General Atomics Electromagnetic Systems Group

GA-EMS Supplier Quality Guide

101

19 November 2018

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Table of Contents

General		<u>Slide</u>
Revision Reco	brd	3
Purpose of th	e Supplier Quality Guide	<u>4</u>
Flow-down of	f GA Requirements	5
Transmitting (Quality Deliverables to GA-EMS	<u>11</u>
Individual Quality	y Clauses	
203	Subcontracting	<u>13</u>
204	Sub-tier Supplier Requirements	<u>14</u>
213a	Critical Safety Items – Process and Operation Sheets	<u>15</u>
213b	Critical Safety Items - Inspection Method Sheets	<u>17</u>
213c	Critical Safety Items - Material Identification Code (MIC) Mark	<u>20</u>
213d	Critical Safety Items - Inspection for CAIs Including CSIs	<u>34</u>
213e	Critical Safety Items/Critical Application Items	<u>36</u>
214a/215b	Source Inspection/Hold Points & Government Source Inspection (7 Day Notice)	<u>38</u>
215c	Government Notification Points (7-day Notice, Non-CSI/CAI)	<u>39</u>
217	Work Release Prior to Shipment	<u>40</u>
218	First Article Inspection – First Lot Produced	<u>41</u>
218a	First Article Inspection	<u>42</u>
221	Control of Nonconforming Modified Items	<u>47</u>
255	Certificate of Conformance	<u>48</u>
256/256a	Test Reports	<u>51</u>
259	Material Certifications – Chemical and Physical Properties	<u>52</u>
273	AWS Welding Requirements	<u>54</u>
275	Welding Requirements for Procedures, Repairs and Material Records	<u>55</u>
277	Special Process Certifications	<u>85</u>
280	Nondestructive Examination (NDE) Requirements	<u>86</u>
302	Counterfeit Parts Prevention	<u>93</u>
303	Counterfeit Parts Prevention (Components)	<u>94</u>
Other Topics		

Corrective Action Requests (sCARs)	
Supplier Performance Program	



<u>95</u> 96

Revision Record

Rev Date	Description of Change
10/01/2014	Clause 213b - Removed statement about only applying to CSI, not CAI; SDR slide - added note to be sure to check for most current rev on website, and also underscoring that emails do not constitute GA approval; front cover - added URL for Supplier Quality Guide on GA website; 277 - added note regarding banned hexavalent chromium.
04/08/2015	Emphasized new data submittal process in the example of a PO, added slides for CVN79 (clauses 213e & 213f), explained difference between clauses 280 and 280a, added placeholder for Clause 220, added 2 slides for Counterfeit Parts Prevention, with many other refinements throughout the Guide (affecting 220, 221, 255, 259, 275 & 277).
09/08/2015	Clause 221 – added additional language regarding SDR submittal requirements, added slide for clause 215c, removed clause 220 and any references to it in other slides, modified clause 218 to reflect requirements for changes in government contract number, added language to 213b to clarify approval prior to start of MFG, corrected FAI data delivery instructions. Replaced clause contents as needed with newer language.
09/26/2016	Added slides for clauses 203, 218a and 273, greatly expounded on welding clause 275, added reference to MIC Mark Package Summary Form, and made multiple modifications to reflect Revision P of the GA-EMS Standard Quality Clauses.
02/06/2017	Added slides for Clause 213c Mic Mark Preparation, modified slides for 213d and 213e [c] to ensure correct sample sizes, modified slides for welding clause 273 and 275, added new PT, MT & UT Technique Sheet slides for 280/280a, added language regarding making changes to GA approved documents
04/13/2017	Removed contradictory language from Clause 280/280a slides
01/19/2018	Changed several slide screenshots to match current Rev T clauses. Added new slide to show GA.com QA website changes and additions of supplier tools and forms. Removed reference to clause 280a which was deleted. Welding slides were modified.
07/30/2018	Added slide for Clause 204 Sub-tier Supplier Requirements and 214a/215a Source Inspection/Hold Points & GSI, changed several slide screenshots for Clauses 221, 259 & 280 to match changes to current Rev U clauses.
11/19/2018	Added new supplier quality contacts to cover page. Added 4 new clauses to list of all clauses. Added new guideline to clause 203 for facility move notification to GA. Changed several screenshots for documentation submittal instructions and clauses 203, 221, 255, 256, 259 and 303 to match Rev V clauses.





Purpose of the GA-EMS Supplier Quality Guide:

- 1. Communicate GA-EMS' expectations to our suppliers.
- 2. Enhance suppliers' understanding of the GA-EMS "Quality Clauses".
- 3. Prevent quality rejections by sharing past lessons learned.

The Supplier Quality Guide is a living document that will be continually developed with **input from our valuable suppliers**.



Flow-down of GA-EMS Requirements

Flow-down of GA-EMS quality requirements :

- 1. GA-EMS specifies quality requirements by placing standard "Quality Clauses" in the Purchase Order.
- 2. It is imperative that the supplier perform a robust contract review process for flowing down customer requirements (these Quality Clauses) throughout the supplier's operations.



Typical GA-EMS PO

Link to detailed Quality Clause descriptions is provided on every PO cover sheet.

seneral atomics	ENERAL ATOMICS PURCHASE ORDER NUMBER 5500020191 Order Type - Firm Fixed Price (FFP) Date Approved: 10/20/2015 Total PO Value: 14.06 USD							
SUPPLIER: 105858	SHIP TO ADDRESS:	BILL TO ADDRESS: Please submit original invoice to:						
FIELD CORFORATION 1520 ALBERT AVE LOS ANGELES CA 91010-2925 USA Attn: ERIC CARTMAN Ph: 555-999-1234 FAX: 555-888-4321 CAGE Code: 98765	GENERAL ATOMICS EMS - RANCHO BERNARDO 16969 MESAMINT STREET SAN DIEGO CA 92127-2407 USA	GENERAL ATOMICS ATTN: ACCOUNTS PAYABLE P.O. BOX 85608 SAN DIEGO, CA 92186-5608 OR E-MAIL INVOICE TO: CORPAP@GA.COM						
	SHIP VIA: Not Applicable							
SUPPLIER'S MEG SITE:		RESALE NO.: SR FH25-754887 PAYMENT TERMS:						
SAME AS ADOVE		within 30 days Due net						

HEADER TEXT:

THE PROVISIONS OF GENERAL ATOMICS' FORM 1603, REV. 05/12 ENTITLED "TERMS AND CONDITIONS FOR COMMERCIAL ORDERS (SUPPLIES AND SERVICES)" AND GA FORM 1603 ADDENDUM B REV. 07/15 ENTITLED "ADDITIONAL TERMS AND CONDITIONS FOR COMMERCIAL ITEMS PURCHASED UNDER GOVERNMENT CONTRACTS" APPLY TO THIS ORDER. THESE TERMS AND CONDITIONS MAY BE VIEWED IN PDF FORMAT AT GENERAL ATOMICS' WEBSITE: HTTP://WWW.GA.COM/TERMS-CONDITIONS OR YOU MAY OBTAIN A COPY BY CONTACTING THE PURCHASING REPRESENTATIVE.

QUALITY REQUIREMENTS ARE SPECIFIED AT THE INDIVIDUAL LINE ITEMS BELOW. WHERE 'CODES' ARE USED BELOW, SEE THE "STANDARD QUALITY CLAUSES, EMS" VIEWABLE IN PDF FORMAT AT GENERAL ATOMICS WEBSITE: http://www.ga.com/quality-assurance/FOR FULL EXPLANATIONS OF REQUIREMENTS.

IMPORTANT: WHEN PROVIDING ANY REQUIRED DATA DELIVERABLES TO GA-EMS, FOLLOW THE "DATA SUBMITTAL INSTRUCTIONS" PROVIDED IN THE STANDARD QUALITY CLAUSES (DOCUMENT 09492L00008).

seneral atomics

Back

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(CONTINUED NEXT PAGE)

http://www.ga.com/quality-assurance

- 1. The GA Procurement Website http://www.ga.com/quality-assurance
- 2. Start at http://www.ga.com.
- 3. Select "Procurement".
- 4. Select "Quality Assurance".





- 1. GA-EMS Quality Clauses, SDR form, Supplier Quality Guide
- 2. Supplier Tools (New!)
- 3. Supplier Forms (New!)
- GA-EMS has added a new supplier bulletin section.
 Please take the time to read theses important announcements
- 5. IMPORTANT! Please read

AND AFFILIATED COMPANIE	Search
> Home > About > Pr	roducts & Technology >> Procurement >> News & Media >> Careers >> Contact >> Visitor Informat
Procurement	Quality Assurance
Terms and Conditions	Standard Quality Clauses. EMS
Certifications and Forms	Standard Quality Clauses, Nuclear Surpline Quality Crists
Quality Assurance	Supplier duality Gude Supplier Tools
Small Business Program	 Welding Supplier Template_ASME Section IX WPS Essential Variable Checklist
Supplier Registration	Supplier Template_Checklist_WPQR_D1.1 Supplier Template_Checklist_WPQR_D1.2
GA-ASI Suppliers	 Supplier Template_Checklist_WPQR_D1.3 Supplier Template_Checklist_WPQR_D1.4
	 Supplier Template_Rev A_AWS D1.1 Prequalified WPS Essential Variable Checklist Supplier Template_Rev A_AWS D1.2 WPS Essential Variable Checklist Supplier Template_Rev A_AWS D1.3 WPS Essential Variable Checklist Supplier Template_Rev A_AWS D1.6 Prequalified WPS Essential Variable Checklist Supplier Template_Rev A_AWS D1.6 WPS Essential Variable Checklist Supplier Template_Rev A_AWS D1.6 WPS Essential Variable Checklist Supplier Template_Rev A_AWS D1.6 WPS Essential Variable Checklist Supplier Template_Rev A_AWS D1.1 WPS Essential Variable Checklist Supplier Template_Rev A_NAVSEA Tech Pub 248 WPS Essential Variable Checklist Process & Operations Sheets/Inspection Methods Sheets REF-0159_Process-Op and Inspection Method Sheet Checklist_3-2-16 Forms MIC Mark Package Summary (EMS-0282) Document Reuse and Duplication Request Form (EMS-0364) Welder Summary Form (EMS-0365) Supplier Disposition Request (SDR) Supplier Quality Bulletins Isused January 6. 2017





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Transmitting Quality Deliverables to GA-EMS

* New GA-EMS Policy *

Send all certs, procedures and other data deliverables <u>directly</u> to Configuration Data Management (CDM), as described in the EMS Standard Quality Clauses (see next slide).

