **67** |  |  |  |  |  |
| **3** | X |  |  |  |  | **68** |  |  |  |  |  |
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| **6** | X | X |  |  |  | **71** |  |  |  |  |  |
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# 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.

**GENERAL DEFINITION**

The following terms shall be used in this document.

|  |  |
| --- | --- |
| CLIENT:  | National Iranian South Oilfields Company (NISOC)  |
| PROJECT: | Binak Oilfield Development – General Facilities |
| 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. |
| 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. |

# SCOPE

This document covers minimum necessary requirements for the Welding and control the quality of the pipeline execution activities including control of documents & welding process in the development project of Binak oil field.

It shall be used in conjunction with data/requisition sheets for present document subject.

# NORMATIVE REFERENCES

D01

## Local Codes and Standards

* IPS-C-PI-270 Rev.02 Construction Standard for Welding of Transportation Pipeline
* IPS-C-PI-190 Rev.02 Material and Equipment Standard for Pipeline

## International Codes and Standards

* API 1104 - 2021 Welding of Pipeline and Related Facilities
* API 5L - 2018 Line Pipe
* ASME BPVC Sec.II-PART A - 2021 Ferrous Materials Specifications
* ASME BPVC Sec.II-PART C - 2021 Specifications for Welding Materials
* ASME B31.4 - 2019 Pipeline Transportation Systems for Liquids and Slurries
* ASME B31.8 - 2020 Gas Transmission and Distribution Piping Systems

## The Project Documents

* BK-GNRAL-PEDCO-000-PL-SP-0011 Specification For Pipeline Insulation Joint
* BK-GNRAL-PEDCO-000-PL-SP-0009 Specification For Welding of Transportation Pipeline
* BK-SSGRL-PEDCO-110-PL-SP-0001 Pipeline (Flowline) Material Specification
* BK-SSGRL-PEDCO-110-PL-DW-0001 Pipeline Standard Support Drawings
* BK-PPL-PEDCO-320-PL-SP-0001 Pipeline Material Specification

## 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.

# PWPS FOR PIPELINE

D01

**4.1 PWPS FOR PIPELINE 6 inch (Flowlines)**

|  |  |
| --- | --- |
| Procedure No. : BINAK-PWPS101 | Process : SMAW |
| Ref. Standard : API 1104 & IPS-C-PIi-270 |  |
| For: Binak Oilfield Development Project / Pipeline No. CRD – 110 – 115 - LN12 – 6" – PT/CRD – 110 – 145 - LN12 – 6" – PT/ CRD–110–135-LN12–6–PT/CRD – 110 – 155 - LN12 – 6" – PT/CRD – 110 – 165 - LN12 – 6" – PT/CRD – 110 – 125 - LN12 – 6" - PT |
| **Material :**  | API 5L X52 PSL2 Group No. : 1 / P No. : 1 |
| **Diameter and Wall Thickness:**  | OD : (6") & Thickness : (7.9 mm)  |
| **Joint Design & Bevel angle :**  | Butt Joint, Single **V** / 37.5 ± 0.5 |
| **Backing type (if applicable) & Roll or fixed position :** | N/A  |
| **Electrical Characteristics :**  | DCEP  |
| **Position:**  | **5G**  |
| **Direction of Welding :**  | Uphill (Root pass), Uphill (other)  |
| **No. of Welders:**  | 1  |
| **Time Lapse Between Passes :**  | Max 5 Minutes  |
| **Type and Removal of Line up Clamp :**  | External and Removal at least after 70% of Root Pass  |
| **Cleaning:**  | First Pass Grinding, Other Passes Brushing or Grinding  |
| **Preheat Temperature & Method of Heating :**  | 50°C / Gas torch |
| **Interpass Temperature (Min\Max)**  | Preheat Temperature **:** 180°C ± 10°C or <5 Min |
| **Stringer / Weave**  | Root pass is Stringer and other passes are Weave  |
| **Minimum number of passes** | 4 pass |
| **PWHT**  | N.A  |
| **NACE**  | NACE MR0175/ISO 15156 |
| **Shielding Gas and Flow Rate :**  | N.A  |
| **Shielding Flux :**  | N.A  |
| **Filler Metal & Flux :**   | Specification AWS A5.1 E-6010 Group No. : 1  |
| Specification AWS A5.1 E-7018 Group No. : 3 |
| **Joint Design:****a : 75° ± 5°** **b : 7.9 mm** **c : 1.6mm ± 0.8 mm** **d : 2.5mm ± 0.5 mm**  |  |  |
| **Summary Table**  |
| **Run** | **Bead Name**  | **Process** | **Filler Metal** | **Electrical Characteristics** | **Voltage** | **Amperage**  | **Travel Speed (mm/s)** | **Heat Input** **(KJ/mm)** |
| **Group****No.** | **AWS****Classification** | **Size (mm)** |
| 1 | Root  | SMAW | 1 | A5.1 | 2.5 | E6010 | 20-26 | 75-100 | 2.5 - 3 | 0.50 – 1.04 |
| 2 | Inter pass | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| 3 | Inter pass | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| 4 | Cap  | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| **NOTE:** Note 1 : HRC surveys of butt welds shall be Figure 5 of ANSI/NACE MR0175/ISO 15156 Note 2 : E7018 Electrode shall be Draying in 2 Hr at 300°C - 350°C Note 3 : Max acceptable hardness Base metal and HAZ and root metal shall be 22 HRC  |

