
	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض</p> <p>عمومی و مشترک</p>																									
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طرح نگهداشت و افزایش تولید ۲۷ مخزن

SPECIFICATION FOR COLOR CODING AND MARKING

نگهداشت و افزایش تولید میدان نفتی بینک



D02	MAY. 2023	AFD	M.Noori	M.Fakharian	A.M.MOHSENI	
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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 COMPANY Review
 AB-A: As-Built –Approved

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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.

GENERAL DEFINITION



The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields CLIENT (NISOC)
PROJECT:	Binak Oilfield Development – General Facilities
EPD/EPC CONTRACTOR:	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 EPC CONTRACTOR and approved by GC & COMPANY (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 COMPANY rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR.
MAY:	Is used where a provision is completely discretionary.

2.0 SCOPE

This specification applies to color coding of the following types of commodities:

- (1) Pipes
- (2) Butt Welding Fittings
- (3) Forged Fittings
- (4) Flanges

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(5) Bolts and Nuts

(6) Valves

3.0 NORMATIVE REFERENCES

3.1 LOCAL CODES AND STANDARDS

- IPS-E-TP-100 Engineering Standard for Paints
- IPS-M-PI-190 (3) Material And Equipment Standard For Line Pipe

3.2 INTERNATIONAL CODES AND STANDARDS

API (AMERICAN PETROLEUM INSTITUTE)



- API 5L Specification for Line Pipe

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERES)

- ASME B 16.20 Metallic Gasket for Pipe Flanges-Ring Joint, Spiral wound
- ASME B16.5 Steel Pipe Flanges And Flanged Fittings
- ASME B16.9 Factory-Made Wrought Steel Butt welding Fittings
- ASME B16.11 Forged Steel Fittings, Socket Welding And Threaded
- ASME B16.34 Steel Valves, Flanged And Butt-welding Ends
- ASME B18.2.1 Square And Hex. Bolts And Screws, Inch Series
- ASME B18.2.2 Square And Hex. Nuts
- .

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

- ASTM A105 Forgings, Carbon Steel, for Piping Components
- ASTM A106 Seamless Carbon Steel Pipe for high temperature service
- ASTM A193 Alloy-Steel and Stainless-Steel Bolting Materials for high- temperature Service
- ASTM A194 Carbon and Alloy-Steel Nuts for Bolts for high pressure and high-temperature Service"
- ASTM A182 Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings, and Valves and Parts for high temperature Service
- ASTM A234 Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated temperature
- ASTM A312 Seamless and Welded Austenitic Stainless Steel Pipe

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- BS 5383 Material Identification of Steel, Nickel Alloy and Titanium Alloy tubes by Continuous Character Marking and Colour Coding of Steel Tubes
- MSS SP-25 Standard marking system for valves fittings, flanges & unions

3.3 THE PROJECT DOCUMENTS



- BK-SSGRL-PEDCO-110-PI-SP-0001 Piping Material Specification
- BK-GCS-PEDCO-120-PI-SP-0001 Piping Material Specification

3.2 ENVIRONMENTAL DATA

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

4.0 GENERAL

- (1) Color coding is intended to supplement not replace, normal identification marking required by ASTM, MSS or other standards and specifications.
- (2) The pipe shall be color coded and marked (stenciling) at locations such that there is no interference with identifying marks, welding bevels, etc.
- (3) All commodities shall be identified by marking (stamping or stenciling), in excess of color coding.
- (4) Painting material to be used for the color coding and marking on austenitic stainless steel pipe or components shall not contain any harmful metal, or metal salts, such as zinc, lead, sulfur or copper, which cause corrosive attack on heating.
- (5) The paint shall be resistant to salt water atmosphere, tropical or freezing climates or similar attack.
- (6) DIE stamping (pressing) is not allowed on austenitic stainless steel materials.
- (7) Surface to be color coded shall be clean, dry, and free from grease, rust, scale or other foreign matter.
- (8) Color coding can be applied on sound primer.
- (9) Flange faces and ends of materials to be welded shall not be painted.
- (10) Color painting shall not interfere with permanent marking.
- (11) Following surface preparation, the color code paint is to be applied within the same work shift. Prepared surfaces which are left for a longer period shall be re-cleaned before painting.
- (12) The approved Manufacturer's instructions for use shall be carefully observed. Paint shall not be applied under the following conditions.
- (13) Painted areas shall be thoroughly cured before the components are handled and prepared for packing and shipping.

