



RENOVATION FOR ABOOZAR - ILAM PIPELINE



Document Title: Data Sheet for Hot Bend

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DATA SHEET FOR HOT BEND



PROJECT RENOVATION FOR ILAM-ABOOZAR PIPELINE

COMPANY IRANIAN OFFSHORE OIL COMPANY

CONTRACTOR IRANIAN OFFSHORE ENGINEERING AND
CONSTRUCTION COMPANY

N. Rezaei *D. Shahgholian* *S. Azimi*

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1. INTRODUCTION

1.1 Project Description

The Aboozar oil field is located in Persian Gulf some 75 KM to the west of Kharg Island district. This project includes five existing platforms and four infield/ Export pipe lines. The Aboozar field is located in a water depth of about 45 meters.

- The existing platforms consist of:
 - wellhead platforms (A14/A19/A15)
 - Production platforms (AC/AB new)
- The existing subsea pipelines which shall be replaced consist of:
 - A 24” production subsea pipelines between A14 and AC.
 - A 12” test subsea pipelines between A15 and ABnew.
 - A 16” production subsea pipelines between A19 and AC.
 - A 24” oil export subsea pipelines between AB new to Kharg island.
- The three main components of the WORK are the followings:

A) Supply and installation of New Subsea offshore Pipelines/ Spools/Risers



- A 12” production subsea pipeline between A14 and AC with approximate length 2600m.
- A 12” test subsea pipeline between A15 and ABnew with approximate length 4200m.
- A 12” production subsea pipeline between A19 and AC with approximate length 3100m.
- A 20” oil export subsea pipeline between AB new to Kharg island approximate length 73800m.

B) New onshore Pipeline

- A 20” oil onshore pipeline with approximate length 2500m.

C) New pig launcher and pig receiver system

- A new pig launcher/receiver system, topside piping and tie-in to the existing piping and facilities for all the above platforms.

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The ILAM field is located in 18 km of south/ south-east of Siri Island in water depth of about 60 meters. This renovation project includes two existing platforms and one infield pipe lines.

- The existing platforms consist of:
 - wellhead platforms (WPE-2)
 - Production platforms (PPE)
- The existing subsea pipelines which shall be replaced consist of:
 - A 14” production subsea pipelines between WPE-2 and PPE.
- The two main components of the WORK are the followings:

D) Supply and installation of New Subsea offshore Pipelines/ Spools/Risers



- A 10” production subsea pipeline between WPE-2 and PPE with approximate length 2900m.

E) New pig launcher and pig receiver system

- A new pig launcher/receiver system, topside piping and tie-in to the existing piping and facilities for all the above platforms.

1.2 Definition

Company:	Iranian Offshore Oil Company (IOOC)
Contractor:	Iranian Offshore Engineering and Construction Company (IOEC)
MWS:	Marine Warranty Surveyor
TPA:	Designates the third-party inspection agency carrying out inspection.
May:	Indicates a provision is optional.
Shall:	Indicates a provision is mandatory.
Should:	Indicates a provision is not mandatory but is recommended.



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1.3 Scope of This Document

This data sheet summarizes all main characteristics of the hot bends for 20-inch and 12-inch Aboozar oil field offshore pipelines.

1.4 Abbreviations

API	American Petroleum Institute
BM	Base Metal
CLR	Crack Length Ratio
CSR	Crack Sensitivity Ratio
CTR	Crack Thickness Ratio
DNV	Det Norske Veritas
HIC	Hydrogen Induced Cracking
ID	Internal Diameter
ISO	International Organization for Standardization
KVT	Transverse Charpy V-notch impact tests
Max.	Maximum
Min.	Minimum
OD	Outer Diameter
SMLS	Seamless
SSC	Sulfide Stress Cracking
TS	Tensile Strength
WM	Weld Metal
WT	Nominal Wall Thickness
YS	Yield Strength

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2. REFERENCE DOCUMENT, AND STANDARDS CODEODES

2.1 Reference Project Document

Reference	Title
AB-ENG-SP-PL-2013 (B0)	Specification for Hot Induction Bend
AB-ENG-SP-PL-2011 (B0)	Specification for Seamless Line Pipes
AB-ENG-SP-PL-2008 (B0)	Specification for ERW Line Pipes, (for Sour Service)
AB-ENG-SP-PL-2010 (B1)	Specification for SAWL Line Pipes, (for Sour Service)
GAIP-ABZ-PL-MR-002	RFQ For Bend

2.2 Reference Standard and Code

Reference	Title
API 5L	Specification for Line Pipe (45 th edition)
BS EN 10204	Metallic products. Types of inspection documents
DNVGL-ST-F101	Submarine Pipeline Systems (2017)
NACE MR0175 / ISO 15156	Petroleum and natural gas industries - Materials for use in H ₂ S-containing environments in oil and gas production (2015)
NACE TM0284	Evaluation of Pipeline and Pressure Vessel Steels for Resistance to Hydrogen-Induced Cracking (2016)
NACE TM0177	Laboratory Testing of Metals for Resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in H ₂ S Environments (2016)
ISO 15590 - EN14870	Petroleum and natural gas industries – Induction bends, fittings and flanges for pipeline transportation systems

