

Work Instruction No.: QI-1000  
For  
Traceability and Certification Requirements  
for SUBSAFE/Level 1 Material

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**AMENDMENT RECORD:** Revision History can be found on last page of Document.

## 1.0 Scope:

- 1.1 The purpose of this Work Instruction is to detail the requirements necessary to maintain traceability and meet the data requirements for SUBSAFE/Level 1 material.
- 1.2 Material and/or parts must also meet all requirements per drawings, specifications, purchase orders and contract.
- 1.3 All work, testing and inspection is performed in accordance with the latest revision of drawings, specifications, etc. unless otherwise directed by the Customer Contract/Purchase Order.

## 2.0 Material Traceability:

- 2.1 All material (see Appendix A) used in the manufacture of SUBSAFE/Level 1 material must be traceable back to the raw material test reports used to produce the parts. This is accomplished through positive identification markings throughout the manufacturing process by the use of temporary markings that can be reapplied after removal by machining or other operations. Bin or flow tags are acceptable as long as co-mingling of lots is avoided.
- 2.2 Once a serial number is assigned, it must remain with the part and may not be transferred to any other part. If a part must be replaced for any reason after it has been manufactured/shipped, the serial may not be reused on the replacement part.
- 2.3 Weld and/or braze filler metal used in fabricating SUBSAFE/Level 1 parts or assemblies require material certifications and test reports and must be referenced on welding documentation and must be of the type specified in the applicable welding procedure and/or other related specification. The material must be properly identified and traced through consumption. There are no physical marking/traceability requirements after consumption beyond the documentation noted.

## 3.0 Material Certifications and Test Reports:

- 3.1 Material certifications/test reports must be clear, legible and contain all of the following information.

### 3.1.1 Material Requirements/Test Reports

The material specification required by the drawing or specification including revision must be listed on the test report. In addition, the test report shall include the class, form, grade, type, condition and finish (as applicable) of the

material as well as the company Name, Address and Telephone Number. Multi-page documents shall have each page numbered (i.e. Page 1 of 8) and traceable to cover page of Test Report.

### 3.1.2 **Chemical Composition**

The test report must detail the actual results of the required tests and the results must be within the specified limits.

### 3.1.3 **Mechanical Properties**

The test report must detail the actual results of the required tests and the results must be within the specified limits.

### 3.1.4 **Heat Number**

The test report must contain the heat number and lot number (when applicable) of the material tested.

### 3.1.5 **Authorized Signature**

The test report must be signed by an authorized representative of the company and include the typed or printed name and title of the individual and date of completion.

### 3.1.6 **Transcribed Data**

The test report must include a copy of any other report from which any data was transcribed onto the test report.

### 3.1.7 The Test Report must include the company Name, Address and Telephone Number.

## 4.0 **Part Identification**

- 4.1 All parts must be identified by heat/lot number. Metal parts shall be marked with the raw material heat/lot number, serial number, part number and manufacturer's identification. Metal parts shall be engraved or etched<sup>1,2</sup>, with the required information in an area that will not damage the part. Small parts or parts that have an available marking area of less than  $\frac{3}{8}$  square inches shall be tagged with the required information. Permanent marking is not required for nonmetallic parts. If traceability markings are not

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<sup>1</sup> Applicable drawing, specifications and/or contracts may require alternate marking method(s)

<sup>2</sup> Procedure approval may be required prior to usage.

visible after assembly, the item shall be tagged with the required information and marking location. These tags are to remain attached to the parts. If the tags must be removed for assembly or processing, the tags must be reattached (if possible) as soon as possible in order to maintain SUBSAFE/Level 1 identity.

## 5.0 Non-Destructive Testing (NDT)

5.1 When non-destructive testing is required, the certification/ test report must contain all of the following information. If any machining takes place after the Dye Penetrant testing, the material will be retested.

### 5.1.1 Part Number

The complete part number of the item being tested including revision must appear on the test report.

### 5.1.2 Heat Number

The heat and lot number of the item shall appear on the test report.

### 5.1.3 Serial Number

The serial number of the item being tested shall appear on the test report.

### 5.1.4 Test Specification

The test specification, including applicable revision, shall be specified on the report.

