



نگهداشت و افزایش تولید میدان نفتی بینک  
سطح الارض و ابنیه تحت الارض



خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک  
(قرارداد BK-HD-GCS-CO-0015\_02)



شماره پیمان:

053 - 073 - 9184

PMI Procedure (welding of stainless steel)

پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه
BK	GCS	AA	120	QC	PR	0011	V00

شماره صفحه: 1 از 9

## طرح نگهداشت و افزایش تولید 27 مخزن

### PMI Procedure (Welding of Stainless Steel)

نگهداشت و افزایش تولید میدان نفتی بینک

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IFI: Issued For Information

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V00	0011	PR	QC	120	AA	GCS	BK

شماره صفحه: 2 از 9

REVISION RECORD SHEET



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 <p>NISOC</p>	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض</p> <p>خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)</p>																	
<p>شماره پیمان: 053 - 073 - 9184</p>	<p>PMI Procedure (welding of stainless steel)</p> <table border="1" data-bbox="387 383 1174 448"> <tr> <th>نسخه</th> <th>سریال</th> <th>نوع مدرک</th> <th>رشته</th> <th>تسهیلات</th> <th>صادرکننده</th> <th>بسته کاری</th> <th>پروژه</th> </tr> <tr> <td>V00</td> <td>0011</td> <td>PR</td> <td>QC</td> <td>120</td> <td>AA</td> <td>GCS</td> <td>BK</td> </tr> </table>	نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادرکننده	بسته کاری	پروژه	V00	0011	PR	QC	120	AA	GCS	BK	<p>شماره صفحه: 3 از 9</p>
نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادرکننده	بسته کاری	پروژه											
V00	0011	PR	QC	120	AA	GCS	BK											

### Table of Contents

1. INTRODUCTION.....	4
2. SCOPE.....	5
3. REFERENCE .....	5
4. PARTS TO BE EXAMINED.....	5
5. EXTENT OF PMI .....	5
6. TIMMING ON PMI.....	5
7. NUMBER OF PMI TESTS .....	6
8. PERSONNEL QUALIFICATION .....	6
9. EXAMINATION METHOD .....	7
10. ACCEPTANCE CRITERIA .....	7
11. RETEST .....	8
12. RESPONSIBILITY .....	8
13. IDENTIFICATION MARKING.....	8
14. CALIBRATION CONTROL .....	8
15. INSPECTION REPORT .....	8
16. ATTACHMENT .....	8

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض  خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)								
	PMI Procedure (welding of stainless steel)							شماره صفحه : 4 از 9	
شماره پیمان: 053 – 073 – 9184	پروژه BK	بسته کاری GCS	صادرکننده AA	تسهیلات 120	رشته QC	نوع مدرک PR	سریال 0011	نسخه V00	

## 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.

### GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – Manufacturing (w/Engineering & Material Supply) of Air Coolers
EPD/EPC CONTRACTOR (GC):	Petro Iran Development Company (PEDCO)
OWNER:	OWNER is collectively refer to National Iranian South Oil Company (NISOC) and Petro Iran Development Company (PEDCO)
EPC CONTRACTOR:	Joint Venture of : Hirgan Energy – Design & Inspection(D&I) Companies
VENDOR:	Aban Air Cooler (AAC)
EXECUTOR:	Executor is the party which carries out all or part of construction and/or commissioning for the project.
THIRD PARTY INSPECTOR (TPI):	Third Party Inspector
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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	PMI Procedure (welding of stainless steel)							شماره صفحه : 5 از 9	
شماره پیمان: 053 – 073 – 9184	پروژه BK	بسته کاری GCS	صادرکننده AA	تسهیلات 120	رشته QC	نوع مدرک PR	سریال 0011	نسخه V00	

## 2. SCOPE

This procedure covers components and material compositions to be checked, sampling requirements, approved methods, acceptance/rejection criteria, and marking requirements for Positive Material Identification (PMI) for non carbon steel material and stainless steels materials for air coolers of sulfur recovery unit and tail gas treating unit of Binak Oilfield Development – Manufacturing (w/Engineering & Material Supply) of Air Coolers.

## 3. REFERENCE

ASME Sec. II Part A, B, C (2017).

## 4. PARTS TO BE EXAMINED

The following items shall be examined:

AE-2101

The element which shall be examined can be seen in table 1.

Material	Alloying Element										
	C	Cr	Ni	Mo	Cb	Ti	Cu	W	Al	Zn	Other
S.S TP316	-	16-18	10-14	2-3	-	-	-	-	-	-	-

## 5. EXTENT OF PMI

PMI shall be performed on following items as min.:

- S.S TP316



- Base material

- Weld consumables before welding. The PMI shall consist of one test on one electrode from each batch number or filler wire from each heat number.

The welded joints and components shall be tested after fabrication.

## 6. TIMING ON PMI

When taking the “material receiving inspection”, the PMI shall be performed after putting I.D marking and cutting plan, but before cutting to pieces, under the witness of Q/C. “PMI” shall be stamp on to each piece of the component If any pieces on component is found out later, which has no “PMI, mark”, those are to be retested.

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض  خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)							
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شماره پیمان: 053 – 073 – 9184	پروژه BK	بسته کاری GCS	صادرکننده AA	تسهیلات 120	رشته QC	نوع مدرک PR	سریال 0011	نسخه V00

The welding joints are to be “PMI” tested after welding but before NDE. The “PMI” to be put in HAZ part on each welding line.

Each analyzer shall be calibrated according to the manufacturer's requirements. At the beginning and end of each shift, the instrument must be checked against a known standard for each alloy type to be inspected during the shift.

