DCMA NSEO MANUFACTURING PROCESS SURVEILLANCE (MPS) CHECKLIST #30

BALANCING OF PROPELLERS

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

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

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**Process Concerns and Guidance:**

* The contractor does not have an effective system in place to ensure proper calibration of balancing equipment
* Procedures defining the proper use of the balance equipment
* Contractor personnel do not follow proper techniques to detect, locate and measure unbalance of marine propellers
* Government source inspection shall in no way replace contractor inspection or otherwise relieve the contractor of their responsibility to furnish acceptable products.
* Contractors recall system does not adequately control the calibration of balance equipment.
* Test results and accompanying documentation is incorrect, incomplete or missing.
* Operations not performed in the proper or specified sequence
* Improper handling equipment can damage machined surfaces.
* Operations not being performed from the latest or specified drawing revision or work instructions

**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. Are procedures available to the personnel performing the balance test with clear acceptance criteria? **Are all test results documented?**
 |  |  |  |
| 1. Are balance work instructions, testing and inspection and testing procedures, travelers, etc. being used current, adequate, clear, concise and up to date (latest revision)?
 |  |  |  |
| 1. Have personnel performing the balance test been qualified on the basis of appropriate education, skill/experience level and/or have they been properly trained/certified to perform balance inspections as required? Do training records exist?
 |  |  |  |
| 1. Is the area where the balancing is being performed organized with the proper tools, gauges or other necessary equipment and is it uncluttered, clean and free from dirt and debris?
 |  |  |  |
| 1. Are the gauges, dial indicator, tools and instruments being used within the acceptable ranges and have current calibration records?
 |  |  |  |
| 1. Balance run #1: Is the balancing machine set up to minimize the amount of runout, (eccentricity) induced into the propeller?
 |  |  |  |
| 1. Is the balancing machine stable and level (run #1)?
 |  |  |  |
| 1. Is the balancing machine (or stable rollers) leveled to the same standard as propellers? (0.0015 inch) (run #1) ***Level should be demonstrated through the use of a calibrated leveling tool/precision level applied in three locations for a vertical axis balance machine.***
 |  |  |  |
| 1. Has the Total Indicator Runout, (**TIR**) of the mounting plate for vertical axis balance machine been measured? (run #1)
 |  |  |  |
| 1. Has the balancing plate been mounted to reduce the variance of runout during rotation? (run #1)
 |  |  |  |
| 1. Has the supplier minimized the **TIR** as much as possible? Is this reading repeatable? (run #1)
 |  |  |  |
| 1. Balance run #2: Is the balancing machine set up to minimize the amount of runout, (eccentricity) induced into the propeller?
 |  |  |  |
| 1. Is the balancing machine stable and level (run #2)?
 |  |  |  |
| 1. Is the balancing machine (or stable rollers) leveled to the same standard as propellers? (0.0015 inch) (run #2) ***Level should be demonstrated through the use of a calibrated leveling tool/precision level applied in three locations for a vertical axis balance machine.***
 |  |  |  |
| 1. Has the Total **TIR** of the mounting plate for vertical axis balance machine been measured? (run #2)
 |  |  |  |
| 1. Has the balancing plate been mounted to reduce the variance of runout during rotation? (run #2)
 |  |  |  |
| 1. Has the supplier minimized the **TIR** as much as possible? Is this reading repeatable? (run #2)
 |  |  |  |
| 1. Once the level and **TIR** have been demonstrated has the balancing machine been run through a complete balancing cycle to demonstrate that all machine components and mandrels are balanced within tolerance?
 |  |  |  |
| 1. Has the tolerance demonstrated been calculated by multiplying the propeller residual unbalance tolerance (**UT**) (which is obtained in the drawing) by 0.005 and **TIR** for the balance mandrels that is **UT/73\*** the weight of the mandrel or 0.001 whichever is greater?
 |  |  |  |
| 1. Has the balance machine and mandrel been prepared and the propeller mounted to the machine by using a mandrel or concentric rings mounted in the bore?
 |  |  |  |
| 1. Was a dummy hub used for CPP blades?
 |  |  |  |
| 1. Was the tolerance of the **TIR** calculated using the formula on NAVSEA form 9245/4? Was the proper data used?
 |  |  |  |
| 1. Was the propeller weight obtained from the stamped data and was the UT obtained from the propeller drawing?
 |  |  |  |
| 1. Were the **TIR** readings from the dial indicator compared to the calculated tolerance and recorded on NAVSEA form 9245/4?
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| 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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