**4.2 PWPS FOR PIPELINE - 8 inch (GAS PIPELINE TO SIAHMAKAN gis)**

|  |  |
| --- | --- |
| Procedure No. : BINAK-PWPS102 | Process : SMAW |
| Ref. Standard : API 1104 & IPS-C-PIi-270 |  |
| For: Binak Oilfield Development Project / Pipeline No. GAS – 113 – 0010 – FN27 – 8" - UG |
| **Material :**  | API 5L X52 PSL2 Group No. : 1 / P No. : 1 |
| **Diameter and Wall Thickness:**  | OD : (8") & Thickness : (8 mm)  |
| **Joint Design & Bevel angle :**  | Butt Joint, Single **V** / 37.5 ± 0.5 |
| **Backing type (if applicable) & Roll or fixed position :** | N/A  |
| **Electrical Characteristics :**  | DCEP  |
| **Position:**  | **5G**  |
| **Direction of Welding :**  | Uphill (Root pass), Uphill (other)  |
| **No. of Welders:**  | 1  |
| **Time Lapse Between Passes :**  | Max 5 Minutes  |
| **Type and Removal of Line up Clamp :**  | External and Removal at least after 70% of Root Pass  |
| **Cleaning:**  | First Pass Grinding, Other Passes Brushing or Grinding  |
| **Preheat Temperature & Method of Heating :**  | 50°C / Gas torch |
| **Interpass Temperature (Min\Max)**  | Preheat Temperature **:** 180°C ± 10°C or <5 Min |
| **Stringer / Weave**  | Root pass is Stringer and other passes are Weave  |
| **Minimum number of passes** | 4 pass |
| **PWHT**  | N.A  |
| **NACE**  | NACE MR0175/ISO 15156 |
| **Shielding Gas and Flow Rate :**  | N.A  |
| **Shielding Flux :**  | N.A  |
| **Filler Metal & Flux :**   | Specification AWS A5.1 E-6010 Group No. : 1  |
| Specification AWS A5.1 E-7018 Group No. : 3 |
| **Joint Design:****a : 75° ± 5°** **b : 8 mm** **c : 1.6mm ± 0.8 mm** **d : 2.5mm ± 0.5 mm**  |  |  |
| **Summary Table**  |
| **Run** | **Bead Name**  | **Process** | **Filler Metal** | **Electrical Characteristics** | **Voltage** | **Amperage**  | **Travel Speed (mm/s)** | **Heat Input** **(KJ/mm)** |
| **Group****No.** | **AWS****Classification** | **Size (mm)** |
| 1 | Root  | SMAW | 1 | A5.1 | 2.5 | E6010 | 20-26 | 75-100 | 2.5 - 3 | 0.50 – 1.04 |
| 2 | Inter pass | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| 3 | Inter pass | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| 4 | Cap  | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| **NOTE:** Note 1 : HRC surveys of butt welds shall be Figure 5 of ANSI/NACE MR0175/ISO 15156 Note 2 : E7018 Electrode shall be Draying in 2 Hr at 300°C - 350°C Note 3 : Max acceptable hardness Base metal and HAZ and root metal shall be 22 HRC  |