Do not send any data deliverables to the GA-EMS Buyer, QE, Manufacturing Engineer or anyone else at GA-EMS other than directly to CDM. **The only exception** is for Supplier Disposition Requests (SDR) – see slide 31.

scient atomics	Page 1 of 2 Please reference this Purchase Order Number on all Invoces, appring lists, shipping lables and other dorrespondence.	
SUPPLIER: 105858 FIELD CORPORATION 1520 ALBERT AVE LOS ANGELES CA 91010-2925 USA Attn: ERIC CARTMAN Ph: 555-999-1234 FAX: 555-888-4321 CAGE Code: 98765	SHIP TO ADDRESS: GENERAL ATOMICS EMS - RANCHO BERNARDO 16969 MESAMINT STREET SAN DIEGO CA 92127-2407 USA	BILL TO ADDRESS: Please submit original invoice to: GENERAL ATOMICS ATTN: ACCOUNTS PAYABLE P.O. BOX 85608 SAN DIEGO, CA 92186-5608 OR E-MAIL INVOICE TO: CORPAP@GA.COM
SUPPLIER'S MEG SITE: SAME AS ABOVE	SHIP VIA: Not Applicable	RESALE NO.: SR FH25-754887 PAYMENT TERMS: within 30 days Due net

HEADER TEXT

THE PROVISIONS OF GENERAL ATOMICS' FORM 1603, REV. 05/12 ENTITLED "TERMS AND CONDITIONS FOR COMMERCIAL ORDERS (SUPPLIES AND SERVICES)" AND GA FORM 1603 ADDENDUM B REV. 07/15 ENTITLED "ADDITIONAL TERMS AND CONDITIONS FOR COMMERCIAL ITEMS PURCHASED UNDER GOVERNMENT CONTRACTS" APPLY TO THIS ORDER. THESE TERMS AND CONDITIONS MAY BE VIEWED IN PDF FORMAT AT GENERAL ATOMICS' WEBSITE: HTTP://WWW.GA.COM/TERMS-CONDITIONS OR YOU MAY OBTAIN A COPY BY CONTACTING THE PURCHASING REPRESENTATIVE.

QUALITY REQUIREMENTS ARE SPECIFIED AT THE INDIVIDUAL LINE ITEMS BELOW, WHERE 'CODES' ARE USED BELOW, SEE THE "STANDARD QUALITY CLAUSES, EMS" VIEWABLE IN PDF FORMAT AT GENERAL ATOMICS WEBSITE: http://www.ga.com/quality-assurance FOR FULL EXPLANATIONS OF REQUIREMENTS.

IMPORTANT: WHEN PROVIDING ANY REQUIRED DATA DELIVERABLES TO GA-EMS, FOLLOW THE "DATA SUBMITTAL INSTRUCTIONS" PROVIDED IN THE STANDARD QUALITY CLAUSES (DOCUMENT 09492L00008),

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Transmitting Quality Deliverables to GA-EMS (continued)

Quality Data is to be transmitted to GA-EMS per the "DATA SUBMITTAL INSTRUCTIONS" provided in the front of the EMS Standard Quality Clauses document (09492L00008).

<u>IMPORTANT</u>: Once a document has been approved by GA-EMS, Suppliers are not to make any changes to GA approved procedures or other documents without resubmittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.

DOCUMENTATION SUBMITTAL INSTRUCTIONS

The supplier shall submit their data item deliverables, as outlined in the PO, to the GA-EMS Configuration and Data Management (CDM) organization. This may be accomplished through one of the two following methods:

- ProjectLink system: The GA-EMS product lifecycle management (PLM) system. In the event that access to the PLM ProjectLink system has not been established, the supplier shall submit all data item deliverables to CDM through method 2 below :
- 2) Secure File Transfer Protocol (SFTP): Data item deliverables shall be securely sent/received using GA-EMS SFTP "Dropbox." Contact CDM at ems_cm@ga.com to request an SFTP account. Be sure that all e-mail correspondence with CDM includes the supplier contact information, PO number, or statement of work (SOW) number, and the GA-EMS Subcontracts Administrator's (SCA's)/Buyer's full name.

All electronic data items shall be compatible, at a minimum, with Microsoft (MS) Office 2007 for reports, presentations, and spreadsheets and Microsoft Project 2010 for all schedule types unless otherwise stated. Electronic drawings shall be readable with Adobe Acrobat Reader 9.0 unless otherwise stated. All data items, whether hard copy or electronic, shall not contain proprietary or restrictive markings.

The supplier shall provide all applicable passwords to unlock and/or unprotect documents.

If documents requiring GA-EMS approval are rejected by GA-EMS, the supplier shall resubmit their reworked documents by the same method as described above.

NOTES:

- All data deliverables must have been submitted to GA-EMS by the time the product is received by GA-EMS.
- Distributors of available commercial off-the-shelf (COTS) parts have the choice of providing the required documentation by the above methods or physically with the shipment.
- Suppliers may request that a PLM ProjectLink account be established by contacting their GA-EMS SCA.
- 4) Document Reuse: If a supplier has previously produced a part, it may be permissible to reuse certain documentation that was approved by GA-EMS from the previous PO in subsequent POs. Form EMS-0364 must be used to request GA-EMS approval for data reuse, and can be obtained from the GA-EMS Procurement website at the following link: http://www.ga.com/quality-assurance. The shaded Quality Clauses in Table 3 represent candidates for possible document reuse.



Transmitting Quality Documentation to GA-EMS (continued)

Data deliverables associated with the red Quality Clauses are submitted to GA by the normal means – to GA's Configuration and Data Management (CDM) department, as described in the previous slide.

QUALITY PROGRAM

- (200) General Quality Requirements
- (201a) Quality Management System (Q9001) (Certification or Compliance Required)
- (202a) Quality Inspection System
- (203) Subcontracting
- (204) Sub-Tier Supplier Requirements
- (205) Quality Management System per ASME Boiler & Pressure Vessel Code
- (207) Quality Plan
- (208) Software Quality Assurance Plan
- (209) Software Quality Management System
- (210) Control of Test Software
- (210a) Control of Test Software
- (211) Project Kickoff Meeting

SOURCE EVALUATION/INSPECTION

- (212) Right of Access
- (212a) Right of Access
- (213) Critical Safety Items/Critical Application Items
- (213a Critical Safety Items Process and Operation Sheets
- (213b) Critical Safety Items Inspection Method Sheets
- (213c) Critical Safety Items Material Identification Code Mark
- (213d) Critical Safety Items Inspection for CAIs Including CSIs
- (213e) Critical Safety Items/Critical Application Items
- (214) Source Inspection/Hold Points (5-day notice)
- (214a) Source Inspection/Hold Points (7-day notice)
- (215) Government Source Inspection (5-day notice)
- (215a) Government Source Inspection (with DD Form 250)
- (215b) Government Source Inspection (7-day Notice)
- (215c) Government Notification Points (7-day Notice, Non-CSI/CAI)
- (216a) Release to Manufacture
- (217) Work Release Prior to Shipment
- (217a) Work Release Prior to Shipment (GSI)
- (218) First Article Inspection First Lot Produced
- (218a) First Article Inspection
- (218b) First Article Inspection with Functional Testing (NAVSUP)
- (219) NAVAIR Source Inspection (5-day Notice)
- (219a) NAVAIR Source Inspection (7-day Notice)

CONTROL OF PRODUCT CONFIGURATION

(221) Control of Nonconforming/Modified Items

CONTROL OF MONITORING, MEASURING, AND TEST EQUIPMENT

- (230) Certificate of Calibration
- (231) Calibration of Items
- (232) Reporting Out-of-Tolerance Items

PACKAGING, STORAGE, AND HANDLING

(242) Packaging and Shipping Requirements

DOCUMENTATION

- (247) Repairables Test & Evaluation
- (248) Specialty Metals
- (249) Country of Origin Defense Contracts
- (249a) Country of Origin Gulftronics Contracts
- (250) Stress Relief Procedures
- (251) Environmental Stress Screening Procedures
- (254) Supplier Data List and Transmittals
- (255) Certificate of Conformance
- (256) Test Reports
- (256a) Test Reports
- (257) Test Plan/Procedure
- (258) Pressure/Leak Test Results
- (258a) ASME Pressure/Leak Test Results
- (259) Material Certifications-Chemical and Physical Properties
- (259b) Certification of Titanium Material
- (261) Inspection and Test Instructions
- (262) Period of Useful Life
- (263) Limited Shelf Life/Rubber Parts
- (266) Control of Limited Shelf Life Materials
- (268) Quality Assurance Data Package Requirements
- (270) Records Retention

HARDWARE PROVISIONS

- (272) ASME Boiler and Pressure Vessel Code Requirements
- (273) AWS Welding Requirements
- (275) Welding/Brazing Requirements for Procedures and Repairs
- (277) Special Process Certifications
- (278) Radiographic Inspection Submittals
- (280) Nondestructive Examination Requirements
- (280b) Nondestructive Examination Requirements
- (284) Hydrostatic Testing Requirements
- (286) As-Built Configuration List
- (287) Foreign Object Damage
- (288) Part Identification (Revision + Change Notice)
- (289) Item Unique Identification (NAVSUP)

ELECTRONIC PRODUCTS

- (293) Cable and Wire Harness Assembly Workmanship IPC/WHMA-A-620 Class 3
- (293a) Fiber Optic Cable and Hybrid Wire Harness Workmanship
- (294) Radiographic Submittal–Electronic Components
- (295) Printed Wiring Boards
- (295a) Printed Wiring Boards (Class 3)
- (296) Electronic Assembly and Solder Workmanship-IPC-A-610
- (296a) Electronic Assembly and Solder Workmanship-IPC-A-610 (Class 3)
- (297) Electrostatic Discharge Sensitive Devices
- (298) Solder Workmanship-IPC J-STD-001; Class 2
- (299) Solder Workmanship-IPC J-STD-001; Class 3
- (300) Qualified Products List
- (301) Counterfeit Parts Prevention
- (302) Counterfeit Parts Prevention (Subassemblies)
- (303) Counterfeit Parts Prevention (Components)



Clause 203 Subcontracting/Facility Relocation

Supplier Guidelines

- 1. If the supplier wishes to subcontract the GA job to another supplier or sister facility, the Supplier must notify and gain approval GA-EMS using the SDR form (EMS-0196). Email correspondence with GA employees will not suffice as approval without a formal SDR form submitted.
- 2. If the GA supplier wishes to relocate it's facility, they must notify GA-EMS in writing at least 30 days prior to the planned relocation (use of the EMS-0196 SDR form is not required).
- 3. If there's any doubt, regarding what is an acceptable percentage of work that the supplier wishes subcontract out, submit an SDR.
- 4. <u>Note:</u> GA does not need to be notified when supplier orders commercial supplies such as: raw material, hardware, fasteners and outside services such as: coatings, plating, cleaning, painting, heat treat, water jet and NDE services.
- 5. As a rule, suppliers should not subcontract services that they are capable of performing themselves.
- 6. Below are some examples of subcontracting in which the supplier <u>must</u> notify GA:
 - The supplier is a machine shop but wishes to subcontract all or a large portion of the machining that they are capable of performing, to another local shop due to capacity issues.
 - The supplier is a weld fabrication shop and wishes to subcontract all or a large portion of the welding to another welding shop.
 - The supplier is a weld fabrication shop, but has limited or no machining capabilities and wishes to subcontract most of or all of the rough and/or final machining.
 - The supplier is a plating shop and wishes to subcontract to another shop due to capacity issues.
 - The supplier is a PC Board Assembly (PCBA) Manufacturing shop and wishes to subcontract to another local PCBA shop.
 - The supplier has another facility, division, affiliate or subsidiary in same or different state or another country (i.e. Mexico or Canada) and wishes to send work to that sister facility.