### 5.1.5 Test Procedure<sup>3</sup>

The test procedure and applicable revision being used shall be specified on the test report.

### 5.1.6 Test Results

All test results, including any indications or out of tolerance conditions, shall be on the test report, as well as "Accept/Reject" indications.

### 5.1.7 Acceptance Criteria

The acceptance specification(s) and the revision being used shall appear on the report.

<sup>3</sup> Procedure approval may be required prior to usage.

**5.1.8 Certifying Activity**

The name, address and phone number of the certifying activity shall be on the test report (company letterhead is acceptable).

**5.1.9 Authorized Signature**

The test report must be signed by an authorized representative of the company and include the typed or printed name and title of the individual and date of completion.

**5.1.10 Traceability**

If parts are not serialized, parts from different heats or lots shall not be intermixed on any reports.

If multiple heats/lots of material are used to make a group of parts bearing the same part number, then a separate certification/test report shall be generated for each heat/lot, listing only those serial numbers that were made from that particular heat of material.

For serialized parts, NDT reports may contain multiple part numbers, heat numbers, lot numbers and/or serial numbers only if the report clearly indicates which part numbers, heat numbers, lot numbers and/or serial numbers correspond to each other.

Reports shall not be so overcrowded with multiple part information so as to compromise clarity of information and accurate traceability.

**5.1.11 Government Source Inspection**

Certifications/test reports for parts requiring government source inspection (GSI) must be approved and dated by the witnessing/inspecting/reviewing Quality Assurance Representative (QAR).

- 5.2 Up-to-date qualification data for all inspectors performing NDT operations/testing shall be furnished with test reports. Qualifications furnished shall cover all procedures performed as well as vision testing.

## **6.0 Inspection Reports**

- 6.1 Inspection reports for SUBSAFE/Level 1 parts shall list all attributes called for on the drawing. Actual results or dimensions

shall be shown on the inspection report. the report shall also include the method of measurement used including the serial number of the instrument, the last date of calibration and the calibration due date. The results of inspection, date of completion and the inspector's identification shall also be included on the inspection report.

The test report must be signed by an authorized representative of the company and include the typed or printed name and title of the individual and date of completion.

- 6.2 All Inspection results, including any indications or out of tolerance conditions, shall be on the Inspection report, as well as "Accept/Reject" indications

## **7.0 Functional Test Reports**

7.1 Functional test reports must detail all required test parameters including voltages, pressures, times, etc. The report shall show actual results for all tests. The report shall also include the method of measurement used including the serial number of the instrument, last calibration date and the calibration due date. The results of inspections and inspector's identification shall also be included on the inspection report. The test report must be signed by an authorized representative of the company and include the typed or printed name and title of the individual and date of completion.

7.2 All test results, including any indications or out of tolerance conditions, shall be on the test report, as well as "Accept/Reject" indications

## **8.0 Mercury Free Certification**

8.1 All material utilized for SUBSAFE/Level 1 material must be free of mercury contamination as detailed in PQC-1, Clause 09. Any exceptions to the use of material containing Mercury, requires prior customer approval.

## **9.0 Packings and O-Rings**

9.1 All packings and O-rings shall be of the size, type and material specified. Packings and O-rings must be installed in the assemblies prior to their expiration dates.

9.2 O-rings shipped uninstalled shall be prepackaged to prevent damage, and shall include the following information: part numbers, cure dates, expiration dates, specification, durometer,



batch number, manufacturer and receiver numbers. The part numbers, cure and expiration dates shall be included as part of the data package.

- 9.3 Special expiration dates, retention of packaging for installed O-rings, etc., may be required per specific customer PO or contract.

## **10.0 Control of Subcontractors**

- 10.1 When operations are subcontracted, all applicable requirements must be flowed-down to the supplier via the purchase order. This may be accomplished using purchase order notes, references to PQC-1 clauses, work instructions, drawings, specifications, etc.
- 10.2 Any time AMETEK SCP suppliers subcontract any operations, they are responsible to flow-down all SUBSAFE/Level 1 and job specific requirements to their sub-tier supplier(s).
- 10.3 If serialized parts are sent for outside operations, all serial numbers and part numbers must appear on the AMETEK purchase order and on supplier certification documents (i.e. Certificates of Conformance, Test Reports, etc.).

