DCMA NSEO MANUFACTURING PROCESS SURVEILLANCE (MPS) CHECKLIST #01

**METALLURGICAL/CHEMICAL LABORATORY TESTING**

Including Alloy Identity and Destructive Testing Mechanical Metallography

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

**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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| Surveillance Performed By: |  |
|  |  |
| Date(s) of Surveillance: |  |

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| --- | --- |
| Contract Number(s): |  |
|  |  |
| Part Number(s)/Serial number(s)/NSN: |  |
|  |  |
| Part Nomenclature(s): |  |
|  |  |
| Supplier Personnel Contacted and Titles: |  |
|  |  |
| Drawing Number & Revision: |  |

# Process Concerns and Guidance:

* Determination of appropriate test methodology/criteria
* Samples taken in the wrong orientation or from the wrong location may not properly reveal the characteristic being examined, potentially allowing for acceptance of deficient material.
* Careful and proper sample preparation, particularly when destructively evaluating defects is necessary to assure the sample and defects are evaluated properly.
* Improper testing of material could result in inaccurate material certifications.
* A test specimen was taken from the wrong orientation and location resulting in a specimen which did not have the worst case grain growth properties.
* The wrong method for determining Yield Strength was used. Contractor used the Upper Yield Point vs. the 2% offset method that was called out by specification, providing a false and higher indication of the actual Yield Strength.
* The wrong class of extensometer was being used which affected the accuracy of the stress-strain diagram and the resulting calculated yield strength of the material.
* An incorrect orientation of a fastener tension test wedge (angle) resulted in the acceptance of product when the product represented by the Test Specimen should have been rejected.
* An improperly machined test specimen diameter resulted in an invalid test and indeterminate product quality on delivered product.
* Chemical, mechanical (tensile), and hardness testing has been performed on an insufficient number of test specimens.
* Chemical analysis must be taken at the appropriate production point – ladle vs. heat vs. product analysis – and by the correct analysis method (e.g. quantitative analysis).

**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.

* + 01 MPR-MPS - Addendum 1 – Chemical Analysis
  + 01 MPR-MPS - Addendum 2 – Tension Testing
  + 01 MPR-MPS - Addendum 3 – Charpy V-Notch
  + 01 MPR-MPS - Addendum 4 – Drop Weight Testing

QARs should use the “BASIS OF DETERMINATION” column to document the objective quality evidence and/or clarify the rationale used to support their decision. (ie. direct observation, documents verified etc.)

S = Satisfactory U = Unsatisfactory

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| **SURVEILLANCE QUESTIONS** | **S** | **U** | **BASIS OF DETERMINATION** |
| 1. Are the personnel performing the process of the appropriate skill/experience level and/or properly trained/certified to produce conforming product? ***What are the requirements?*** |  |  |  |
| 1. Are training records available (review sample), and are they accurate and complete (as applicable)? Are any personnel certifications expired and are they still working in the process? |  |  |  |
| 1. Are the tests performed to specific written procedures? Do the procedures meet contract/applicable requirements, and do they contain specific parameters and correct accept/reject criteria? |  |  |  |
| 1. Are the material/product test specimens traceable to the appropriate heat/lot of material throughout the process? |  |  |  |
| 1. Is the documentation clear, readable and does it match with the material being processed? |  |  |  |
| 1. Did the test technician demonstrate their ability to properly perform and document the test(s) during your surveillance? |  |  |  |
| 1. Are the environmental controls of the test area in accordance with the requirements of the governing test standard? |  |  |  |
| 1. Is **inspection and testing equipment** being used of the required adequacy, accuracy and precision (type & condition) 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?* |  |  |  |
| 1. Are hardness test standards properly utilized (indentations on one side only) and certified? |  |  |  |
| 1. Is hardness testing conducted using the applicable scale as specified by the material specification? |  |  |  |
| 1. Are the proper test specimens and number of test specimens being tested? Size? Configuration? Orientation? Location? |  |  |  |
| 1. Is the proper size test specimen for material elongation, as specified by the material/test specification, utilized? |  |  |  |
| 1. Is the proper method being used for the determination of yield strength (offset vs. extension-under-load)? |  |  |  |
| 1. For chemical analysis, is/are the correct reference standard(s) utilized during calibration (when applicable)? |  |  |  |
| 1. Are all specification required elements being reported for the chemical analysis? |  |  |  |
| 1. Are there controls in place to ensure material cannot mistakenly be certified as a material alloy it is not? (Such as Grade 7 steel being certified as Grade 4) |  |  |  |
| 1. Is the configuration of the test fixture (as applicable) in accordance with the test procedure/standard? |  |  |  |
| 1. Are elevated tension and charpy impact test specimens tested at the proper temperature, as specified by the governing procedure/standard/specification? |  |  |  |
| 1. Are the temperature controls for the supporting equipment for these tests maintained? |  |  |  |
| 1. Are all specification required material tests performed? (i.e. Intergranular corrosion, macrostructure, grain size, etc.) |  |  |  |
| 1. Is the proper class/type of extensometer being used and is it calibrated? |  |  |  |
| Other observations: |  |  |  |
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| **Overall MPS 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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