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5.0 COLOR CODING

- (1) Identification by color coding shall be made by "Painting" directly on piping material.
- (2) The painting color shall be clearly indicated and shall not be easily erasable.
- (3) Paint colors to be used for color coding shall be those given in Table-1.

6.0 MARKING

Marking shall mean stamping or stenciling.

6.1 CRITERIA OF MARKING

The followings shall be legibly and clearly marked on the body or surface, and/or metal identification plate.

(1) Stamping

Shall be done either by stamping vibro pen, pressing or moulding.

Application: Forged fitting, Flanges, Bolt and nuts, Valves

Stenciling

Stencil marks must not be easily erasable.

Application: Pipes, Butt weld fittings

6.2 MARKS TO BE STAMPED OR STENCILED

- (a) Size (normal diameter)
- (b) Wall thickness (schedule number)
- (c) Rating
- (d) Material symbol
- (e) Manufacture name or trade mark
- (f) Vendor work number, manufacturing number or heat no
- (g) NACE MR0175 (Where Applicable)



DEFINITIONS FOR IDENTIFICATION SYMBOLS

(1) Material symbol

Material is indicated by the symbol denoting the steel type, according to the following example. Example: A53-S-GrB, A105, A312-TP316.

(2) Size (Nominal Diameter)

The nominal sizes of piping shall be indicated in "inches". The unit designation may be omitted.

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(3) Schedule Number or Rating

The schedule number or rating of items shall have the letters "Sch." Preceding the number or wall thickness of item shall be indicated in millimeters with the unit designation omitted.

(4) Manufacturer's Name or Trade Mark

The manufacturer's name or trade mark or abbreviated form of company name of the manufacturer (or vendor) shall be affixed on the products.

(5) Vendor Work Order No., Manufacturing No. or Heat No.

These identification numbers are assigned to each specific order from purchaser, and the key to fabricator's production control.

7.0 PROCEDURE FOR COLOR CODING AND MARKING

7.1 Color Coding and Marking Shall Be Done According to the Following Procedures SCOPE OF IDENTIFICATION WORK

	<u>Marking</u>	<u>Color Coding</u>
Pipes	M	M
Fittings	M	M*
Forged Fitting	M	M*
Flanges	M	M*
Bolt and Nuts	M	M**
Valves	M	M*

M : Manufacturer

* : For alloy only

** : For alloy B16 only on body/bonnet bolts of valves

7.2 Pipes

7.2.1. Color coding



Each length of pipe shall be painted for identification of material code over the entire length with a 13mm to 38 mm wide stripe. Vendor shall exercise good judgment in selecting appropriate width, depending on size of pipe.

- Color coding is not applicable for galvanized and externally coated materials.
- IPS-M-PI-190(3) shall be considered for pipes.

7.2.2. Stenciling

The manufacturer's standard stencil shall include the following matters.

- Size (normal diameter)

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- (d) Wall thickness (schedule number)
- (e) Material Symbol
- (f) Manufacturer's Name or Trade Mark
- (g) Work Number, Manufacturing Number or Heat No.

7.3. BUTT WELDING FITTINGS

7.3.1. Color coding. (applied only for alloy material)

The back of each butt-weld fitting shall be painted for identification of material code over the entire length with a 13 mm to 38 mm wide stripe. Vendor shall exercise good judgment in selecting appropriate width, depending on size of fittings.

7.3.2. The stenciling shall indicate the following:

- (a) Size (nominal diameter)
- (b) Wall Thickness (schedule number)
- (c) Material Symbol
- (d) Manufacturer's Name or Trade Mark
- (e) Vendor Work No., Manufacturing Number or Heat No.

7.4. FORGED FITTINGS

7.4.1. Color coding. (applied only for alloy material)

Each forged fitting shall be dabbed with a spot of paint, 13 mm to 25 mm in diameter.