(203) Subcontracting/Facility Relocation

The supplier shall not subcontract the manufacture, design or services, or relocate their facility without GA-EMS prior written approval. The only exceptions are processes outside the contracted manufacturers' capabilities, such as Non-Destructive Evaluation (NDE) or other special processes. Notification of intent to relocate the supplier's facility must be provided to GA-EMS at least 30 days prior to the planned relocation.

This limitation does not apply to the supplier's purchase of standard commercial supplies or raw material.

The SDR process described in Quality Clause 221 is used to obtain GA-EMS approvals.



Clause 204 Sub-tier Supplier Requirements

The supplier must flow-down all GA-EMS Quality Clause requirements as specified in the PO to sub tier suppliers, as applicable, either through their Terms & Conditions, by transmitting the GA-EMS Standard Quality Clauses (or the suppliers quality clauses) directly as-written, or through the supplier's specific PO verbiage.

(204) Sub-Tier Supplier Requirements

The supplier shall establish in its sub-tier supplier purchase order (PO) requirements necessary to ensure that each item delivered has been controlled, manufactured, tested and inspected in compliance with the requirements of the GA-EMS PO. Examples of PO requirements include drawing revisions and ECNs. A copy (with redacted pricing) of each sub-tier PO shall be available for review by GA-EMS upon request.

> The following provides guidance as to which Quality Clauses must be flow-down in POs to sub-tier suppliers.

All Sub-tier POs:

- 201a or 202a Quality Management/Inspection System for all non-COTS POs
- 203 Subcontracting
- 212 Right of Access
- 221 Control of Nonconforming /Modified Items

As Necessary (partial list/examples only):

- 204 Sub-tier Supplier Requirements when the sub-tier supplier is outsourcing a portion of their work
- 214a/215b Source Inspection when a GA or Government inspection is planned at the sub tier supplier's site
- 218a First Article Inspection if the sub tier supplier is performing a first article inspection
- 255 Certificate of Conformance when required for a subcomponent part
- 256 Test Reports if the specified testing is performed by the sub tier supplier
- 259 Material Certifications when specified for raw material
- 280 Nondestructive Evaluation Requirements when the sub-tier supplier is responsible for conducting NDEs



213a - Critical Safety Items (CSI) Process and Operation Sheets (POS)

Manufacturing of CSI/CAI hardware shall not commence until GA-EMS has provided formal approval of Process Operation Sheets.

Typical Approval Sequence for Clause 213a and 213b.

- 1. GA-EMS receives documents from supplierand its sub-tier suppliers (if applicable).
- 2. Once GA-EMS review team deems submittal acceptable, then GA must submit and gain approval from its' customer.
- 3. Once GA-EMS receives customer approval, the GA supplier will be formally notified.
- 4. Once the GA-EMS supplier receives written approval, manufacturing can then proceed.

For assemblies with multiple components, a table of contents should be included in order to organize Process and Operations Sheets for individual components.

(213a) Critical Safety Items - Process and Operation Sheets

IMPORTANT: This clause requires one or more documents that must be approved by GA-EMS prior to the commencement of manufacturing. Once a document has been approved by GA-EMS, Suppliers are not to make any changes to GA-EMS approved procedures or other documents without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.

The supplier and its sub-tier suppliers shall submit process and operation sheets to GA-EMS for approval within thirty (30) calendar days after issuance of the purchase order (PO). The process and operation sheets shall identify a detailed step-by-step account of the procedures necessary, in the proper sequence, to manufacture the Critical Safety Item (CSI). The process and operation sheets must indicate operation number, description, tolerance (specification), location, and sub-tier suppliers, etc., necessary to control manufacturing operations.

After GA-EMS has granted approval of the process and operation sheets, the supplier shall complete the process and operation sheets and have them stamped or signed off by an in-process operator and/or inspector. Process and operation sheets may also include the inspection method sheets noted in Quality Clause 213b, and must be provided to GA-EMS upon completion.

<u>IMPORTANT</u>: Once the POS has been approved by GA-EMS, Suppliers are not to make any changes to this document without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.



213a - Critical Safety Items (CSI) Process and Operation Sheets (continued)





213b - Critical Safety Items (CSI) Inspection Method Sheets (IMS)

Manufacturing of CSI/CAI hardware shall not commence until GA-EMS has provided formal approval Inspection Method Sheets.

- CSI characteristics are typically labeled "C1, C2", etc. or "C101, C102, etc." for Critical characteristics and "M1, M2", etc. or "M101, M102", etc., for Major characteristics. Note however that <u>all</u> features (including Minor Characteristics) must be included in the Inspection Method Sheet.
- All elements (A thru J) of the Quality Clause must be reflected in the Inspection Sheet.
- <u>All</u> features (Critical, Major, Minor) are to be listed. See Quality Clause 213d for sampling frequency.
- Once GA provides formal approval, then the supplier shall use these Inspection Method Sheets to record results of Critical, Major and Minor characteristics.

<u>IMPORTANT</u>: Once the IMS has been approved by GA-EMS, Suppliers are not to make any changes to this document without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.

(213b) Critical Safety Items - Inspection Method Sheets

IMPORTANT: This clause requires one or more documents that must be approved by GA-EMS prior to the commencement of manufacturing. Once a document has been approved by GA-EMS, Suppliers are not to make any changes to GA-EMS approved procedures or other documents without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.

The supplier and its sub-tier suppliers shall submit inspection method sheets for approval by GA-EMS within thirty (30) calendar days after issuance of the purchase order (PO). The inspection method sheets shall identify the Critical Safety Item (CSI) characteristics (including minors) to be inspected, special instructions, item, drawing zone, acceptability limits, inspection tooling/method, and frequency. The completed inspection method sheets shall have the actual inspection results recorded with inspector's stamp or signature and date. Inspection method sheets may be included as an integral part of the process and operation sheets noted in Quality Clause 213a, and must be provided to GA-EMS upon completion.

 Job #:
 38957-0000
 Serial #:6900012345-0008

 Traveler Part #:
 56000D7894321 MAJOR

 Customer Drawing #:
 56000D7894321

Inspection Plan Tech Contact:WENDY TESTABURGER Q.A. Review: KYLE BROFLOVSKI Rev: - Template# 006415 Rev E Quantity: 1.0000 Q.A. Date: 10/22/2013 Sheet 2 of 2

Comments/Special Instructions:

THIS INSPECTION REPORT ONLY CONTAINS CSI DIMENSIONS TO BE SUBMITTED TO GENERAL ATOMICS FOR REVIEW. ALL ITEMS HAVE BEEN TRANSFERRED FROM THEIR ORIGINAL INSPECTION REPORT.

С	Characteristic Accountability	Α	D	G	Inspection/Test	Results	Produ	ct Ac	ceptance
ITEM NO	DRAWING REQUIREMENTS	CHAR	NOTE/ ZONE	SAMPLE SIZE	RESULTS	MEASURING DEVICE	ACCEPI	INSP BY	DATE
267		M108	SH10 F-5	100%	.003	MACHINE PROBE	4		10/24/13
392 Pa	.500 +.003/000 IN THRU INSERT ONLY [MIDE]	M106	SH9 C-3	100%	.5017	INTRIMIC	44 3TC		10/24/13
3937	(♦]Ø.010 @ A C@ B]	M106	SH9 C-3	100%	.003	MACHINE PROBE			10/24/13
³⁹⁵ of 183	2X .509-20 UNF-2 USE BOTTOMING TAP DO NOT BREAK THRU [MI07]	M107	SH9 B-1	100%	2X.500-20 UNF-2	THREAD GAUG			10/24/13
396	2 x I .750±.010 IN	M107	SH9 B-1	100%	2× 6.740	THREAD GAUG	4		10/24/13
397	2 x M107 (\$\overline\$0.020 [A]C@]B	H107	SH9 B-1	100%	2x ,005	MACHINE PROBE	4		10/24/13
(1 280	J-13		Back



213b - CSI Inspection Method Sheets (continued)



			lr	spect	tion I	Plan	Temp	olate# 00	6810	Rev A
	Job #	: 41988-0000 Serial #:7800012345-0438		Fech Con	tact:STA	AN MARSH	Quan	tity:	1.0000	
	Trave	eler Part #: 53000D2630323 MAJORS REV	D (Q.A. Revi	ew: KE	NNY MCCORMICK	Q.A. J	Date: 05	/09/201	14
	Custo	ts/Special Instructions:		Kev: D			Snee	t 1 01 1		
M104 4X Ø2.5000+.0000 THRU	THIS IN BEEN TR	NSPECTION REPORT ONLY CONTAINS CSI DIMEN RANSFERRED FROM THEIR ORIGINAL INSPECTION	SIONS REPOR	TO BE SU	BMITTED	D TO GENERAL ATOMICS	FOR REVIEW.	ALL I	TEMS H	AVE
		Characteristic Accountability				Inspection/Test	Results	Produ	ct Ac	ceptance
	ITEM NO	DRAWING REQUIREMENTS	CHAR CLASS	NOTE/ ZONE	SAMPLE SIZE	RESULTS	MEASURING DEVICE	ACCEP1 STAMP	INSP BY	DATE
	FLAG 9	Install Bushings -2 and -3 flush +.001/003 with outer surface				.000/.000	DEPTH MIC	4		6-23-14
2X Ø4.20	M-103	2X 31.950 BASIC GA 84 SHT 2-B3	M103			31.9488 31.9486	CMM	44		6-23-14
	M-104	4X 2.5000 +.0000/0012 THRU GA 49 SHT 2-C6	M104			2.4998 2.4993 2.4990 2.4990 2.4992	BORE GAUGE	44		6-23-14
	M-104	4X √32 CIRCULAR LAY GA 5Ø SHT 2-C6	M104			32 - 32 - 32 - 32 -	PROFILOMETE	R (4		6-23-14
	M-104	4X MAJOR DIMENSION M1Ø4 GA 51 SHT 2-C6 ⊕Ø.010@B@AC	M104			.0025 .0032 .0040 .0056	СММ	(4)		6-23-14
	M-105	2X Ø 2.5023 +.0007/0000 GA 103 SHT 4-G6	M105			2.5028 2.5028	OD MICS	(4)		6-23-14
Major (or Critical) designators apply	M-106	2X Ø 2.5023 +.0007/0000 GA 117 SHT 4-C6	M106			2.5025 2.5028	OD MICS	(4)		6-23-14
to <u>all</u> their associated features.		(GA) 6-24-14				2994 21 - 7 2994 de	MANN			

- Sometimes the same Critical and Major characteristic exists in multiple drawing locations. <u>Each</u> characteristic in the various locations requires measurement. Simply stating a "range" is not allowed.
- Measurements must be provided for each serial numbered part, either on the same or separate sheets.

