

	نگهداشت و افزایش تولید میدان نفتی بینک فعالیت های رو زمینی در بسته های کاری تحت الارض عمومی و مشترک								
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طرح نگهداشت و افزایش تولید ۲۷ مخزن

PIPELINE MATERIAL SPECIFICATION

نگهداشت و افزایش تولید میدان نفتی بینک

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 IFC: Issued For Comment
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 AFD: Approved For Design
 AFC: Approved For Construction
 AFP: Approved For Purchase
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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, construction of well location, access roads, wellhead facilities for 6 new wells (with electric power supply for 2 of them) and required modifications on 4 workover wells (with electric power supply) shall be done. In addition, construction of 6 new flowlines from new wells to Binak B/C unit (with extension of relevant manifold) are in the Project scope of work.

GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – Construction of New Well Locations, Modifications on Workover Wells, Wellhead Facilities, Electrification Facilities, Flowlines and Extension of Binak B/C Manifold
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.

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2.0 SCOPE

This specification covers the general requirements to be implemented in the selection materials of pipelines, fittings, flanges, valves and other pipeline components to be used for "Construction of flowlines and wellhead Facilities for BINAK Oil Field" Project.

3.0 REFERENCES

Throughout this Specification the latest editions of the following standards and codes are referred to:

3.1 LOCAL CODES AND STANDARDS

IPS-E-PI-140	Engineering Standard for Onshore Transportation Pipelines
IPS-C-PI-140	Construction Standard for Transportation Pipelines (Onshore)
IPS-E-PI-240	Engineering Standard For Plant Piping Systems
IPS-E-PI-221	Engineering Standard For Piping Material Selection (on plot piping)
IPS-G-PI-280	General Standard for Pipe Supports
IPS-M-PI-110	Material and Equipment Standard for Valves
IPS-M-PI-150	Material Standard for Flanges and Fittings
IPS-M-PI-190 (3)	Material and Equipment Standard for Line Pipe
NOSIC-S5L-9002-0010	5000API/3000 API Oil Well Production Wellhead Fittings 6"

3.2 INTERNATIONAL CODES & STANDARDS

ASME B1.20.1	Pipe Threads General Purpose (Inch).
ASME B16.5	Steel Pipe Flanges And Flanged Fittings
ASME B16.9	Factory-Made Wrought Steel Butt welding Fittings
ASME B16.10	Face To Face And End To End Dimension Of Valve
ASME B16.11	Forged Steel Fittings, Socket Welding And Threaded
ASME B16.21	Nonmetallic Flat Gaskets For Pipe Flanges
ASME B16.25	Butt-Welding Ends
ASME B16.34	Steel Valves, Flanged And Butt-welding Ends
ASME B16.48	Steel Line Blanks
ASME B18.2.1	Square And Hex. Bolts And Screws, Inch Series
ASME B18.2.2	Square And Hex. Nuts
ASME B31.3	Process Piping
ASME B31.4	Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids
ASME B31.8	Gas Transmission and Distribution Piping Systems
ASME B36.10M	Welded and Seamless Wrought Steel Pipe
ASME B16.20	Metallic Gaskets for Pipe Flanges
API 5L	Specification For Line Pipe
API 6D	Pipeline Valves
API 6A	Specification for Wellhead and Christmas Tree Equipment
API 599	Steel Plug Valves, Flanged Or Butt-welding Ends
API-600	Steel Gate Valves, Flanged And Butt-welding Ends

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API 601	Metallic Gaskets For Piping, Double-Jacketed, Corrugated And Spiral Wound
API-602	Compact Steel Gate Valves
API 6FA	Specification for Fire Test For Valves
API 608	Metal Ball Valves-Flanged, Threaded, and Welding End
BS-1868	Flanged And Butt-Welding Ends Steel Check Valves For Petroleum And Petrochemical Industries
BS-1873	Flanged And Butt-Welding Ends Steel Globe Valves For Petroleum And Petrochemical Industries
BS EN ISO 17292:2015	Metal ball valves for petroleum, petrochemical and allied industries
BS EN ISO 15761:2002	Steel gate, globe and check valves for sizes DN 100 and smaller, for the petroleum and natural gas industries
BS 6775 (PART 2)	Testing Of Valve Specification For Fire Type Testing Requirement
BS EN 10204	Metallic Products-Type of Inspection Documents
MSS-SP-44	Steel Pipeline Flanges
MSS-SP-45	By pass and drain connection standard
MSS-SP-75	High-Strength, Wrought, Butt Welding Fittings
MSS SP-83	Class 300 and 6000 pipe unions, socket welding and threaded
MSS SP-80	Bronze Gate, globe angle and check valves
MSS SP-95	Swadage Nipples And Ball Plugs
MSS SP-97	Forged Carbon Steel Branch Olet Fittings
MSS SP-120	Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
NACE MR0175/ ISO 15156	Petroleum And Natural Gas Industries - Materials For Use In H2S Containing Environments In Oil And Gas Production
NACE TM-0284	Standard Test Method - Evaluation Of Pipeline And Pressure Vessel Steels For Resistance To Hydrogen-Induced Cracking
NACE TM-0177	Laboratory Testing Of Metals For Resistance To Sulfide Stress Cracking And Stress Corrosion Cracking In H2s Environments