7.4.2. The stamping shall indicate the following:

- (a) Size (nominal diameter)
- (b) Rating
- (c) Material symbol
- (d) Manufacturer's Name or Trade Mark

7.5. FLANGES



7.5.1. Color coding. (applied only for alloy material)

The outer periphery (edge) of each flange shall be painted over the entire circumference. For flanges thicker than 25 mm, the width of the band may be limited to 25 mm.

Care shall be taken to avoid colour painting on flange gasket surfaces, weld bevel or any surfaces intended for welding.

7.5.2. The stamping which shall be done on the side of the flanges, shall indicated the following:

- (a) Rating and facing Type
- (b) Size (nominal diameter)
- (c) Material Symbol
- (d) Manufacturer's Name or Trade Mark
- (e) Vendor Work Number, Manufacturing Number or Heat No.

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7.6. BOLTS AND NUTS

The stamp marks given below shall be provided at the heads of machine bolts, both heads of stud bolts and one side of each nut.

<u>Bolt of Nut</u>	<u>Material</u>	<u>Stamping Mark</u>
A) Bolt Nut	A193 Gr B7 A194 Gr 2H	B7 2H
B) Bolt Nut	A193 Gr B16 A194 Gr 4	B16 4
C) Bolt Nut	A193 Gr B7M A194 Gr 2M	B7M 2M
D) Bolt Nut	A307 Gr B A563 Gr A	B A
E) Bolt Nut	A193 Gr B8 A194 Gr 8	B8 8
F) Bolt/ Nut	A453 Gr 660 CL.B	660-B

7.7. VALVES

7.7.1. Color coding. (applied for alloy material only)

For flanged valves

The outer periphery (edge) of each flange shall be painted over the entire circumference. For flanges thicker than 25 mm, the width of the band may be limited to 25 mm.

For butt-weld, screwed and socket-weld valve



They shall be painted (color band) on each end of valve. The width of band may be limited to 25 mm.

7.7.2. All valves should be identified on the body or hand wheel as follows:

- Size (nominal diameter)
 - Rating
 - Material Symbol
 - Manufacturer's Name or Trade Mark
 - Flow (If required ex. Globe, check ... etc.)
 - Work Number, Manufacturing Number or Heat No. (Only for cast steel valve)
 - JV Material Symbol
- Example: P30B1H-001

7.7.3. All valves shall have a rust-resistant metal tag.

7.8. GASKETS

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7.8.1 Spiral wound gaskets shall be color coded on the outside edge of the centering ring in full accordance with ASME B 16.20.

7.8.2 For ring joint gaskets, all items shall be marked on the circumference of ring by punching with copper brown (8004).

TABLE 1. COLOR CODING FOR MATERIAL OF PIPING

<u>Material Type</u>	<u>Material Code</u>	<u>Color Code</u>
Carbon steel	ASTM A53 Gr. B	None
	ASTM A106 Gr. B	White
	API 5L	Orange
	SPECIAL C.S (ASME MAT'L)	Yellow
Carbon steel (NACE)	ASTM A 106 Gr.B	Light Brown
	API 5L Gr.B	
	ASTM A 105	
	ASTM A 234 Gr.	
	WPB/WPB-W	
	ASTM A 516 Gr. 70	
Low Temp. Carbon steel (NACE)	ASTM A 333 Gr. 6	Blue
	ASTM A 350 Gr. LF2	
	ASTM A 420	
	WPL6/WPL6-W	
Alloy Steel	C- ½ Mo	Red + Yellow
	5 Cr - ½ Mo	Dark Green + Yellow
	9 Cr - 1 Mo	Light Blue + Yellow
	12 Cr	Purple + Yellow
	1-1/4 Cr - ½ Mo	Light Green + Yellow
	2-1/4 Cr - 1 Mo	Orange + Yellow
	1-1/4Cr - ½ Mo	White + Yellow
		(for CCR/HCR unit only as per UOP Spec- 7143/7145-801)
Stainless Steel	Type 304	Purple
	Type 304L	Brown
	Type 316	Black
	Type 316L	Light Green
	Type 321	Red
	Type 347	Light Blue
Other	Alloy 20	Dark Blue
	B16 STUD-BOLTS	Black
	B 7 STUD-BOLTS	None Color