213b - CSI Inspection Method Sheets (continued)

- C101 MATERIAL: CRES, 15-5PH, CONDITION H1100, IAW AMS 5659, HEAT TREAT IN ACCORDANCE WITH AMS 2759. PROVIDE MATERIAL CERTIFICATION IAW GA SPEC 34000S1580220, CLASS 4. HARDNESS TEST TO BE PERFORMED IN AREA INDICATED.
- (C102) D MATERIAL: CRES, PH13-8 M₀, CONDITION H1050, IAW AMS 5629. PROVIDE MATERIAL CERTIFICATION IAW GA SPEC 34000S1580220, CLASS 4. VERIFY MATERIAL CONDITION BY HARDNESS TEST, RHC 40 MIN. HARDNESS TEST TO BE PERFORMED IN AREA INDICATED. IF FORGED, FORGING TO BE PRODUCED AND ACCEPTED, IAW REQUIREMENTS OF AMS 6400.
- (M101) 3. LIQUID PENETRANT INSPECT ALL MACHINED SURFACES, EXCLUDING THREADS, PER ASTM E1417. TYPE 1, METHOD B OR D, SENSITIVITY LEVEL 4. ACCEPTANCE CRITERIA PER MIL-STD-2035, EXCEPT LOCATIONS NOTED BY (A).
- (#102) (INCATION NOTED: NO LINEAR INDICATIONS PERMITTED.

 Each drawing note that specifies a requirement constitutes a separate line in the Inspection Method Sheet.



213c – Critical Safety Items Material Identification Code (MIC) Mark

- A unique marking to be applied by the supplier to certain CSI items as identified on the PO.
- Supplier submits to GA-EMS for approval.
- GA-EMS submits to NAVAIR for approval.
- Required for parts having Critical or Major features designated in the drawing.
- Compile the various required documents into a single package with Table of Contents.

<u>IMPORTANT:</u> Once the MIC mark has been approved by GA-EMS and has been applied to the part, Suppliers cannot make any changes to the part or MIC documentation.

<u>IMPORTANT:</u> If supplier does not choose to use GA-EMS Form EMS-0282, all information from that form must appear on supplier's equivalent form.

(213c) Critical Safety Items - Material Identification Code Mark

IMPORTANT: This clause requires one or more documents that must be approved by GA-EMS before shipment of product. Once a document has been approved by GA-EMS, Suppliers are not to make any changes to GA-EMS approved procedures or other documents without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.

The purchase order (PO) is for the procurement of articles with Critical Application Item (CAI)/Critical Safety Item (CSI) characteristics that require Material Identification Code (MIC) marking. The supplier shall submit all CSI documentation associated with the identified CAI/CSI feature up to the GSI hold point associated with the MIC mark request to GA-EMS for review and acceptance prior to applying the MIC mark. This documentation set, referred to as the MIC mark package, may include but is not limited to the following:

- Completed and approved process and operation sheets per Quality Clause 213a and Quality Clause 213e, Step (a), as required by contract
- Completed and approved inspection method sheets per Quality Clause 213b and Quality Clause 213e, Step (b), as required by contract
- Quality conformance and lot sampling inspection results per Quality Clause 213d and Quality Clause 213e, Step (c), as required by contract
- Documentation of Government witness of GSI hold points
- Material certifications
- Supplemental documentation (such as quality notifications [QNs])
- Table of contents/summary page outlining documentation contained in package is required. Supplier may use form EMS-0282 "Material Identification Code Mark Package Summary". If supplier chooses not to use this form, all information listed on
 form EMS-0282 is required on supplier's index page. Form EMS-0282 can be obtained from the GA Procurement website at the following link: http://www.ga.com/quality-assurance.
- For CAI/CSI assemblies, the MIC mark package shall include CAI/CSI characteristic results for all GSI hold points identified on the GA-EMS PO line item at both top level assembly level and subcomponent/subassembly level.
- <u>NOTE</u>: In rare cases, non-CSI characteristics may be identified as a GSI hold point on the GA-EMS PO line item. These non-CSI characteristic results are also required to be in the MIC mark package).



213c – Critical Safety Items MIC Mark (continued)

Very Important! Read carefully.

- Compile the various required documents into a single package with Table of Contents (example below). Include:
 - feature descriptor (e.g., C1, M101)
 - document number, document name
 - document description and page numbers
- GA recommends using the Mic Mark Package Summary (Form EMS-0282) or equivalent now located on the GA Procurement Website: <u>http://www.ga.com/quality-</u> assurance
- See next slide for screen shot of current Mic Mark Package Summary (Form EMS-0282)

(213c) Critical Safety Items - Material Identification Code Mark (Continued)

IMPORTANT: This clause requires one or more documents that must be approved by GA-EMS before shipment of product. Once a document has been approved by GA-EMS, Suppliers are not to make any changes to GA-EMS approved procedures or other documents without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.

The supplier shall contact the GA-EMS Authorized Representative to determine if any additional documentation is needed per contract requirements.

The MIC mark(s) shall be located near, and in the method of, the part marking indicated on the applicable drawing (except when ink stamp and stencil are specified that for the purposes of traceability are not considered permanent. In these cases, the MIC mark shall be a metal stamp, laser etch, <u>vibro</u>-etch, or chemical etch unless the use of such marking methods will cause damage to the functionality of the part). Deviation from any of these methods shall require prior NAVAIR approval. Application of the MIC marking will be verified by the designated Government representative.

NOTE: The MIC marking(s) applied to the individual parts must also be identified on all associated documentation.

> When submitting MIC mark packages for top level assemblies, objective quality evidence is not required to be submitted for existing MIC-marked subcomponents of that current assembly; however, the part number, revision, serial number, and MIC number issued for those subcomponents must be included in the table of contents.

□ Be sure to number each page.





213c – Critical Safety Items MIC Mark (continued)

GA Form EMS-0282



Material Identification Code Mark Package Summary Reference EMS-QAP-22, MIC Mark Preparation and Submittal

Part Numb Part Name Revision:	ber:		Supplier: Serial Number: Contract Number:		
		CSI DOCU	MENTATION		
Sequence Number	Document Number	Document Name	Document Description		
1					
2					
3					

Sequence number should follow chronological timeline. All documents should support that the part is in the final configuration in accordance with the drawing(s) and meets all CSI requirements. Add/remove lines as needed.

	SUPPLEMENTAL DOCUMENTATION FOR PN XXXX SN XXXX								
Sequence Number	Document Number	Document Description	Page Number(s)						
1									
2									
3									

Х		X
GA-EMS Quality Engineer	Date	GA-EMS QA Representative Date

POINTS OF CONTACT					
General Atomics		Subcontractor (If Applicable)		GSI Authority	
Contact Name:		Contact Name:		Contact Name:	
Email/Phone:		Email/Phone:		Email/Phone:	

EMS-0282

Revision: E

2017/12/18

See next slides for detailed MIC mark process preparation, submittal instructions, process flow and responsibilities. for both supplier, General Atomics - EMS and the U.S. Government.



213c – Critical Safety Items Material Identification Code (MIC) Mark MIC Mark Preparation and Submittal

How to Prepare and Submit a MIC Mark Package

- Purpose
 - to define the supplier responsibility in regards to MIC Mark Package submission
 - To define the GA-EMS process for documentation, review, submittal and customer approval of MIC Mark part application
- Definition
 - Material Identification Code (MIC) Mark The inspection record number (format: QA-XX-EXXXX) that provides traceability to the inspection records. This number is issued by NAVAIR QA at the time of certification and permanently affixed to the CSI.
 - MIC Mark Request Hold point in which the CSI shall not advance until receipt of NAVAIR approval and MIC Mark issuance.
- Reference Documents
 - 09492L00008, EMS Standard Quality Clauses (<u>http://www.ga.com/quality-assurance</u>)
 - GA-EMS Supplier Quality Guide (<u>http://www.ga.com/quality-assurance</u>)



213c – Critical Safety Items Material Identification Code (MIC) Mark Roles and Responsibilities: SUPPLIER

Roles and Responsibilities

- Supplier
 - Accumulates MIC Mark documentation based on contractual requirements discussed with GA-EMS Quality Engineer. Creates and submits completed package to GA-EMS Quality Engineer
 - Applies MIC Mark once notification received from GA-EMS



213c – Critical Safety Items Material Identification Code (MIC) Mark Roles and Responsibilities: GA-EMS Quality Engineer

- GA-EMS Quality Engineer
 - Supports the supplier with an explanation of contractual requirements for developing MIC Mark Package
 - Coordinates with the supplier to ensure a completed and accurate MIC Mark package is submitted
 - Stamps MIC Mark package for completeness and accuracy
 - Submits supplier MIC Mark package to MIC Coordinator for final review
 - Communication of MIC Mark number to Supplier and Buyer
 - Verification of MIC Mark to part



213c – Critical Safety Items Material Identification Code (MIC) Mark Roles and Responsibilities: MIC Coordinator

GA-EMS Internal Process ONLY

- MIC Coordinator
 - Coordinates with GA-EMS Quality Engineer and Manufacturing
 Engineer to ensure timely submittal of MIC Mark packages
 - Performs final GA-EMS review of MIC Mark packages prior to submittal to government agency
 - Submits completed MIC Mark package to CDM



213c – Critical Safety Items Material Identification Code (MIC) Mark Roles and Responsibilities: CDM, Government Agency

GA-EMS Internal Process ONLY

- Configuration and Data Management (CDM)
 - Submits MIC Mark documentation into the GA-EMS PLM System
 - Submits project link to Government for certification
 - Attaches confirmation email to PLM object as an attachment to the MIC Mark package
- Government
 - Review and acceptance of MIC Mark package
 - Issue MIC Mark number



213c – Critical Safety Items Material Identification Code (MIC) Mark MIC Mark Preparation and Submittal Process Flowchart

MIC Mark Preparation and Submittal Process





213c – Critical Safety Items Material Identification Code (MIC) Mark Required Documentation

Accumulate MIC Mark Documentation and Create Package

- The supplier shall submit, via approved transferrable means, all applicable CSI documentation associated with the identified CSI feature up to the GSI hold point associated with the MIC Mark request to GA-EMS for review and acceptance. This documentation set, referred to as the MIC Mark package may include, but is not limited to:
 - Material Certifications (must have government stamp and/or signature)
 - Process Certifications (e.g. NDE, Heat Treat, Material Testing)
 - Dimensional Inspection Report (must have government stamp and/or signature)
 - Completed POS, as required by contract
 - Completed IMS, as required by contract
 - Quality conformance and lot sampling inspection results, as required by contract
 - Documentation of GSI hold points
 - Table of contents/summary page outlining documentation contained in package. Supplier may use form EMS-0282. If supplier chooses not to use this form, all information listed on EMS-0282 is required on supplier's index page. This form can be obtained from the GA Procurement website at http://www.ga.com/quality-assurance



213c – Critical Safety Items Material Identification Code (MIC) Mark GA-EMS QA Review/Acceptance

GA-EMS Internal Process ONLY

Review Documentation, Accept and Stamp

- The GA Quality Engineer
 - Reviews all required documentation for completeness and accuracy
 - Any discrepancies must be resolved with the supplier
 - Once package is accurate and complete, QE stamps package Note: If supplier chooses not to use GA EMS-0282, QE must generate this form as cover page prior to submission to MIC Coordinator
 - Submits package to MIC Coordinator
- MIC Coordinator
 - Performs final GA-EMS review
 - Applies electronic page numbering



213c – Critical Safety Items Material Identification Code (MIC) Mark MIC Mark Request

GA-EMS Internal Process ONLY

- GA-EMS QA Submit Documentation to CDM for submission to Government
 - MIC Coordinator submits the completed MIC Mark package to CDM
 - CDM
 - Uploads the completed MIC Mark package into the GA-EMS PLM System in a location to where the government has access.
 - Submits the project link to the appropriate government agency.