3.3 THE PROJECT DOCUMENTS

BK-GNRAL-PEDCO-000-PL-DC-0001	Pipeline Design Criteria
BK-GNRAL-PEDCO-000-PR-DB-0001	Process Basis of Design
BK- GNRAL-PEDCO-000-PL-SP-0002	Specification for Line Pipe
BK-SSGRL-PEDCO-110-PL-CN-0001	Pipeline Wall Thickness Calculation

3.4 ENVIRONMENTAL DATA

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

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3.5 ORDER OF PRECEDENCE

In case of any conflict between requirements specified herein & the requirements of any other referenced document, this subject shall be reflected to CLIENT and the final decision will be made by CLIENT.

4.0 DESIGN CODES

The design of pipeline systems and production facilities shall conform to ASME B31.4 latest edition. The design of all process gas and natural gas distribution pipeline systems shall conform to ASME B31.8 latest edition.

All material for sour services shall meet the supplementary requirements of NACE MR-0175/ ISO 15156 latest edition.

5.0 GENERAL NOTES

Notes pertinent to a particular pipeline class appear directly on this relevant class.

- 5.1 All pipes shall be supplied in accordance with IPS-M-PI-190(3) & API.5L.
- 5.2 Pipe wall thickness is calculated in accordance with ASME B31.8 & ASME B31.4.
- 5.3 Butt-weld ends shall be beveled to ASME B 16.25.
- 5.4 Stud-bolts shall be threaded, full length to ASME B 1.1 and supplied with two hexagonal heavy type nuts to ASME B 18.2.2.
- 5.5 The hardness of all material including welds in sour services shall be as per requirements of NACE STD MR-0175/ ISO 15156.
- 5.6 Welded branch connection on steel pipes must meet the requirements of ASME B31.4 & B31.8 respectively.
- 5.7 *Deleted.*
- 5.8 All flanges and fittings shall be supplied in accordance with IPS-M-PI-150.
- 5.9 All valves shall be supplied in accordance with IPS-M-PI-110 and API 6A.

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6.0 LIST OF ABBREVIATIONS

BB	Bolted Bonnet
BC	Bolted Cover
BG	Bolted Gland
BW	Butt-weld
CA	Corrosion Allowance
CS	Carbon Steel
FE	Flanged End
OS&Y	Outside Screw and Yoke
RF	Raised Face
RTJ	Ring Type Joint
SMLS	Seamless
SPW	Spiral Wound
WN	Welding Neck

7.0 PIPELINE MATERIAL CLASSES

7.1 IDENTIFICATION OF PIPELINE CLASSES

Each pipeline class is identified from two alphabetical characters which precede a two digit figure. The first alphabetical character indicates pressure rating of flange and the second alphabetical character indicates material as follows:

1st alphabetical character		2nd alphabetical character	
A	Class 150	N	Carbon Steel
C	Class 300	S	Stainless Steel
F	Class 600	X	Non Metal Pipe
G	Class 900	Z	Galvanized Carbon Steel
H	Class 1500		
L	API 3000		
M	API 5000		

The third figure indicates the design code and the forth figure indicates corrosion allowance for metallic as follows:

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3rd figure		4th figure for metal pipe		
Fig.	Design standard	Fig.	C.A.	NACE 175 Requirement
0	ASME B 31.3 (For Inside of Plant)	0	0 mm	No
		1	1 mm	No
1	ASME B 31.4 (For Liquid Pipeline)	2	1 mm	Yes
		4	3 mm	No
2	ASME B 31.8 (For Gas Pipeline)	5	3 mm	Yes
		6	6 mm	No
		7	6 mm	Yes

