

निर्माण स्थल पर सामग्री की सकारात्मक

पहचान के लिए मानक विनिर्देशन

STANDARD SPECIFICATION

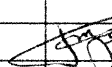


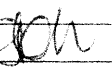
FOR

POSITIVE MATERIAL IDENTIFICATION

(PMI)

AT

CONSTRUCTION SITES

0	22.07.2002	ISSUED AS STANDARD SPECIFICATION				
REV.	DATE	REVISIONS	BY	CHECKED	CONVENOR	CHAIRMAN (S.B.)



ENGINEERS INDIA LIMITED
NEW DELHI

**STANDARD SPECIFICATION FOR
POSITIVE MATERIAL
IDENTIFICATION AT CONSTN SITES**

SPECIFICATION

6 - 82 - 0002

REV.

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ATTACHMENT (REPORTING FORMAT)

I. FORMAT FOR PMI TEST REPORT - 6-82-0002-F1 (1 SHEET)



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1.0 SCOPE

- 1.1 This specification applies to metallic alloy materials used in piping, heater coils, storage tanks, vessels etc. at construction sites. PMI is to be carried out on owner-supplied material as well on material purchased by the contractor.
- 1.2 This specification covers the procedures and methods to be used to assure that the chemical composition of alloy materials conforms to the material specification as specified in purchase documents/contract using Alloy Analyzers.
- 1.3 Any deviation from this specification must be approved by Owner/EIL in the prescribed format.
- 1.4 Carbon steels are excluded from the scope of this specification.

2.0 DEFINITIONS

2.1 POSITIVE MATERIAL IDENTIFICATION (PMI)

The term Positive Material Identification (PMI) refers to determination/ verification of alloy type or its composition using portable or mobile spectrometer/alloy analyzer.

Chemical spot checking, resistivity testing, eddy current testing, electromagnetic alloy sorting, triboelectric testing thermoelectric testing shall not be considered as PMI for the purpose of this specification.

3.0 SPECIFIC APPLICABILITY

- 3.1 The following items require PMI unless specifically exempted through a Waiver/Deviation permit by Owner/EIL.
 - 3.1.1 All pressure containing piping components including, thermowells instrument manifolds, RTJ gaskets, fasteners etc..
 - 3.1.2 Tubular products used in the fabrication of heaters.
 - 3.1.3 Pressure - containing instrument housings (e.g. gauge glass housings, orifice meter tubes).
 - 3.1.4 Internal metallic linings/cladding, and weld overlay, done at site, used for protection against corrosive environments.
 - 3.1.5 Tubing
 - 3.1.6 Stud, bolts and nuts
 - 3.1.7 Plates
 - 3.1.8 All pressure containing welds.



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3.1.9 Any other components or materials specifically designated for PMI on the purchase order/contract.

3.2 EXCLUSIONS

The following items are exempted unless specifically designated for PMI in the purchase order/contract.

3.2.1 Gaskets (spiral wound or carbon steel only).

3.2.2 Internal instrument parts.

3.2.3 Internal machinery parts.

3.2.4 Internal non pressure - containing baffles, trays, tray clips, supports, pall-rings, support rings, etc.

3.2.5 Electrical components.

3.2.6 Non pressure - containing welds, including seal welds, piping supports welds, structural parts.

3.2.7 Internal valve components.

3.2.8 Compression-type ferrules and fittings for use with 3/4 inch (19mm) outside diameter and smaller tubing.

4.0 REFERENCES

- American Society of Mechanical Engineers (ASME) BPV Code Section-II Part A,B,C and D
- ASME B 31.3
- American Society for Testing and Materials (ASTM) : As applicable
- Material Verification Program for New and Existing Alloy Piping Systems : API RP 578
- Any other material specification referenced by the Purchase Order/Contract.

5.0 GENERAL REQUIREMENTS

5.1 The test methods outlined in this specification are intended to identify the nominal composition of alloy materials. These test methods are not intended to establish the conformance of a material to a particular alloy specification.

5.2 PMI shall not be considered as a substitute for required mill test reports listing chemical composition. In addition, mill test reports shall not be considered as confirming alloy verification.



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- 5.3 The PMI activity shall be included in the overall quality plan and Inspection & Test Plan for warehouse and fabrication/erection. The Contractor shall submit to EIL/Owner, a procedure for PMI to comply with the requirements of this specification. Approval of PMI procedure shall be obtained from Owner/EIL prior to commencement of fabrication/erection as the case may be.
- 5.4 A copy of daily PMI records shall be submitted to owner/EIL .
- 5.5 After installation, but prior to hydrostatic testing/painting/insulation, the Contractor shall examine all components requiring PMI for proper compliance to this specification. A record of this final check, as specified below, shall be submitted to EIL/Owner and made part of the permanent inspection records.
- 5.5.1 **Owner supplied material :**
- Records signed by contractor and duly certified by EIL/Owner.
- 5.5.2 **Contractor supplied material :**
- Records signed by contractor and certified by an approved third party inspection agency.
- 5.6 After acceptance, all components shall be marked with a suitable paint mark. Markings must be permanent and readily visible. These markings are in addition to markings required by other codes/specifications/Technical Notes.
- 5.7 Controls shall be established to keep the non-conforming items identified till proper resolution of non-conformity.
- 5.8 EIL/Owner shall have the right to witness the performance of any PMI test.