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3. DATA SHEET FOR 12-INCH OFFSHORE HOT BENDS

No.	Parameters	Hot Bends Requirements
1	Quantity	As per RFQ for Bend (GAIP-ABZ-PL-MR-002)
2	References	
	Design Code	ISO 15590-EN14870
	Project Specification	AB-ENG-SP-PL-2013 (B0)
3	Bend Dimension	
	Angle of Bend	As per RFQ for Bend (GAIP-ABZ-PL-MR-002)
	Outer Diameter	323.9 mm (12in)
	Inner Diameter	295.3 mm
	Wall Thickness	14.3 mm
	Wall Thickness Tolerance	-5%, +10%
	Curvature Radius	1619.5 mm (5 x OD)
	Curvature Radius Tolerance	±12.7mm
	Tangent Length	1000 mm
	Bend End	30° +5°, -0°, with a root face of 1.6 mm ± 0.6 mm
4	Material	
	Material Grade	API 5L X52 SMLS PSL2
	Supplementary Requirements	API 5L (45th Edition): Annexes B, C, H, J, K, NACE MR0175 / ISO 15156
	Mother Pipe Spec	AB-ENG-SP-PL-2011 (Rev. B0)
	Bend Manufacturing	Induction Heating and Forming without mandrels
5	Process Parameters	
	Service	Sour Crude Oil
	Design Pressure	90 bar
	Design Temperature (Min./Max.)	0°C / 65°C
	Hydrostatic Test Pressure (for mother pipe)	205 bar
6	Inspection and Testing	
	Test Bend	As per AB-ENG-SP-PL-2013 (B0), sub-section 3.3
	Production Test	As per AB-ENG-SP-PL-2013 (B0), sub-section 3.4
	Dimensional	As per AB-ENG-SP-PL-2013 (B0), sub-section 3.5
	NDT	As per AB-ENG-SP-PL-2013 (B0), section 4
	Impact Test Temperature	-10°C
	Impact Test Absorbed Energy	30J (single), 36J (average)
	Hardness (max.)	220 HV10 (BM), 248 HV10 (WM, HAZ)





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No.	Parameters	Hot Bends Requirements
	HIC Test	Required as per AB-ENG-SP-PL-2013 (B0), sub-section 3.3.5
	SSCC Test	Required as per AB-ENG-SP-PL-2013 (B0), sub-section 3.3.5
	Hydrostatic Test	Required on all completed bends
7	Others	
	Coating	Fusion Bonded Epoxy (800 μ)
	Final Documentation	As per AB-ENG-SP-PL-2013 (B0) section 11

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4. DATA SHEET FOR 20-INCH OFFSHORE HOT BENDS

No.	Parameters	Hot Bends Requirements
1	Quantity	As per RFQ for Bend (GAIP-ABZ-PL-MR-002)
2	References	
	Design Code	ISO 15590-EN14870
	Project Specification	AB-ENG-SP-PL-2013 (B0)
3	Bend Dimension	
	Angle of Bend	As per RFQ for Bend (GAIP-ABZ-PL-MR-002)
	Outer Diameter	508 mm (20in)
	Inner Diameter	479.4 mm
	Wall Thickness	14.3 mm
	Wall Thickness Tolerance	-5%, +10%
	Curvature Radius	2540 mm (5 x OD)
	Curvature Radius Tolerance	±12.7mm
	Tangent Length	1000 mm
	Bend End	30° +5°, -0°, with a root face of 1.6 mm ± 0.6 mm
4	Material	
	Material Grade	API 5L X60 SAWL PSL2
	Supplementary Requirements	API 5L (45th Edition): Annexes B, C, H, J, K, NACE MR0175 / ISO 15156
	Mother Pipe Spec	AB-ENG-SP-PL-2010 (B1) AB-ENG-SP-PL-2008 (B0)
	Bend Manufacturing	Induction Heating and Forming without mandrels
5	Process Parameters	
	Service	Sour Crude Oil
	Design Pressure	60 bar
	Design Temperature (Min./Max.)	0°C / 65°C
	Hydrostatic Test Pressure	205 bar
6	Inspection and Testing	
	Test Bend	As per AB-ENG-SP-PL-2013 (B0), sub-section 3.3
	Production Test	As per AB-ENG-SP-PL-2013 (B0), sub-section 3.4
	Dimensional	As per AB-ENG-SP-PL-2013 (B0), sub-section 3.5
	NDT	As per AB-ENG-SP-PL-2013 (B0), section 4
	Impact Test Temperature	-10°C
	Impact Test Absorbed Energy	30J (single), 36J (average)
	Hardness (max.)	220 HV10 (BM), 248 HV10 (WM, HAZ)



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	HIC Test	Required as per AB-ENG-SP-PL-2013 (B0), sub-section 3.3.5
	SSCC Test	Required as per AB-ENG-SP-PL-2013 (B0), sub-section 3.3.5
	Hydrostatic Test	Required on all completed bends
7	Others	
	Coating	Fusion Bonded Epoxy (800 μ)
	Final Documentation	As per AB-ENG-SP-PL-2013 (B0) section 11