7.2 SUMMARY OF PIPELINE CLASSES

Class	Rating	Base Material	C.A (mm)	Design Code	Design Temp. (°C)	Design Pressure (psig)	Fluid	Symbol	State
	Face				Max.	Max.			
Flow line									
LN15	LN15	C.S	3	ASME B31.4	85	1035	Crude Oil	CRD	Liquid
	RTJ								

Class LN15

CODE	SERVICE	Material	C.A.	RATING	Design	
ASME B31.4	Oil	Carbon Steel (NACE MR-0175/ ISO 15156)	3 mm	API 3000	TEMP (Cº)	PRESS (psig)
					-5/85	1035
ITEM	SIZE	DESCRIPTION				
Pipe	1/2" To 1 1/2"	API 5L GR.B- SCH 160-NACE-PSL2-SMLS-PE–acc to ASME B36.10M& NACE MR-0175/ ISO 15156.				
	2"-3"	API 5L X52, NACE, PSL2, SMLS, SCH.40 BE, ACC to API 5L, IPS-M-PI-190 & NACE MR-0175/ ISO 15156.				
	4"-6"	API 5L X52, NACE, PSL2, SMLS, THK 7.9 mm BE, ACC to API 5L, IPS-M-PI-190 & NACE MR-0175/ ISO 15156.				
Fittings	1/2" To 1 1/2"	6000#, SW, ASTM A105,NACE, acc to IPS-M-PI-150, ASME B 16.11 & NACE MR-0175/ ISO 15156.				

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CODE	SERVICE	Material	C.A.	RATING	Design	
ASME B31.4	Oil	Carbon Steel (NACE MR-0175/ ISO 15156)	3 mm	API 3000	TEMP (C°)	PRESS (psig)
					-5/85	1035
ITEM	SIZE	DESCRIPTION				
	2" To 6"	CS to ASTM A860 WPHY52, NACE, BW, ACC to MSS-SP-75 & NACE MR-0175/ ISO 15156.				
Flanges	1/2" To 1 1/2"	1500#, RTJ, SW, ASTM A105 NACE, acc. to IPS-M-PI-150, ASMEB16.5 & NACE MR-0175/ ISO 15156.				
	2" To 6" (2 1/16" To 7 1/16")	TYPE 6B, WN, BW, RTJ, API60K, NACE, ACC to NACE MR-0175/ ISO 15156.				
Gate Valves	1/2" To 1 1/2"	1500 #, SW, BODY:ASTM A105, TRIM:AISI 316L+STELLITE6,OS&Y, BB, Solid Wedge, acc to API 602, IPS-MPI-110 & NACE MR-0175/ ISO 15156.				
	2" To 6" (2 1/16" To 7 1/16")	API 3000, Material Class EE, Body: API 60K, Trim: API 75K, BB, FE, RTJ, ACC to API 6A & NACE MR-0175/ ISO 15156.				
Ball Valves	1/2" To 1 1/2"	1500 #, Floating Ball, SW, Body: ASTM A105, Ball: AISI 316(L), Trim: Soft Seat-CS ENP-75 micron-PTFE, acc to DIN EN ISO 17292, IPS-MPI-110 & NACE MR-0175/ ISO 15156.				
	2" To 6" (2 1/16" To 7 1/16")	API 3000, Material Class EE, Body: API 60K, Trim: API 75K, FE, RTJ, ACC to API 6A & NACE MR-0175/ ISO 15156.				
Check Valves	1/2" To 1 1/2"	1500 #, SW, Body: ASTM A105, Trim: AISI 316L+STELLITE6, Horizontal Piston lift ,acc to API 602 & NACE MR0175/ISO 15156.				
	2" To 6" (2 1/16" To 7 1/16")	API 3000, Material Class EE, Body: API 60K, Trim: API 75K, BC, FE, RTJ, ACC to API 6A & NACE MR-0175/ ISO 15156.				
Gaskets	1/2" To 1 1/2"	1500#, RTJ, 316SS acc to ASME B 16.20 & NACE MR-0175/ ISO 15156.				
	2" To 6"	API3000, RTJ, SS316 ACC to NACE MR-0175/ ISO 15156.				
Stud Bolts & Nuts	-	Stud bolts ASTM A193 grade B7M, HH nuts ASTM A194 grade 2HM, Thread: bolts class 2A, nuts class 2B				

Note 1:

Final thickness of flowlines will be 7.9mm. So considering design pressure of 1035 psi (~~Approved by NISOC~~), the actual corrosion allowance would be **5-5.5 mm** which is sufficient for the corrosion calculations.

5.5mm