DCMA NSEO MANUFACTURING PROCESS SURVEILLANCE (MPS) CHECKLIST #22

WELDING

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| |  |  | | --- | --- | | **SUPPLIER & CAGE:** |  | |  |  | | **LOCATION:** |  | |  |  |   **Program Type:**   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | 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:**   |  | | --- | |  |   **Supplier Procedure Number(s), Title(s) & Revision Level(s)/Date(s):**   |  | | --- | |  |  |  |  |  | | --- | --- | --- | | Surveillance Performed By: |  | | |  |  | | | Date(s) of Surveillance: |  | | | 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:**

* Weld defects such as cracks, lack of fusion, undercut, incomplete penetration, inclusions, porosity and others compromise product integrity and can result in mission failure including loss of life.
* Proper setup
* Proper techniques
* Procedure compliance
* Shielded Metal Arc Welding (SMAW), also called *stick welding* *process,* **cannot** be used on steel thinner than about 3mm. Since it is a discontinuous process, it is only suitable for manual operation.
* Metal Inert Gas (MIG) or Gas Metal Arc Welding (GMAW) key issues are: selecting the correct gas mixture, flow rate, welding wire, speed, and current.
* Tungsten Inert Gas (TIG) or Gas Tungsten Arc Welding (GTAW); a high degree of skill and care is needed to prevent tungsten inclusion in the weld.
* Welds with inferior properties can result in concerns for strength, fatigue or brittle fracture.
* Welds deposited with incorrect filler materials can result in cracks, inferior properties or corrosion.
* Welds deposited with insufficient pre-heat, exceeding the maximum weld inter-pass temperature and improper post-weld stress relief can result in cracking.

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

S = Satisfactory U = Unsatisfactory

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| **SURVEILLANCE QUESTIONS** | **S** | **U** | **BASIS OF DETERMINATION** |
| 1. Is the material/product controlled and traceable throughout the process being audited? |  |  |  |
| 1. Are welding procedures readily available to the personnel performing the task? |  |  |  |
| 1. Is the documentation clear, readable, and does it match with the material being processed? |  |  |  |
| 1. Do training records exist, and are they current with proper certifications? VT and Welder Workmanship Training current? |  |  |  |
| 1. Is the welder currently certified to perform the weld in accordance with the procedure being used? |  |  |  |
| 1. Are the gauges, tools, and instruments being used within the acceptable ranges and have current calibration records? |  |  |  |
| 1. Does the welder have a current Jaeger 1 eye exam on record? |  |  |  |
| 1. Does Supplier perform welding per a written standard (i.e., MIL standard or NAVSEA)? |  |  |  |
| 1. Are the welding operations being performed within the parameters listed on the welding procedure? |  |  |  |
| 1. Is appropriate NDT used and documented, when required, to verify joint fit-up, root, intermediate, and cover pass? |  |  |  |
| 1. If welding operations are sub-contracted, did supplier perform an audit of sub-contractors capabilities and document the results? |  |  |  |
| 1. If applicable, were welding procedures approved by the contracting agency and in accordance with contract requirements? |  |  |  |
| 1. Correct base and filler materials? |  |  |  |
| 1. Correct purge gas and flow rate? |  |  |  |
| 1. Correct pre-cleaning? |  |  |  |
| 1. Correct dimensions, alignment, and joint fit up? |  |  |  |
| 1. Does the weld contour meet the acceptance criteria? |  |  |  |
| 1. No evidence of undercut in excess of acceptance criteria? |  |  |  |
| 1. No evidence of arc strikes? |  |  |  |
| 1. Does the finished weld meet the dimensional specification requirements? |  |  |  |
| 1. Post NDT requirement performed when applicable? |  |  |  |
| 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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