213c – Critical Safety Items Material Identification Code (MIC) Mark Government Approval/MIC Mark Notification

• Government Review and Approval of MIC Mark Package

- Government reviews the documentation for completeness and accuracy
- Accepts MIC Mark package

MIC Mark Notification

- Government sends confirmation email to GA-EMS QA, CDM, and the local NAVAIR rep communicating MIC Mark # to be marked on part
- Quality Engineer communicates information to supplier and buyer
- CDM attaches email as attachment to primary content in Windchill



213c – Critical Safety Items Material Identification Code (MIC) Mark Application/Verification of MIC Mark

Application of MIC Mark

- Supplier
 - Applies MIC Mark number per requirements. Reference drawing and GA EMS Standard Quality Clause 213c.
 - The MIC mark(s) shall be located near, and in the method of, the part marking indicated on the applicable drawing (except when ink stamp and stencil are specified that for the purposes of traceability are not considered permanent. In these cases, the MIC mark shall be a metal stamp, laser etch, vibro-etch, or chemical etch unless the use of such marking methods will cause damage to the functionality of the part). Deviation from any of these methods shall require prior NAVAIR approval. Application of the MIC marking will be verified by the designated Government representative.
 - Notifies GA-EMS QA and GSI authority that the MIC Mark application is ready for verification

Verification of MIC Mark

- The GSI authority and GA-EMS QA (Quality Engineer and/or Quality Inspector) perform visual inspection (via photograph or physical verification) of the MIC Mark identification on the part
 - GA-EMS Quality Engineer notifies MIC Coordinator that part has been appropriately marked
- Output: Authorization to move forward with product



213d – Critical Safety Items Inspection for CAIs including CSIs

- Critical characteristics are typically labeled C1, C2, etc. or C101, C102; Major characteristics are labeled M1, M2 or M101, M102.
- These statements apply to all Minor characteristics as well – those which do not have a Critical or Major designator.
- This section is for Class 3 threads and Minor characteristics only (with tolerance range ≤.010).
- Applies to all other Minor characteristics with tolerance range >.010.

(213d) Critical Safety Items - Inspection for CAIs Including CSIs

All Critical Application Items (CAIs) and Critical Safety Items (CSIs) shall undergo Critical/Major characteristics inspection and, as noted on design documents, nondestructive inspections to verify that CAI or CSI items are within specifications. Actual inspection result for all Critical or Major characteristics will be recorded by serialized part number, and shall be included in each document package.

The supplier shall perform quality conformance and lot sampling inspections for all associated features and characteristics that are present in the drawings and specifications. The inspection results (actual readings and/or measurements) will be recorded on all of the supplier's CSI/CAI inspection and certification documentation:

- Features/attributes/requirements classified as Critical and Major on the drawing(s) or within the technical specification will be inspected 100%.
- Unless otherwise specified, attributes for plating, hardness, and nondestructive testing (NDT) shall be inspected 100%.

Class 3 threads, dimensions, and geometric feature controls with a tolerance range of 0.010 in. or less, will be inspected and recorded using an acceptable quality limit (AQL) of 1.0 and the General Inspection Level II as defined by ANSI/ASQ Z1.4.

The supplier shall inspect and record all other Minor characteristics using an AQL of 4.0 and the General Inspection Level II as defined by ANSI/ASQ Z1.4.



213d & 213e Section c CSI Inspection for CAIs including CSIs

Lot or batch size

to

to

to

2

9

16

Sample

This slide applies to both Clause 213d and 213e Section c

- 1. Note that <u>actual</u> dimensions for minor characteristics need to be measured, recorded and reported to GA-EMS.
- 2. Choose General Level II column -
- 3. Then choose Lot or Batch Size Letter Examples of lot sampling for Minor characteristics, per Clause 213d (using ANSI/ASQ Z1.4):

Example #1

If there are 20 parts, the sample size for General Level II, AQL 1.0 (Code Letter "C") is 13 parts - **Record actual dimensions for ALL characteristics in this AQL category for each S/N in sample size.**

Example #2

If there are 20 parts, the sample size for General Level II, AQL 4.0 (Code Letter "C") is 3 parts – **Record actual dimensions for ALL characteristics in this AQL category for each S/N in sample size.**



Table I-Sample size code letters

Special inspection levels

S-3

А

в

S-2

A

А

Α

S-1

Α

А

Α

8

15

25

Table II-A—Single sampling plans for normal inspection (Master table)

Acceptance Quality Limits, AOLs, in Percent Nonconforming Items and Nonconformities per 100 Items (N

S-4

А

А

в

А

в



(See 9.2 and 9.3)

Ш

В

С

D

General inspection levels

► II

Α

В

С

213e Critical Safety Items/Critical Application Items

* New Quality Clause for CVN 79 contract *

- <u>IMPORTANT</u>: Manufacturing of CSI hardware shall not commence until all documents requiring pre-approval have been approved and GA-EMS has provided formal authorization to proceed.
- This clause combines the requirements of Clauses 213, 213a, 213b and 213d into one clause but there are some new requirements and additional language.
- Sections a) & b) apply to <u>CSI Items ONLY</u>, <u>not</u> CAI items
- See next slide for important information regarding making changes to GA-EMS approved documents.
- To obtain document DI-SAFT-81934, refer to the website below and enter number into the "Document ID" section & click Submit button :

http://quicksearch.dla.mil/





DLA Document Services, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094. Address questions to ASSIST Help Desk at 215-697-6396 (DSN: 442-6398) [. iecurity Information and Section 508 Compliance Information. Questions or comments: ASSIST Feedb



WARNING: UNAUTHORIZED ACCESS TO THIS UNITED STATES GOVERNMENT COMPUTER SYSTEM AND SOFTWARE IS PROHIBITED BY PUBLIC LAW 99-474 (THE COMPUTER FRAUD AND ABUSE ACT OF 1986) AND CAN RESULT IN ADMINISTRATIVE, DISCIPLINARY OR CRIMINAL PROCEEDINGS. (213e) Critical Safety Items/Critical Application Items

IMPORTANT: This clause requires one or more documents that must be approved by GA-EMS prior to the commencement of manufacturing. Once a document has been approved by GA-EMS, Suppliers are not to make any changes to GA-EMS approved procedures or other documents without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.]

All attributes/characteristics identified on the design documents as a Critical and/or Major characteristic will require 100% inspection by GA-EMS, with actual inspection results of each characteristic recorded, documented, and provided to GA-EMS.

Section (a) below is only a requirement for drawings that are designated as Critical Safety Item (CSI)

a) CSI – Process and Operation Sheets/Preapproval – The supplier and its sub-tier suppliers shall submit process and operation sheets to GA-EMS for approval within thirty (30) calendar days after issuance of the purchase order (PO). Refer to DI-SAFT-81934 for the specific contents required in this report.

NOTE: Manufacturing of CSI hardware shall not commence whill GA-EMS has provided formal authorization to proceed.

Section (b) below is only a requirement for drawings that are designated as CSI.

- b) CSI Inspection Method Sheets/Preapproval: The supplier and its sub-tier suppliers shall submit inspection method sheets to GA-EMS for approval within thirty (30) calendar days after issuance of the PO. The inspection method sheets shall identify objective quality evidence necessary to demonstrate that the item conforms to all requirements and specifications, from raw material to finished product.
 - The supplier may use its own report format, provided on an 8 ½ by 11 inch (metric A4) page size, and delivered electronically.
 - The report must contain a title page containing item number, item description, revision, PO number, title of subcontract data requirements list (SDRL) if applicable, and the distribution list.
 - · The individual sheets must indicate the following:
 - o Item number, revision and item description
 - o Serial number(s)
 - Lot size
 - o Sample size (and associated acceptable quality limit [AQL])
 - o Characteristic inspected
 - o Classification of characteristic
 - Specification (tolerance)
 - Inspection tooling/method
 - o Government Source Inspection (GSI) agent's name for each GSI hold point
 - Sign or initial or stamp, and date of Quality Control inspector (for all inspection hold points)

NOTE: Manufacturing of CSI hardware shall not commence until GA-EMS has provided formal authorization to proceed.


213e Critical Safety Items/Critical Application Items -Continued

- Section (c) applies to both <u>CSI and CAI Items!</u> This is the only section of Clause 213e that applies to CAI items.
- Critical characteristics are typically labeled C1, C2, etc. or C101, C102; Major characteristics are labeled M1, M2 or M101, M102.
- These statements apply to all Minor characteristics as well – those which do not have a Critical or Major designator.
- This section is for Class 3 threads and Minor characteristics only (with tolerance range ≤.010).
 Record actual dimensions for ALL characteristics in this AQL category for each S/N in sample size.
- Applies to all other Minor characteristics with tolerance range >.010. Record actual dimensions for ALL characteristics in this AQL category for each S/N in sample size.
- Section (d) <u>ONLY applies</u> to CSI Items, <u>not</u> CAI items

New section for CVN 79 contract:

 Section d) requires submittals of Process and Operation Sheets and Inspection Method Sheets at specific intervals and as separate documents. If there are multiple GSI hold points, then multiple submittals of partially completed Process and Operation Sheets and Inspection Method Sheets are required. See highlighted areas.

<u>IMPORTANT</u>: Once the POS & IMS have been approved by GA-EMS, Suppliers are not to make any changes to this document without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS. Section (c) below is a requirement for drawings that are designated either as CSIs or CAIs.

- c) CSI/CAI: Inspection of all CSIs and CAIs shall undergo inspections as required by design and contractual documents to verify items are within specifications. The supplier and its sub tier shall perform quality conformance and lot sampling inspection for all associated features and characteristics that are present in the drawings and specifications with results (actual readings and/or measurements) of each characteristic recorded, documented, and provided to GA-EMS. The lot sampling shall be performed as follows:
 - Features/attributes/requirements classified as Critical and Major on the drawing(s) or within the technical specification shall be 100% inspected and results recorded.
 - Unless otherwise specified, attributes for plating, hardness, and NDT shall be 100% inspected and results recorded.
 - Class 3 threads, dimensions, and geometric feature controls with a tolerance range of 0.010-inch or less, shall be inspected and recorded using an AQL of 1.0 and the General Inspection Level II, as defined by ANSI/ASQ Z1.4.
 - The supplier shall inspect and record all other Minor characteristics using an AQL of 4.0 and the General Inspection Level II as defined by ANSI/ASQ Z1.4.

Section (d) below is only a requirement for drawings that are designated as CSIs.

