DCMA NSEO MANUFACTURING PROCESS REVIEW (MPR) CHECKLIST #03PT

PENETRANT TESTING

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| **SUPPLIER & CAGE:** |  |
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| **LOCATION:** |  |
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| **PROCESS REVIEWED:** |  |

**Program Type:**

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|  | Level I/SUSBAFE (LI/SS) |  | Navy Propulsion Program (NPP) |  | Deep Submergence Systems/Scope of Certification Program (DSS-SOC) |
|  | Nuclear Plant Material (NPM) |  | Naval Nuclear Propulsion Program (NNPP) |  | Aircraft Launch & Recovery Equipment (ALRE) |
|  | Fly By Wire Ships Control Systems (FBWSCS) |  | Ships Critical Safety Items (SCSIs) |  | Other: |

**Contractual Requirement(s) for this Process:**

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**Supplier Procedure Number(s), Title(s) & Revision Level(s)/Date(s):**

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| **Process Reviewed By:** |  |
|  |  |
| **Date(s) of Review:** |  |
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**Process Concerns and Guidance:**

* Improper Surface Preparation - It is critical that all Penetrant inspections be performed on surfaces that meet technical and procedural requirements. Improper surface conditions can mask defects with excessive background or prohibit the penetrant from entering a defect.
* Acceptance Criteria - Acceptance criteria can vary depending on whether the product will be 100 percent volumetrically inspected using another NDT method. QAR must be cognizant of all NDT inspections to be performed that may affect acceptance criteria.
* Inadequate Process Controls – Supplier must provide the necessary controls to ensure that the penetrant system, materials and equipment provide an acceptable level of performance.
* Inadequate Technique – Poor or improper technique attributes could cause invalid and questionable results due to:
  + improper final pre-test cleaning orexcessive penetrant removal which could reduce the test sensitivity and could result in blocking or missing the detection of relevant indications
  + inadequate visible or fluorescent lighting in the inspection area
  + improper penetrant application
  + insufficient coverage of the full area of interest
  + improper application of developer (pooling or splatter) which can mask defects
  + poor handling of test specimen
  + incorrect inspection surface temperature
  + incorrect water wash temperature or pressure
  + inaccessible areas on parts not adequately masked to preclude loss of cleanliness
* Improper or inadequate evaluation and/or reporting of non-relevant indications.
* Evaluating indications prior to the minimum or after the maximum dwell time may results in the improper interpretation of indications.

**Governing Specifications**:

* NAVSEA 250-1500-1
* MIL-STD-2132
* T9074-AS-GIB-010/271

**Additional Oversight Checklists**

* Addendums to this MPS checklist are available to use for a more in-depth process surveillance. If used, the completed Addendum(s) are to be attached to the PDREP Surveillance Plan with the base checklist.

* 03 MPR-MPS - Addendum 1 – NDT Qualification, Certification and Oversight

**General Instructions for Performing Penetrant Testing Process Reviews:**

Navy Supplier contracts may invoke various, governing NDT specifications. This checklist may not include all of the requirements of all of the possible specifications that may be called out in a Navy contract and is, therefore, offered as guidance. It is incumbent upon the QAR to review the governing specifications imposed on the supplier being audited and adjust this checklist accordingly. Additional checklists regarding Mil-STD, ASTM, and personnel certification specifications can be found in the NSEO NDT Toolbox.

Use this over-arching checklist in tandem with the additional, specific checklists. (Example: an audit of an NDT lab for penetrant testing may require the use of this checklist, the NAVSEA-250-1500 checklist, the SNT-TC-1a checklist and possibly numerous MIL-STD and/or ASTM checklists.)

**A**. **MANPOWER:**

1. Is there a Written Practice for the control and administration of NDT personnel training, examination, certification and oversight approved by the Level III Examiner? (Addendum 1 available if needed)

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1. Are the personnel performing the inspection and testing functions of the appropriate skill/experience level and/or properly trained/certified to perform the required inspections/tests? ***What are the requirements?***

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1. Record all operations observed (include type and specification, where applicable) and the corresponding inspectors’ names. Are any personnel certifications expired and are they still working in the process? (NAV03-9)

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1. Are all NDT personnel, including the examiner, recertified by examination at a minimum interval as required by specification? (NAV03-3)

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1. Are adequate records available to administer personnel qualification (e.g. name, evidence of examination given, grade, re-certification dates, signature of examiner)? (NAV03-4)

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1. Do records include evidence of performance of applicable NDT during the last 9 months or performance of required surveillance and technical performance evaluations as applicable to maintain qualification? (NAV03-5) ***What are the requirements?***

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1. Are vision test records available? Do vision test records note corrective aids (glasses) when applicable? Do these records indicate a J1 Jaeger test or equivalent brightness discrimination on an annual basis, when applicable? (NAV03-6A/B/7)

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1. Are the credentials of the training/certification official in accordance with specification requirements? ***What are the requirements?***

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1. Is there a corrective action system or remedial training plan in place for when inspector errors occur and is there evidence that it is followed?