6.0 EXTENT OF PMI

PMI shall be done on each component (100 percent PMI inspection) including welds, unless specifically exempted by Owner/EIL.

However, one stud & nut assembly for each flange joint shall require PMI. All studs & nuts in a piping hydro test loop shall require PMI, if any non conformity is detected.

7.0 PMI IN WAREHOUSE

PMI testing to be performed as part of the receiving inspection at warehouse.

The extent of PMI shall be as specified in 6.0. However, if PMI testing has been carried out at vendor/manufacture's shop and relevant certified records and correlation with incoming material is available, PMI testing at warehouse need not be done.

PMI testing within the warehouse shall not be regarded as an alternative to PMI testing of the installed system.



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8.0 PMI OF PIPING AND HEATER COIL COMPONENTS

PMI testing (irrespective of PMI done at earlier stages) shall be carried out when piping loops/heater coils have been cleared for hydrostatic testing by EIL/Owner. Hydrostatic Testing shall be carried out only when non conforming components have been replaced with conforming components and subsequent Non Destructive Testing, Post Weld Heat-Treatment, Hardness checking etc., as required by specifications have been completed. PMI records shall form a part of piping/heater inspection records. Contractor shall demonstrate to EIL that each & every component of the piping system and heater coils has been subjected to PMI by providing line wise records of PMI.

9.0 TESTING METHODOLOGY

In general, portable X-Ray Fluorescence (XRF) type analyzers such as Metorex X-Met 2000 Metal Master or NITON II Alloy Analyzer or similar analyzer shall be used for carrying out PMI. Identification of characteristic alloying elements, which distinguishes the material from other materials, will be sufficient.

Testing shall be done after proper surface cleaning and other requirements outlined by the manufacturer of the portable alloy analyzer. Modification, if any, of these procedures must be approved by Owner/EIL.

10.0 CALIBRATION

- 10.1 Instruments used for PMI shall have the sensitivity to detect the alloy elements in the specified ranges. Instruments or methods used for examination shall be of the type that will provide quantitative, record-able, elemental composition results for positive identification of the alloy elements present.

However, all non pressure containing parts (such as pipe supports) and studs, bolts, nuts & washers shall require random PMI of 10% of each lot. For each nonconformity detected, the extent of PMI shall double.

- 10.2 Each alloy analyzer shall be calibrated using known alloy standards for intended materials to be checked by PMI. Manufacturer's recommendations shall be followed in this regard.
- 10.3 EIL/Owner shall review the procedure and qualification and witness sample alloy verification tests to confirm that the procedures, equipment and personnel are capable of providing consistent and accurate results.

11.0 PERSONNEL QUALIFICATION

The persons performing the PMI test should be knowledgeable about properties of material, all aspects of operation of PMI equipment including the method of testing. Qualification documents of the person performing the PMI test including his training and experience shall be submitted to EIL/owner for review and approval.



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12.0 ACCEPTANCE CRITERIA

- 12.1 Material shall contain amount of characteristic alloying elements as specified in respective material code/specification.
- 12.2 Deposited weld metal or undiluted weld metal deposits shall be within +/- 12.5% of the ranges allowed by the welding consumable specification/code.

13.0 REJECTION CRITERIA

- 13.1 If the PMI test results fall outside the acceptable range, the contractor shall obtain a quantitative check analysis performed by a laboratory acceptable to EIL/owner for a complete chemical analysis. Results of this analysis shall govern.
- 13.2 If any material component or weld is found unacceptable all other represented materials (e.g. fasteners, supports) or weld shall be considered suspect. The contractor has the following options.
- 13.2.1 Scrapping all those represented materials and components and replacing with new components or welds.
- 13.2.2 Performing 100% examination of the remainder of the represented materials/ components and replacing each item that fails the PMI check..
- 13.2.3 If the performance of any verification activity is unacceptable to EIL/Owner or if any material has been incorrectly identified, all further tests shall be subject to EIL/Owner approval until the problem is corrected.

14.0 DOCUMENTATION

- 14.1 Print out from alloy analyzer, in original, duly certified by the contractor and the approved third party inspection agency for contractor's supplied material and EIL/Owner for Owner's supply materials.
- 14.2 PMI report as per format No. 6-82-0002-F1
- 14.3 Basis and action for resolving and documenting PMI non conformances .
- 14.4 Contractor shall demonstrate to EIL/owner that all components requiring PMI have been subjected to PMI testing and accepted.



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REPORT NO: _____

POSITIVE MATERIAL IDENTIFICATION TEST REPORT

Contractor _____ Date _____

Project _____ Inspection Agency _____

Location _____ PMI Equipment model _____

Line No. /ISO Drg. No _____ Make & Serial No. _____

/Heater No. _____

Sr. No.	Part Identification	Material As per Drg./spec	Material as per PMI	Result

(CONTRACTOR)

(THIRD PARTY)

(EIL/OWNER)



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