- d) CSI Process Operation and Inspection Method Sheet Data/Submittal: Upon receiving formal authorization from GA-EMS to commence manufacturing of CSI hardware the supplier and it sub-tier supplier shall:
 - At the conclusion of each GSI event, submit GA-EMS and Government stamped or signed and dated process operation and inspection method sheets with objective quality evidence to GA-EMS.
 - The supplier shall submit the process operation and inspection method sheets, as separate documents (i.e., separate electronic files), with objective quality evidence within 72 hours of the GSI event, completed up to the level of the GSI event.
 - Actual inspection result for all Critical or Major <u>characteristics</u> will be recorded by serialized part number, and shall be included in each document package.

```
NOTE: For process operation and inspection method sheets that contain several GSI hold
points, GA-EMS will require multiple submittals of partially completed process
operation and inspection method sheets up to each GSI hold point.
```



(214a & 215b) GA-EMS and Government Source Inspection/Hold Points (7-day Notice)

Source Inspections (by GA-EMS or Government)

The supplier must be <u>prepared</u> and <u>ready</u> for source inspections at scheduled day and time, otherwise they run the risk of cancellation or corrective action issuance by GA-EMS or the government (i.e. DCMA).

Please ensure the following are fulfilled prior to the scheduled source inspection:

- GA-EMS and/or DCMA is given the required advance notice of upcoming source inspections
- GA-EMS Quality Notifications and internal non-conformances have been adjudicated and closed out in advance prior to source inspection event
- All prior operations are completed and the unit under test or inspection is physically available when source inspectors arrive
- The parts are clean and ready prior to mechanical, NDT inspections or testing
- All test and handling equipment is available, calibrated if required, and in good working order
- All applicable GA-EMS approved procedures, specifications and drawings are on-hand

Hold Points:

- Hold Points are listed in the GA-EMS Purchase Order.
- Each Source Inspection Hold Point must be included in the supplier's manufacturing instructions (router, traveler, task or signoff sheets).

(214a) Source Inspection/Hold Points (7-day Notice)

Source Inspection: GA-EMS source inspection/acceptance is required on the purchase order (PO). The supplier shall notify GA-EMS a minimum of seven (7) working days via email to EMS-SourceInspection@ga.com prior to start of an acceptance test or inspection of a designated hold point to allow for scheduling of GA-EMS Quality Representative to be in attendance. The supplier shall have technical data (e.g., drawing, specification, certification) available for use in support of the source inspection activity. Source in-process inspection points shall not be by-passed.

When in-process GA-EMS source inspection is required, the GA-EMS Source Inspection Coordinator or Quality Representative will coordinate with supplier. The supplier shall provide reasonable facilities and assistance, including all quality records and related data for the safe and efficient performance of GA-EMS inspections.

The supplier shall provide gauges, tools, fixtures, and jigs necessary to perform the inspections. The supplier shall also provide sufficient rigging/material handling services and manpower to setup/configure/operate equipment and machines used to accomplish the inspection task. This supplier assist requirement shall be applicable to 100% of the production quantities.

Hold Points: Hold points will be designated by GA-EMS on the PO. The supplier will include the GA-EMS designated hold points in the manufacturing instructions (router, traveler, task or sign-off sheets).

(215b) Government Source Inspection (7-day Notice)

Government Source Inspection (GSI) is required prior to shipment of any product from the supplier's facility. Upon receipt of the purchase order (PO), the supplier shall promptly notify the Government representative who normally services the supplier's facility so that appropriate planning for Government inspection can be accomplished.

When the products are ready for inspection, the supplier is responsible for notifying the applicable GA-EMS Quality Representative (at EMS-SourceInspection@ga.com) and the Government representatives a minimum of seven (7) business days for non-resident, or two (2) working days if Government representative is resident, prior to the inspection to make arrangements in support of the inspection.

The supplier shall provide gauges, tools, fixtures, and jigs necessary to perform the inspections. The supplier shall also provide sufficient rigging/material handling services and manpower to setup/configure/operate equipment and machines used to accomplish the inspection task. This supplier assist requirement shall be applicable to 100% of the production quantities.

If the supplier has any questions on the applicability of GSI, contact the GA-EMS Authorized Representative for clarification.



(215c) Government Notification Points (7-day Notice, Non-CSI/CAI)

* New Quality Clause for CVN 79 contract *

(215c) Government Notification Points (7-day Notice, Non-CSI/CAI)

When the products are ready for inspection, the supplier is responsible for notifying the applicable GA-EMS Quality, Purchasing, and Government representatives a minimum of seven (7) business days for non-resident, or two (2) working days if Government representative is resident, so that arrangements can be made by the Government representative to witness the inspections, if they so choose. Note that this is not a mandatory hold point, and therefore Government Source Inspection (GSI) is not required prior to shipment of product from the supplier's facility. The supplier's only responsibility is to inform the above parties of the upcoming inspection. If GA-EMS or the Government representatives are not present at the time of the inspection, the supplier is free to complete the operations and ship the product to GA-EMS.

Some non-CSI/CAI components will now require government notification of source inspection. The GA PO will delineate the applicable part numbers.



217 Work Release Prior to Shipment

- The supplier cannot ship the product until it receives a QA Work Release (GA Form 580),
- Clause 217 QA Work Release (GA Form 580) is always accompanied by Clause 214 or 214a.

85000X24690, WIDGET, FRONT SIDE; Rev E

The items on this order have Critical Application Item (CAI) characteristics that require 100% inspection.

The following QA Clauses per GA-EMS 09492L00008 apply to this PO: (201a-QA Prgm),(203-Subcontracting),(204-Subtier Supplier), (212-Access),(213-CSI/CAI),(218a-FAI),(221-SDR),(259-Matl Certs), ,(277-Passivate),(280-NDE Rqmnt).

(214a-Source Insp Hold Points) (217-QA Work Release) -GA to witness NDE inspections per Note 7- M101 -The following items require 100% inspection and documentation: -(C101)Material/Hardness -(M101)Penetrant Inspection

- The Work Release needs to be signed and issued by the GA-EMS Quality Representative prior to the supplier shipping the product.
- A work release will only be issued if all source inspections are complete and the supplier's QA Clause deliverables have been submitted, reviewed and accepted by GA-EMS.
- The supplier should include an operation in their manufacturing instructions (router, traveler, task or sign-off sheets) to obtain GA Work Release (GA Form 580) prior to shipping product.
- If product is shipped without a required source inspection or Work Release, GA will reject the product upon receipt.

(217) Work Release Prior to Shipment

Items covered by the purchase order (PO) shall be final inspected and released by the GA-EMS Quality Representative prior to each shipment. As evidence of the release of the items and all related documentation, a Quality Assurance Work Release (form GA 580) shall be completed, signed, and dated by GA-EMS Quality Representative and issued to the supplier. A copy of the Quality Assurance Work Release (form GA 580) shall accompany each shipment. Execution of a Quality Assurance Work Release does not relieve the supplier of its obligation to provide items in compliance with the requirements of the PO.

				QUALITY		RANCE	SH	IPPING ORDER NO	
CHEC	K ONE:	0.050	MANUFACTURER			POINT OF SHIPMENT	GA	PD/SR NO	
	D SUP	PLIER							
	GA GA		CUSTOMER			POINT OF DELIVERY	cu	JST. POICONTRACT NO	
ITEM	QTY.		DWG/SPEC NO.	ITENJ DATA NO	ISS/	DESCRI	PTION OF ITEM	cc	NDITIO
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	-				<u> </u>				
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	NO OPENI	AUTHOR	IZED WITH (CHEC	K ONE):		APPLICABLE SOURCE IN	SPECTION PLANS	5	
	OPEN NOP	CONFORM	ANCE REPORTS LISTED	BELOW					
	OPEN SUP	PLIER DISP	OSITION REQUESTS LIS	STED BELOW					
	85.590	NSIBLE QUAL	NG. (DR) QA REP	Date	_	QUALITY ASSURAN	ICE REPRESENTATIVE		Date
			FOR GEN	ERAL ATOM	CSM	ANUFACTURED ITE	MSONLY		
CEF	RTIFICATE	E OF CO	NFORMANCE: G	eneral Atomic	s here	by certifies that the ite	ms described a	above are manuf	actur
in a	ccordance	with the	customer's purcha	ase order/cont	ract. T	he item(s) conform to	the applicable	drawings, specif	catio
and	contract r	equirem	ents with the excep	otions noted in	appro	wed deviation docume	ints.		

218 - First Article Inspection

 Note the notes below apply to both Clause 218 and 218a on next slide

(218) First Article Inspection – First Lot Produced

First Article Inspection (FAI) requirements apply to a representative sample of the first lot produced of a part or an assembly. A new FAI report is not required with subsequent purchase orders (POs) of the exact item, provided that the Government contract number listed on the GA-EMS PO has not changed. However, if the Government contract number changes on subsequent POs of the exact same item, then a new FAI report is required.

An FAI shall be performed by the supplier in accordance with the requirements of SAE AS9102, Aerospace First Article Inspection Requirement, latest revision (or equivalent), and submitted to GA-EMS prior to shipment. When documenting the FAI, supplier may use the forms contained within the latest version of SAE AS9102 or their equivalent, so long as the forms contain all the information required by SAE AS9102.

NOTE: Forms that are shaded may not be fully legible when scanned and therefore not acceptable.

Prior to delivery of the PO item, the supplier shall deliver a copy of the FAI report.

- GA-EMS requires FAIs be performed in accordance with AS9102.
- FAI Reports are to be delivered using one of three methods as detailed in the data submittal instructions section of 0949L00008 EMS Standard Quality Clause document, prior to shipment (not physically with shipment).
 - Note: Once the supplier has submitted the FAI report, the supplier is free to ship parts as long as all other deliverables (if any) have also been submitted and approved (if required). GA-EMS will not provide any notice if the FAI has been accepted; however if the FAI is found not to conform to drawing or PO requirements, the supplier will be notified.
- When a given characteristic is present in multiple locations, measured values may be listed individually or be represented with a minimum and maximum value.
 - This is not the case for critical or major features, where individual measurements must be provided for all locations.
 - Additionally, individual values must be provided for any non-conformances, along with their locations.
- Nonconforming results must be clearly identified as such on the report, along with the corresponding supplier nonconformance number and GA-EMS "Supplier Disposition Request" (SDR) number.



218a - First Article Inspection New Clause

 Note: This is a new clause to allow the suppliers to re-use part or all of a previous first article.

(218a) First Article Inspection

A First Article Inspection (FAI) report shall be submitted by the supplier in accordance with the requirements of SAE AS9102, Aerospace First Article Inspection Requirement, latest revision (or equivalent), prior to shipment of product to GA-EMS. When documenting the FAI, supplier may use the forms contained within the latest version of SAE AS9102 or their equivalent, so long as the forms contain all the information required by SAE AS9102.

NOTE: Forms that are shaded may not be fully legible when scanned and therefore not acceptable.

FAI requirements apply to a representative sample of the first lot produced of a part or an assembly.