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**B. MATERIALS**:

1. Are materials controlled and traceable throughout the process?

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1. Are certifications for materials used in the process reviewed for acceptance and maintained on file for review? Are penetrant materials traceable to the certifications? (NAV03-22B)

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1. Do the materials comply with contract/specification and/or supplier-imposed technical requirements? Are the penetrant materials used listed in the approved procedure (cleaners, penetrants, solvent, developer)? ***What were the materials reviewed?*** (NAV03-22A)

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1. Are there controls to ensure conforming material is consistently used in the process?

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1. Are materials identified, as required, and within shelf life, if applicable? ***(There are shelf lives for chemicals. Check the manufacturer’s certification or the chemical drum for this information)*** (NAV03-22B)

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**C. MACHINERY**:

1. Is **inspection and testing equipment** of the required adequacy, accuracy, precision, and range to assure supplies produced comply with specifications and drawings? *What Items were sampled and were they part of the supplier’s calibration program and within the calibration/check cycle?*

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1. Does equipment, requiring qualification or certification approval, have contractual approval for use?

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1. Identify the NDT equipment available at this facility. Is Government owned equipment adequately protected/maintained in accordance with a documented process?

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1. Are standards, traceable to NIST, available to verify the accuracy of the testing equipment?

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1. **Note: *Equipment Calibration* –** Penetrant inspection examination equipment, (light meters, gauges, measuring devices etc…) should be checked for performance and accuracy at the time of purchase and at defined intervals thereafter; whenever malfunction is suspected, when specified by the Cognizant Engineering Organization, or whenever electrical maintenance that might affect equipment accuracy is performed. Governing contract NDT specifications will define these requirements. ***What requirements are applicable to this facility? Does the equipment meet these requirements?***

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**D**. **METHODS**:

1. Is the correct NDT procedure readily available and being used by the inspector and approved by the cognizant NDT Level III? Identify procedure number, revision, date, and applicable Approval Number (if applicable).(NAV03-2/17)

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1. Are work instructions, test procedures, travelers, etc. being used current, adequate, clear, concise and up to date (latest revision) to allow only contractually conforming supplies to be delivered to the Government? ***What documents (identifying number & revision) were reviewed***?

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1. Do records of PT clearly identify the results of the inspections and tests performed and include traceability back to the procedure, lot/heat numbers, instruments used, personnel who performed each inspection, and the joint or piece inspected with number and type of defects, and any repair descriptions? (NAV03-25)

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1. Is material/product, which has been through the process, positively controlled, traceable, and have the inspections/tests performed been documented to provide a positive indication of the inspection status of the material (e.g. individual inspected, operation sign-off, inspection stamped/initialed/signed accepted or rejected)?

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1. Are changes to methods (instructions) controlled and distributed adequately and timely to affected personnel?

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1. Is there supplier data available for analysis that can substantiate the effectiveness or ineffectiveness of this process? ***If available, what data was reviewed, and what does the data indicate?***

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**E.** **ENVIRONMENT**:

1. Is the process conducted under controlled environmental conditions (clean room, light levels, part/chemical temperature, water pressure etc.) as required by contractual and/or supplier-imposed technical requirements? ***What are the environmental conditions and are they monitored (charts, gages, etc., within calibration)?***

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1. Is safety equipment available and in use, if needed? ***What are the safety requirements for this process?***

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1. Is lighting adequate (visible or fluorescent as applicable) per procedure, and does the procedure meet the specification’s technical requirements? (NAV03-19)

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**F. PRODUCT EXAMINATION:**

***The QAR must perform a product examination in order to verify the output of the process being reviewed and document the results below. If at all possible the QAR should witness performance of the inspection/test by supplier personnel to verify competency of supplier personnel.***

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| Date(s) Conducted: |  |
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| Product Examination Performed By: |  |
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| Contract Number(s): |  |
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| Part Number(s)/Serial number(s): |  |
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| Part Nomenclature(s): |  |
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| Supplier Personnel Contacted and Titles: |  |
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| Drawing Number & Revision: |  |
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| Lot Size and Sample Size: |  |

1. Is the inspector properly qualified and performing the NDT in accordance with the correct procedure and meeting all requirements of the applicable NDT specification being performed (proper technique/type/group)? (NAV03-17B/18/21)

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1. Are the correct pre-cleaning, penetrant, and inspection developer dwell times being used? (NAV03-23)

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1. Are correct accept/reject criteria being applied? (NAV03-20)

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1. Is proper post inspection cleaning of the part performed? (NAV03-24)

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1. Does the inspector complete the inspection record properly? (NAV03-25)

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| Additional PE Characteristics Examined: | # Observations |
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1. Identify the inspection methods (W, I, T, V) used to verify conformance with procedures and standards:

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| **W** |  |  | **I** |  |  | **T** |  |  | **V** |  |

**PE Comments/Concerns**

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| **Overall MPR Results:** | **SATISFACTORY** |  | **UNSATISFACTORY** |  |

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| **Corrective Action Generated?** | **No** |  |  | **Yes** |  |  | **CAR#** |  |

FOLLOW-UP ACTION REQUIRED?

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**SUMMARY/NOTES/COMMENTS/CONCERNS**:

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