## **11.0 Special Processes Procedure Approval**

- 11.1 When specified in the contract, purchase order, drawing, specification, etc., procedures for special processes, such as welding, brazing, visual inspection of welds, marking, non-destructive testing, etc. must be submitted to the customer and/or appropriate agency for approval. Approval must be received prior to usage of the procedure for production.
- 11.2 Suppliers performing work for Ametek SCP utilizing approved procedure(s), amendment(s), etc. shall submit a copy of any revised procedure, amendment, etc. or any new procedure, amendment, etc. to Ametek SCP for approval prior to using revised or new document(s) as a basis for operations performed against any AMETEK SCP purchase order(s).
- 11.3 As required by Customer contract, suppliers shall provide procedure details (Doc Number & Revision) during Quote stage to facilitate customer approval prior to production.



## 12.0 Inspection System

- 12.1 Unless otherwise specified in the contract, purchase order, etc. the contractor's inspection system shall meet the requirements of MIL-I-45208 or ISO 9002.
- 12.2 If contractor's inspection system is in accordance with ISO9002, it must also meet requirements of Electric Boat Standard Clause 60-58 for GDEB orders.

## 13.0 Parts Tracking

- 13.1 All SUBSAFE/Level 1 material and/or parts accepted at receiving inspection shall be tagged or bagged & tagged identifying them as SUBSAFE/Level 1 Material. These tags are to remain attached to the parts. If the tags must be removed for assembly or processing, the tags must be reattached (if possible) as soon as possible, in order to maintain SUBSAFE/Level 1 identity.
- 13.2 All SUBSAFE/Level 1 material and/or parts accepted into inventory shall be stocked in a secured SUBSAFE/Level 1 storage area until such time as they are released to production for manufacturing/assembly.
- 13.3 During the production process, all SUBSAFE/Level 1 parts bearing serial numbers shall be documented by recording the serial number(s) in the corresponding traveler operation block. This is especially critical for parts built into an assembly and whose serial number(s) will no longer be accessible after the operation is complete (such as if molded over).
- 13.4 When SUBSAFE/Level 1 parts are built into an assembly obscuring their identification marking (such as installed inside another part or molded over), Quality Assurance shall attach a durable tag with the part name, part number, serial number, heat/lot number and location of marking.

## 14.0 Documents

- 14.1 All test, inspection and certification documents must be completely legible and must be recorded in a permanent method, such as pen and ink, ink printer, etc.
- 14.2 If test/observation data is transcribed from another document, that original document must accompany the transcribed data and the original document must also meet all requirements set forth for other similar documentation (i.e. letterheads, dates,

signatures, and identifying data as applicable, such as serial number(s), heat/lot number(s), part number(s), etc.)

- 14.3 All test and inspection documents shall clearly indicate the results of the operation with a written statement as to whether the material or part(s) tested or inspected meet the applicable requirements with a written statement. In the case of multiple entries for various tests, listed dimensions, values, etc. each should be indicated as “accept” or “reject” or as “pass” or “fail”. Any failure or unacceptable results shall clearly show exactly what was found unacceptable. In addition, any related Non-Conformance Reports (NCR’s) must also be noted.
- 14.4 All Objective Quality Evidence (OQE) documentation originating outside Ametek SCP shall be reviewed for required content and accuracy by designated Ametek SCP Quality Assurance personnel. OQE that is found acceptable shall be stamped and dated or initialed and dated by the reviewer.

## 15.0 Part Numbers

- 15.1 In all instances where part numbers are used on documents or marked on parts or tags/labels, the part number must accurately reflect the part number on the part drawing or specification, using only officially documented prefixes and/or suffixes (if any).
- 15.2 AMETEK SCP often modifies part numbers by adding various suffixes to facilitate purchasing, processing, stocking, etc. These versions of part numbers are for internal use only, and are not to be used on the part(s) or documentation for other than internal usage.

## 16.0 Welding

- 16.1 If any welding or cladding takes place after Dye Penetrant, new welds must be Dye Penetrant tested. When welding or brazing is required, the weld report must contain the following information.