When reusing part or all of a previous first article, as allowed by SAE AS9102, the supplier must provide the following:

- · Inspection/test results for all new or modified features of the current product
- · Copy of the previous FAI report
- SAE AS9102 Form 1 or a cover sheet that references the baseline part number/revision letter, previous Government contract number, previous and current purchase order (PO) number, reason for the partial FAI (if applicable) and a summary of all features of the current product that were re-inspected/re-tested



218 - First Article Inspection (continued)

The 3 AS9102 Recommended Forms

AS9102 First Article Inspection Sheet of Form 1: Part Number Accountability 1a Supplier Code 1b Supplier Name 1c Date Submitted 1d Control Number 1st Level 2a Detail or 1st Level Assy. Part No. 2b Rev 2c Part Name 2d S.S. Reqd. 2e FAI Complete (Date) Other Level a) if above is a DETAIL drawing, go to the next page "Raw Material/Special Process/Functional Test b) if the 1'st level drawing is an assembly drawing with no 2st level assembly drawing, go to the "INDEX" section below c) if there are 3 or more levels of drawings note the 2rd level assembly drawing, then to "Index" section below 3d S.S. Regd. 3e FAI Complete (Date 3a 2nd Level Assembly Part Number 3b Rev. 3c Part Name Index of Part Numbers Required To Make The 1st or 2nd Level Assemblies Noted Above List the level of all drawings, start with the Level 1 ASSEMBLY drawing. List all sub-tier drawings following the next higher level drawing under which they appear 4bPart No. 4c Rev 4d Control 4e Part Name 4f Supplier 4g S.S. Req. No Number 4a Dwg Level 4h FAI Complete Ck if in this Report See additional pages 5. Customer Guality review: All Characteristics Accounted For: Meet Drawing or are Properly Documented for Disposition Customer Signature and Code Number (if applicable) Review Date Customer Comments

AS9102 First Article Inspection

Form 2: Product Accountability - Raw Material, Special Process, Functional Testing

		Prepared by:			Sheet of
2a Part Number (s) to which Material/ Process Applies	2b Material Identity or Special Process (with code)	2c Source: List Customer Supplier Code if Required	2d Cust. Approval Expiration Date	2e Control, Spe Frequenc	cial Procedures Methods, y, Approved Options
3a Functional Test Type Applicable Part No.	3b Describe Testing & 4 Type, Accuracy, Frequ	Controls, Equipment ency of Calibration	3c Functional Ter Describe Frequer	iting icy, Criteria	

						Cor	npatibilit	y Evaluation										
la Part N	umber:			1f	FAI		1g Dwg. Re	ev.:				1	Ih Product	Acceptance	Plan			
Ib Suppli	ier:			Oth	er:		CIDs.:			Date:	R	W:	By:	To:	Description	1:		
lc Custor	Customer Supplier Code:			mer Supplier Code: Date:				Prepared b	ay:									
ld Dwg R	lev:	CIDs:		Case	e Records:		Customer	Review:										
2	Characteristic	Account	ability	_	3 In	enectie	n / Test Re	eulte	-	A Dr	duct A	cent	2000	5.Com	natibility Ev	aluatio		
a Char No *	28 Drawing Requirement	2c Zone	2d Class	Γ	3a Results (Variable Data)		3b Measurem	ent Equipment	40	Op. 40.	4b. Accept	Ju	4c stification	5a Supp Do	lier Process	5b Si Y/I		
							FAI	Production	1		-		Plan	E	for <100% valuation	Requ	uirement	
				-			-		+			H						
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Cover sheet, for detailed parts or assemblies Certifications and test results for raw material and special processes

Dimensional inspection results



218 First Article Inspection (continued)

CVN7 N683	8 ALRE Production	n		Schedule	A No: Exhig	DD250: GAT-0392
	FORM 2: Product Acco Functional Testing	ountability - Raw M	aterial, Specifica	tions and Special Proce	ess(es),	Sheet \$ of \$ 6
	Customer:	1		Page _3	<u>4</u>	\sim
	1. Part Number 3890AS003139-31	2 Part Name Mechanical Brake B	ench Test Fixture	3. Serial Number	\bigcirc	4. FAI Report Number N/A
	5. Material of Process Name	6. Specification Number	7. Code	8. Special Process Supplier Code	9. Customer Approval Verification (Yes/No/NA)	10. Certificate of Conformance number
			N/A N/A	· · · · · · · · · · · · · · · · · · ·	N/A N/A	
			N/A N/A	-	N/A N/A	
 All applicable form fields must be completed. If the field is not applicable, annotate with "N/A". 			N/A		N/A	

- completed. If the fie annotate with "N/A"
- When the report contains multiple pages, all pertinent fields required for traceability, such as part number, drawing revision or serial number must appear on each page.
- GA-EMS prefers that entries into FAI forms be type-written. If results are hand written, all figures must be legible with discernible decimal points (and inspection stamps).
- Be sure FAI report is signed.



218 First Article Inspection (continued)



Notes in designated "Notes" section of drawing



Notes located in 'Views' of drawing

• All <u>drawing notes</u>, whether appearing in the "Notes" section of the drawing or in 'Views' in the body of the drawing, must be accounted for on the First Article Report.



218 First Article Inspection (continued)



	AS9102	REV. B
	Technically equivalent writings published in all IAQG sectors.	
	Issued 2000-08 Revised 2014-10	
	Superseding AS9102A	
First Article Inspec	tion Requirement	

- 4.6 Partial or Re-accomplishment of First Article Inspection
- a. The FAI requirement, once invoked, shall continue to apply even after initial compliance.

(R) Aerospace

- b. The FAI requirements may be satisfied by a partial FAI that addresses only the changes from a baseline part number provided all other characteristics were conforming on the previous FAI and are produced by the original production processes.
- c. When a partial FAI is performed, the organization shall, as a minimum, complete the affected fields in the FAI forms.
- d. When the organization performs a partial FAI, the organization shall record the "Baseline Part Number", including the revision level and reason for the partial FAI on Form 1 (see field 14).
- e. FAI requirements may be satisfied by a previously approved FAI performed on identical characteristics of similar parts produced by identical means. When FAI requirements (partial or full) are satisfied in this manner, identify the "Baseline Part Number" on Form 1 (see field 14).
- f. The organization shall perform a full FAI or a partial FAI for affected characteristics, when any of the following occurs:
 - 1. A change in the design characteristics affecting fit, form, or function of the part.
 - A change in manufacturing source(s), process(es), inspection method(s), location of manufacture, tooling, or materials that can potentially affect fit, form, or function.
 - 3. A change in numerical control program or translation to another media that can potentially affect fit, form, or function.
 - 4. A natural or man-made event, which may adversely affect the manufacturing process.
 - 5. An implementation of corrective action required to complete a previous FAI, as described in 4.4.
 - 6. A lapse in production for two years shall require an update for any characteristics that may be impacted by the inactivity. This lapse is from the completion of last production operation to the actual restart of production.



Back

Under these circumstances, "repeat" FAIs are

required.

221 Control of Nonconforming/Modified Items Supplier Disposition Requests (SDRs)

- Important: When completing the SDR form, the supplier must follow instructions on rear of SDR form exactly as specified.
- All requests for deviations from drawing or requests for information for PO, drawing or specification requirements must be documented and approved by GA-EMS using the SDR form. Email correspondence with GA-EMS employees will not suffice as approval of deviations, without a formal SDR form submitted.
- CAR's issued by GA-EMS customer representatives (i.e. DCMA or NAVAIR) must be submitted to GA-EMS within 2 days of Receipt.
- Note: The supplier will not receive the original form back after GA-EMS disposition
- See slide #7 for location of SDR form on GA website.
- Be sure to always use latest revision of form (found on website): <u>http://www.ga.com/quality-assurance</u>.
- Acceptable means of transmitting SDRs to GA-EMS:
 - 1. If the supplier has a ProjectLink account with GA-EMS, they may submit directly to the supplier's Windchill account.

8) SUPPLIER NAME-

- 2. Alternatively, they may be emailed to the GA-EMS Buyer or ems-sdr@ga.com.
- Note that "REV" block on SDR form is not for the drawing revision, but rather is the <u>SDR revision</u> (not to be entered by supplier).

Contractor CAGE Code: 4V360 3550 General Atomics Ct Supplier DisposiTion REQUEST (1) SDR NO.: REV.: (2) PAGE: 1 of _____ (3) PART NOMENCLATURE: (4) DWGIFART NO.: (0) REV.: (0) LOCATION: (7) DATE:



• GENERAL ATOMICS

Back

(221) Control of Nonconforming/Modified Items

All line items delivered shall conform to the requirements of the PO. Nonconformances, design modification requests, and requests for information to clarify PO, drawing, or specification requirements shall be documented and submitted for consideration using the current version of the SDR) form (EMS-0196). Under no circumstances shall nonconforming line items or services be shipped without a GA-EMS-approved SDR. The SDR form (EMS-0196) may be obtained from the GA-EMS website at the following URL: http://www.ga.com/quality-assurance.

Product dispositioned as scrap shall be conspicuously and permanently marked, or positively controlled, until physically rendered unusable

The supplier shall submit copies of any Corrective Action Requests (CARs) they receive from GA-EMS' customer representatives (e.g., Defense Contract Management Agency) to GA-EMS within 2 days of receipt.

Completed SDRs and CARs are submitted to GA-EMS QA Representative (via email to EMS-SDR@ga.com) and the GA-EMS Authorized Representative.

NOTE: The original SDR form submitted by supplier will not be returned to the supplier after GA-EMS disposition. Upon GA-EMS disposition of submitted SDRs, a similar looking SAP-generated QN form (with information transposed from the original SDR form) will be returned to the supplier. Additionally, the supplier may receive multiple QNs for one SDR.

255 - Certificate of Conformance

- C of C's are to be delivered using one of two methods as detailed in the data submittal instructions section of 0949L00008 EMS Standard Quality Clause document, prior to shipment (not physically with shipment).
- GA-EMS actually receives and rejects certs lacking Seller's name.

(255) Certificate of Conformance

The supplier shall submit a copy of the Certificate of Conformance (C of C) that is representative for each item delivered. The supplier shall retain the original C of C for its records.

The supplier's C of C shall include the following:

Supplier's name

- Statement attesting that goods and services are of the quality specified and conform to the PO requirements, including specifications, drawings, preservation, packaging, packing, marking requirements, physical item identification, and applicable Government and GA-EMS specification
- · If material is GA-EMS furnished, so indicate.
- · Part number and dash number (when applicable).
- Drawing revision level and GA-EMS-approved ECN that was used to manufacture (when applicable)
- Printed name, date, signature or stamp, and title of the supplier's authorized representative signing the C of C
- GA-EMS PO number
- · Serial Number(s) (when applicable)
- Applicable SDRs

Requirements of this clause also apply to sub-tier supplier's certifications for "special processes" when Quality Clause 204 and Quality Clause 277 appear in the PO.

NOTE: If the supplier is a distributor, a C of C shall be provided in accordance with the above or a copy of the original manufacturer's C of C shall be provided that is representative of each item deliverable with the new shipment, as applicable.