## 7. NUMBER OF PMI TESTS

Material may be checked prior to cutting provided the transferred markings properly identify the subsequent components to the satisfaction of the positive material identification inspector. The "PMI" mark shall be stamped next to the material

heat numbers. Once a plate has been identified and the components properly marked, further testing of the components is not required.

The method of analysis shall be sufficiently accurate to confirm that the measured alloy contents are within the specified limits. The analysis shall be of the inside weld surface. Each weld procedure, welding position, and welder/welding operator for each procedure and position they use shall be analyzed. Analysis shall also include each source of deposited welding materials (e.g., reel of wire, box of rods, etc.).

If a weld fails PMI, remaining welds in the piece of equipment shall receive PMI.



If any material component or weld is found to be unacceptable, all other represented materials, components, or welds shall be considered suspect and the following options are available:

- A. Replacing all those represented materials and components with new and tested components or filler metals (as applicable).
- B. Performing 100 percent examination of the remainder of the represented materials, components, or welds, and replacing each item that fails the PMI check.

## 8. PERSONNEL QUALIFICATION

The person performing the PMI test should be knowledgeable about all aspects of operation of PMI test equipment and the PMI test method used.

All PMI inspectors shall be appropriately qualified for the inspection to be performed and their qualification must be approved by the Client's representative.

 <p>NISOC</p>	<p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض</p> <p>خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)</p>																	
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پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال	نسخه											
BK	GCS	AA	120	QC	PR	0011	V00											

Qualification shall be documented and shall cover:

- Ability to operate the instrument
- Ability to recognize the instrument's limitations in terms of material, surface profile and working conditions.
- Ability to interpret the instrument's output and recognize erroneous readings

If the inspector has not performed PMI inspection during the previous three months, he shall perform a practical examination

## 9. EXAMINATION METHOD

Instruments use to performed PMI shall be conformed to one of following:

Portable X-Ray fluorescence spectrometers with direct reading of alloy grade or composition in the applicable range, such as “Texas nuclear 9266” or equivalent.

The traces of PMI examination shall be taken off not to adversely affected the end use of items.



## 10. ACCEPTANCE CRITERIA

Materials shall contain the number of alloying elements specified in the ASME SEC.II, Part A and B for materials and Part C for welding consumable. Alloy materials and alloy welding filler materials (tested in raw form) shall be acceptable if the percentage of each major alloying element is between 90% of the minimum and 110% of the maximum values permitted by the material specification/Standard.

Deposited production weld metal deposits shall be within  $\pm 12.5$  percent of the ranges allowed by ASME Section II Part C for each element.

Undiluted weld metal deposits shall be within  $\pm 12.5\%$  of the ranges allowed in the material specification for each element.

Acceptance criteria for dissimilar metal alloy welds shall be in accordance with the welding consumable specified in the approved welding procedure. The effects of dilution between the different base metals and the filler metal shall be considered for determining the nominal as-deposited weld metal composition.

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض  خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)							
	PMI Procedure (welding of stainless steel)							
شماره پیمان: 053 – 073 – 9184	پروژه BK	بسته کاری GCS	صادرکننده AA	تسهیلات 120	رشته QC	نوع مدرک PR	سریال 0011	نسخه V00

## 11. RETEST

The representative sample shall be 100% for a lot of five (5) pieces or less; the greater of five (5) pieces or 5% for a lot of five (5) to two hundred (200) pieces, and the greater of ten (10) pieces or 3% for a lot greater than two hundred (200) pieces.

If any piece from a representative sample is found to be unacceptable, each piece of the lot shall be examined.

When a lot is found to contain unacceptable pieces, 100% of the next two lots from the same supplier shall be examined. If both lots are acceptable, or when two successive lots are acceptable, the sampling procedure given in above may be resumed.

## 12. RESPONSIBILITY

Vendor Q.C Department shall be responsible for arranging PMI operators for conducting PMI as per this procedure. PMI shall be carried out in the presence of Client's representative or authorization from Client's representative.

## 13. IDENTIFICATION MARKING

All accepted material shall be marked with “PMI” using a certified low stress stamp. The marked place shall be as follow.

Components: Mark shall be put on every piece adjacent to I.D mark of MFG. Mark.

Tube and Pipe: Stenciled 300mm from each end.

## 14. CALIBRATION CONTROL

- 1) The Vendor shall have current valid calibration certificates.
- 2) Purchaser's / third party's inspector shall review calibration of measuring and test equipment.




## 15. INSPECTION REPORT

Refer to attachment which will be filled in by NDE party (out sources)




## 16. ATTACHMENTS

Attachment #1: PMI Test Report



	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض  خرید پکیج کولرهای هوایی ایستگاه تقویت فشار گاز بینک (قرارداد BK-HD-GCS-CO-0015_02)							  	
	PMI Procedure (welding of stainless steel)							شماره صفحه: 9 از 9	
شماره پیمان: 053-073-9184		پروژه BK	بسته کاری GCS	صادرکننده AA	تسهیلات 120	رشته QC	نوع مدرک PR	سریال 0011	نسخه V00

## Attachment 1

	<h1>PMI Test Report</h1>							  				
	Project Name / No.:				Client:							
Material Supplier:				Manufacturer/Fabricator:								
Location of PMI Examination:				P.O. No.:								
Component Description:			Equipment tag No. / Line No.:			Method of Examination:						
Items to be checked												
Material	Spec.	Mill Certificate No.	Heat No.	No. of Items	Lot Size	Sample Size	Quantity (accept/Reject)	Element / Composition	Chemical Analysis		Proper Color Applied	Accept/Reject
									Acceptable Range	Actual Value		
											Remark	
											Distribution	
AAC QA/QC			Purchaser			TPI		MC/OWNER				
Date												
Name												
signature												