**4.3 WPQR FOR PWPS**

|  |  |
| --- | --- |
| Procedure No. : BINAK-PWPS103 | Process : SMAW |
| Ref. Standard : API 1104 & IPS-C-PIi-270 |  |
| For: Binak Oilfield Development Project / Pipeline No. GAS – 113 – 0010 – FN27 – 8" - UG /CRD – 110 – 115 - LN12 – 6" – PT/CRD – 110 – 145 - LN12 – 6" – PT/ CRD–110–135-LN12–6–PT/CRD – 110 – 155 - LN12 – 6" – PT/CRD – 110 – 165 - LN12 – 6" – PT/CRD – 110 – 125 - LN12 – 6" - PT |
| **Material :**  | API 5L X52 PSL2 Group No. : 1 / P No. : 1 |
| **Diameter and Wall Thickness:**  | OD : (6") & Thickness : (7.9 mm)  |
| **Joint Design & Bevel angle :**  | Butt Joint, Single **V** / 37.5 ± 0.5 |
| **Backing type (if applicable) & Roll or fixed position :** | N/A  |
| **Electrical Characteristics :**  | DCEP  |
| **Position:**  | **5G**  |
| **Direction of Welding :**  | Uphill (Root pass), Uphill (other)  |
| **No. of Welders:**  | 1  |
| **Time Lapse Between Passes :**  | Max 5 Minutes  |
| **Type and Removal of Line up Clamp :**  | External and Removal at least after 70% of Root Pass  |
| **Cleaning:**  | First Pass Grinding, Other Passes Brushing or Grinding  |
| **Preheat Temperature & Method of Heating :**  | 50°C / Gas torch |
| **Interpass Temperature (Min\Max)**  | Preheat Temperature **:** 180°C ± 10°C or <5 Min |
| **Stringer / Weave**  | Root pass is Stringer and other passes are Weave  |
| **Minimum number of passes** | 4 pass |
| **PWHT**  | N.A  |
| **NACE**  | NACE MR0175/ISO 15156 |
| **Shielding Gas and Flow Rate :**  | N.A  |
| **Shielding Flux :**  | N.A  |
| **Filler Metal & Flux :**   | Specification AWS A5.1 E-6010 Group No. : 1  |
| Specification AWS A5.1 E-7018 Group No. : 3 |
| **Joint Design:****a : 75° ± 5°** **b : 7.9 mm** **c : 1.6mm ± 0.8 mm** **d : 2.5mm ± 0.5 mm**  |  |  |
| **Summary Table**  |
| **Run** | **Bead Name**  | **Process** | **Filler Metal** | **Electrical Characteristics** | **Voltage** | **Amperage**  | **Travel Speed (mm/s)** | **Heat Input** **(KJ/mm)** |
| **Group****No.** | **AWS****Classification** | **Size (mm)** |
| 1 | Root  | SMAW | 1 | A5.1 | 2.5 | E6010 | 20-26 | 75-100 | 2.5 - 3 | 0.50 – 1.04 |
| 2 | Inter pass | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| 3 | Inter pass | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| 4 | Cap  | SMAW | 3 | A5.1 | 3.2 | E7018 | 20-26 | 100-130 | 2.5 - 3 | 0.66 – 1.35 |
| **NOTE:** Note 1 : HRC surveys of butt welds shall be Figure 5 of ANSI/NACE MR0175/ISO 15156 Note 2 : E7018 Electrode shall be Draying in 2 Hr at 300°C - 350°C Note 3 : Max acceptable hardness Base metal and HAZ and root metal shall be 22 HRC  |

**4.4 WELD LIST FOR PIPELINE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pipeline No.** | **Procedure No. for PWPS** | **Procedure No. for WPQR No.** | **Procedure No. for WPS Approve**  | **Procedure No. for WPQR.** |
| CRD – 110 – 115 - LN12 – 6" - PT | BINAK-PWPS101 | BINAK-PWPS103 | \_\_\_\_ | \_\_\_\_ |
| CRD – 110 – 145 - LN12 – 6" - PT | BINAK-PWPS101 | BINAK-PWPS103 | \_\_\_\_ | \_\_\_\_ |
| CRD – 110 – 135 - LN12 – 6" - PT | BINAK-PWPS101 | BINAK-PWPS103 | \_\_\_\_ | \_\_\_\_ |
| CRD – 110 – 155 - LN12 – 6" - PT | BINAK-PWPS101 | BINAK-PWPS103 | \_\_\_\_ | \_\_\_\_ |
| CRD – 110 – 165 - LN12 – 6" - PT | BINAK-PWPS101 | BINAK-PWPS103 | \_\_\_\_ | \_\_\_\_ |
| CRD – 110 – 125 - LN12 – 6" - PT | BINAK-PWPS101 | BINAK-PWPS103 | \_\_\_\_ | \_\_\_\_ |
| GAS – 113 – 0010 – FN27 – 8" - UG | BINAK-PWPS102 | BINAK-PWPS103 | \_\_\_\_ | \_\_\_\_ |