### 16.1.1 Part Number

The complete part number of the item being welded, (including revision) must appear on the weld report.

### 16.1.2 Heat/Lot Number

The heat and lot number(s) of the item(s) shall appear on the weld report.

### 16.1.3 Serial Number

The serial number(s) of the item(s) being welded shall appear on the weld record.

### 16.1.4 Joint Identification

The joint number(s) per the applicable weld specification, if required, shall appear on the weld report.

16.1.5 **Joint Design**

The joint design, per the applicable weld specification must appear on the weld report.

16.1.6 **Base Material Type**

Material/alloy name, including heat/lot number.

16.1.7 **Filler Material Type**

Material name/designation, including size (diameter), heat/lot number and class/type Class 1 (Wire)/Class 2 (Rod).

16.1.8 **Fit-Up**

The fit-up, per the applicable weld specification must appear on the weld report.

16.1.9 **Welding Procedure Identification**<sup>5</sup>

Including any amendments and revisions of each.

16.1.10 **Heat Treatments**

Include any preheat, interpass and post-weld heat treatment temperatures.

16.1.11 **Welder Identification**

Qualified welder's signature along with typed or printed name, and date.

16.1.12 **NDT Methods**

PT, VT, etc., including results.

16.1.13 **Disposition of Welds**

"Accept/Reject" status of weld and any related disposition information

16.1.14 **Cycles of Repairs to Welds**

Weld repair information, if performed; may not be allowed by procedure<sup>4</sup>, specification, drawing, etc.

16.1.15 **Inspection Procedures**

Including any amendments and revisions of each.

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<sup>4</sup> Procedure approval may be required prior to usage.

16.1.16 **NDT Personnel Identification**

Qualified technician's signature with typed or printed name and date.

16.1.17 **Certifying Activity**

The name, address and phone number of the certifying activity shall be on the report (company letterhead is acceptable).

16.1.18 **Authorized Signature**

The weld report must be signed by the authorized representative of the company and include the typed or printed name and title of the individual and the date of completion.

16.1.19 **Traceability**

If parts are not serialized, parts from different heats or lots shall not be intermixed on any reports. If multiple heats/lots of material are used to make a group of parts bearing the same part number, then a separate weld report shall be generated for each heat/lot.

For serialized parts, weld reports may contain multiple part numbers, heat numbers, lot numbers and/or serial numbers only if the report clearly indicates which part numbers, heat numbers, lot numbers and/or serial numbers correspond to each other.

Reports shall not be so overcrowded with multiple part information so as to compromise clarity of information and accurate traceability.

16.1.20 **Government Source Inspection**

Weld reports for parts requiring government source inspection (GSI) must be approved and dated by the witnessing, inspecting/reviewing Quality Assurance Representative (QAR).

## 17.0 Government Source Inspection

17.1 Many jobs involving SUBSAFE/Level 1 parts and/or assemblies specify that Government Source Inspection (GSI) is required.

17.2 Hold Points are specific points in the progress of work where the Quality Assurance Representative (QAR) must be notified in

advance so that specific paperwork, hardware or process can be inspected, witnessed and/or verified.

17.2.1 It is necessary to stop (hold) work from progressing until the QAR has completed necessary requirements or advised otherwise.

17.2.2 Often GSI and work can be coordinated so no actual stoppage is required.

17.2.3 Hold Points may be required for, but are not limited to, the following:

- Purchase order review for flow-down and/or delegation of remote location GSI
- Witness of hidden part marking/ traceability
- Hydrostatic pressure testing
- Dimensional inspections
- Final inspections
- First article testing (FAT)
- Quality conformance testing
- Packaging and marking
- Wide area Work Flow (WAWF)
- Data Package certification/identification review

17.3 Notification Points are specific points in the progress of work where the QAR must be notified in advance so that specific paperwork, hardware or process can be inspected, witnessed and/or verified.

17.3.1 It is necessary to stop (hold) work from progressing until the QAR has completed necessary requirements.

17.3.2 If the QAR is unavailable or otherwise unable to check these items, after a 24-hour waiting period, work may proceed without the GSI oversight.

17.3.3 Notification Points may be required for, but are not limited to, the following:

- Receiving inspection
- Dimensional inspection
- Part marking
- Hydrostatic pressure testing
- Packaging and marking

- 17.4 There may be other requirements for GSI specified in contracts, such as, but not limited to:
- Reviewing Non-Destructive (NDT) procedures
  - Verifying weld procedure approvals
- 17.5 GSI requirements may vary from one contract to another. Each contract must be reviewed for direction and the Defense Contract Management Agency (DCMA) QAR should be consulted to confirm specific requirements.
- 17.6 Use QAR (DCMA) Submittal forms to make all necessary QAR notification; do not leave any blank lines on top of submittal Forms. Insert N/A into any unused lines. Submittal forms dated, signed and/or stamped by the QAR serve as records of completed GSI and shall be filed in the appropriate records folder:
- Receiving Inspection
  - In-Process Inspection
  - Certifications and Actuals
  - Contract
- 17.7 DCMA QAR's also have the latitude to require witnessing, inspecting and/or verification of other aspects of work relating to contracts specifying GSI, such as, but not limited to:
- Processes
  - Procedures
  - Records
  - Materials and or parts

## **18.0 Customer Source Inspection**

- 18.1 Customer Source Inspection (CSI) are performed as required by Customer Contract/Purchase Order.
- 18.2 Many aspects of CSI will be similar to GSI. Actual details will be spelled out in the Customer Contract / Purchase Order or in attached referenced documents such as Purchasing Requirements, Standard Clauses or Statement of work, etc.

**APPENDIX A**

Drawing/specification for Monel alloy K-500 (UNS05500) per QQ-N-286 used to produce SUBSAFE/Level 1 parts may specify Inco Alloys as a sole source, but it may be obtained from other manufacturers who use one of the following laboratories to perform the Slow Strain Rate Tensile Test:

- A. Huntington Alloys, a Special Metals Company  
(formerly Inco Alloys)  
Huntington, WV 25705
- B. Metallurgical consultants, Inc.  
4820 Caroline, P.O. Box 88046  
Houston, TX 77288-0046
- C. Naval Surface Warfare Center, Carderock Division  
9500 MacArthur Boulevard  
West Bethesda, MD 20817-5700
- D. Teledyne Allvac  
2020 Ashcroft Avenue  
Monroe, NC 28110
- E. Westmoreland Mechanical Testing and Research, Inc.  
P.O. Box 388  
Youngstown, PA 15696-0388
- G. Mannesmann Rohrenwerke  
Mannesmann Forschungsinstitut  
Postfach 251160  
472251 Duisburg  
Germany
- H. ThyssenKrupp VDM USA, Inc.  
11210 Steeplecrest Drive, Suite 120  
Houston, TX 77065-4939



**AMENDMENT RECORD**

<b>Rev.</b>	<b>Date</b>	<b>Description of Change</b>	<b>Approval</b>
-	-	Initial Issue	-
A	08/12/10	Revision	PAP
B	09/18/13	Revision	PAP
C	06/26/18	<ul style="list-style-type: none"> <li>• Revised format and typos (various). Remove footnote 1 &amp; Renumbered footnotes.</li> <li>• Added Para 1.3.</li> <li>• Para 3.1.7 included additional requirements for Test Report content.</li> <li>• Para 5.1 added requirements for retesting material after machining.</li> <li>• Added para 6.2 Inspection results.</li> <li>• Added para 7.2 Test Results.</li> <li>• Para 8.1 added customer approval if Mercury containing material is used.</li> <li>• Para 9.3 added special expiration date retention.</li> <li>• Para 10.3 added SN &amp; PN to appear on supplier Cert documents.</li> <li>• Replaced para 11.3 with suppliers to provide PN and Rev's as required by customer.</li> <li>• Added para 12.2 requirements for suppliers who have Inspection system IAW ISO9002 must meet EB clause 60-58.</li> <li>• Deleted para 13.3 &amp; renumber.</li> <li>• Para 14.3 added NCR references required.</li> <li>• Para 16.1 added requirements for retesting after weld or cladding.</li> <li>• Para 16.1.7 added class/type.</li> <li>• Added para's 18.1 &amp; 18.2.</li> </ul>	KM RM RA