255 - Certificate of Conformance (continued)





255 - Certificate of Conformance (continued)

March 21st, 2013

Example of a Complete C of C

 Note that this C of C contains all elements, required by the clause i.e.
 Supplier Name, Conformance
 Statement, P.O. Number, Part number, Revision, Quantity, Serial Number,
 Printed Name, Signature and Title of the authorized company representative.

 Include reference to any approved SDRs (Supplier Deviation Requests).

Certificate of Conformance

Drop Ship To:	Bill To:
XYZ, Inc. 36700 Sugar Ridge Road North Ridgeville, OH 44039	General Atomics Attn: Accounts Payable P.O. Box. 85608 SanDiego, CA. 92186-5608
Ph: 440-327-2102	Resale No: SR FH25-754887
FAX: 440-327-6171	GA Buyer: John Smith
ATTN: Mark Novack	

Attention: QUALITY ASSURANCE P.O: 4500040978, C.O.# 06, Approved 02/22/2013

Line Item80DWG:3890AS003937-01, Rev. BPart Description:Rotor Weldment ModificationQuantity:1eaSerial No.008Ref. CustomerN68335-09-C-0573

XYZ, Inc. Work Order No. 95369-1

X, Y, Z, Inc. certifies the Rotor Weldment Modification is welded, machined and inspected per engineering drawing and purchase order requirements including preservation, packaging and marking requirements. All inspection documentation is electronically furnished to GA Buyer upon completion of GA Source Inspection, GA SDR's: 4500040978-006 applies to this unit.

This unit was subject to on-site Source Inspection at our facility.

Sincerely,

Jane Smith

Jane Smith Quality Manager X, Y, Z, Inc.



256/256a – Test Reports

- Test Reports are to be delivered using one of three methods as detailed in the data submittal instructions section of 0949L00008 EMS Standard Quality Clause document, prior to shipment (not physically with shipment).
- If no "quantitative limits" exist, pass/fail results are acceptable in the form of a Certificate of Conformance.

* New Quality Clause for CVN 79 contract (256a)

 Time sensitive submittal: Test report must be delivered using one of three methods as detailed in the data submittal instructions section of 0949L00008 EMS Standard Quality Clause document, prior to shipment (not physically with shipment).

(256) Test Reports

The supplier shall submit one (1) legible and reproducible copy of the actual test results of the lot or item acceptance tests required by the applicable specification, identifiable with test parameters and product submitted. The test report shall include the principal specifications, including revision numbers or letters that govern the production of the item. Where quantitative limits are established by the specification, the test report shall indicate the actual values obtained during testing. Test reports shall include the control identity (e.g., lot, heat lot, batch, serial number) of the material or item tested. If the supplier is not the manufacturer, then the supplier shall furnish the manufacturer's test report as described above.

These test reports must contain the test/inspection stamp of the individual performing the task, or the printed/typed name, signature, title of the authorized representative of the third party performing the test and date.

Test results will be subject to review and approval by GA-EMS.

(256a) Test Reports

Within twenty (20) days after completion of test, the supplier shall submit one (1) legible and reproducible copy of the actual test results of the lot or item acceptance tests required by the applicable specification, identifiable with test parameters and product submitted. The test report shall include the principal specifications, including revision numbers or letters that govern the production of the item.

Where quantitative limits are established by the specification, the test report shall indicate the actual values obtained during testing. Test reports shall include the control identity (e.g., lot, heat lot, batch, serial number) of the material or item tested. If the supplier is not the manufacturer, the supplier shall furnish the manufacturer's test report as described above.

These test reports must contain the test/inspection stamp of the individual performing the task, or the printed/typed name, signature, title of the authorized representative of the third party performing the test and date.

Test results will be subject to review and approval by GA-EMS.



259 – Material Certifications Chemical and Physical Properties

- Material Certifications are to be delivered using one of three methods as detailed in the data submittal instructions section of 0949L00008 EMS Standard Quality Clause document, prior to shipment (not physically with shipment).
- Examples of other standards include NAVSEA and SAE AS.
- The applicable material specification number and revision (e.g., ASTM A469 – 07) shall be listed on the Material Test Report and must match the material specification on the drawing.
- Alternate materials will not be accepted by GA-EMS unless an SDR form has been approved by GA-EMS prior to shipment of the material.

(259) Material Certifications – Chemical and Mechanical Properties

The supplier shall provide to GA-EMS material test reports (MTRs) along with a certification by the mill or testing facility that performed the tests certifying compliance to specific ASME or ASTM standards. This requirement applies to all components in an assembly, as specified in the PO.

The MTRs shall provide both chemical and mechanical properties that include lot/heat/melt number and actual inspection and test values. Any subsequent heat treatment processes shall require test reports and certifications from the testing facility that shall include mechanical properties for the as-delivered condition. All MTRs shall include the typed name, signature, authority or title and shall be dated.

NOTE: If the material specification lists the testing of mechanical properties as "non-mandatory", the MTR may be limited to chemical properties (unless otherwise specified in the drawing).

All documentation provided by the supplier shall be legible, and at a resolution capable of being reproduced and scanned for electronic storage.

Complete material traceability shall be maintained throughout the manufacturing processes with appropriate records maintained. Traceability records shall be available for review by GA-EMS, when requested.

The supplier shall not use alternate materials or grades of materials without prior approval from GA-EMS, even if they have similar chemical and mechanical properties. If the supplier desires to use alternate materials due to availability issues, they must submit a request to GA-EMS using the SDR form (EMS-0196).

For plastics and proprietary materials, a C of C from the material supplier attesting the material meets its specification is acceptable (i.e., a material test report citing chemical and mechanical properties is not required).



259 - Material Certifications (continued)

- The Material Test Report (MTR) should always provide the following as required by applicable material specifications:
 - Lot/heat/melt number
 - o Grade, temper or alloy number, as applicable to the specific material ordered
 - o Manufacturing and heat treatment details as required by material specification
 - o Non-destructive test results (if required by material specification)
 - o Chemical properties test results
 - o Mechanical properties test results
 - ✓ Typical mechanical properties: e.g., Tensile Strength, Yield Strength, Elongation, Reduction in area and Hardness.
 - ✓ Other mechanical properties, as applicable per drawing/material specifications: e.g., Grain Size, FATT50, Charpy absorbed energy, Fracture Toughness, Fatigue Crack Growth Rate, Stress Rupture etc.
- If the heat treat condition listed on the drawing is not readily available from the mill, and the material is purchased as-is, then additional heat treatment must be performed to meet the drawing requirements.
- The name of the supplier's authorized representative must be printed or typed on the MTR, with their signature or stamp, and date. General Atomics sometimes receives MTRs missing some of these entries.
- GA-EMS sometimes receives MTRs which are difficult or impossible to read because they have been scanned or copied multiple times. Test reports are submitted to GA-EMS customers and therefore need to be legible enough for them to verify compliance to material requirements.
- GA-EMS suppliers are required to maintain material traceability throughout the manufacturing processes. Material lot/heat/melt numbers must be maintained on all manufacturing travelers and inspection records.

273 – Commercial Welding / Brazing Requirements for Procedures, Repairs and Material Records

• Same requirements as QC 275 except the following:

- 30 Day SDRL submittal requirement
- Welder Performance Qualification Maintenance Program shall be maintained to meet Code requirements, but does not need to be submitted to GA-EMS
- Multi-process PQRs (e.g. AWS B2.1) are permitted at the discretion of the GA-EMS weld engineer
- PQR supporting documentation shall be maintained, but not submitted
- WPQRs are not required to be submitted



275 – NAVAIR Welding / Brazing Requirements for Procedures, Repairs and Material Records

- Most NAVAIR welding will be specified to AWS or ASME codes.
- Work cannot begin until documentation is approved by GA-EMS.
- This **Guide is intended to aid**, **not direct**, the supplier towards successful completion and approval of weld documentation.

(275) Weld/Brazing Requirements for Procedures & Repairs

IMPORTANT: This clause requires one or more documents that must be approved by GA-EMS prior to use. The supplier shall provide, for review and approval by GA-EMS, copies of the following documentation within ninety (90) calendar days prior to commencement of work:



275 – Frequently Asked Questions

• FAQs:

– What is a PQR, WPS and WPQR?

- A <u>Procedure Qualification <u>Record</u> (PQR) is the <u>record</u> of [actual] welding variables used to produce an acceptable test weldment and the results of tests conducted [in accordance with the specified code] on the weldment to qualify a WPS.
 </u>
- A <u>Welding Procedure</u> <u>Specification</u> (WPS) is the [working] document providing the required welding variables [and their limitations] for a specific application to assure repeatability by properly trained welders and welding operators.
- A <u>Welder/Welding Operator Performance Qualification **Record** (WPQR) is the demonstration of a welder's or welding operator's ability to produce welds meeting prescribed standards. The welder's "certificate" [or WPQR] is the written verification that a welder has produced welds meeting a prescribed standard of welder performance.
 </u>
- What format should be used for PQR, WPS and WPQR?
 - Recommended templates are available in the welding codes, but any format is acceptable as long as the "essential variables", henceforth referred to as "EV", are specified within the document.

Source: AWS A2.4



275 – PQR/WPS Qualification Process

GENERAL ATOMICS ELECTROMAGNETICS Summon, AWS DLJ Welding Proc Supporting PORto POR 167, Supporting POR 167,	ATOMICS alfonsiand direstoppi dure Specification (WPS) 1	POR to: POR Hit Verding Them: 60 Joint Digits (Der Weit Type (2) You Davids Weiter Digits Davids Weiter Digits Davids (Tim Boot Opening, 8,17 Opening, 84 Back Opening, 8,17
Premark By: C. Jai C. La	Took 20/2016 AVSCW 90/0041 TOOK 71/2017 Just Detail Readin Wood Number Filles July, Herstenses, & Yorkind Wood Number Filles July, Herstenses, & Yorkind Wood Number Groupe Jink, Herstenska, & Yorkind Wood Number Stress, Name Stress, N	Rest and a second
Note: 1) ER70S-2 and ER70S-6 are both acceptable welding	Temperature None Time (hr.) None electrodes.	North 3 3 minutes Boot 1 Boot 1
Para Mada garawan Para Mada garawan Para Mada garawan Para Mara Mara Mara Mara Mara Mara Mara	Uncess Value Tarvel Corrent Value Value (investor) Information Areps (investor) (investor) Information (investor) (investor) (investor) Information (investor) (investor) (investor) Information (investor) (investor) (investor) Information (investor) (investor) (investor)	bergi Annower Annote Sta

PQR	Supporting Documentation
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275 – PQR/WPS/WPQR & WOPQR Interaction





275 - PQR Data

- Supporting documentation is critical for the quality and integrity of the PQR.
- This is <u>not</u> a new requirement because the Codes always made a provision for "specific values".





275 - PQR Data (Cont'd)

AWS D1.1:2015

4.3 Common Requirements for WPS and Welding Personnel Performance Qualification

4.3.1 Qualification to Earlier Editions. Qualifications which were performed to and met the requirements of earlier editions of AWS D1.1 or AWS D1.0 or AWS D2.0 while those editions were in effect are valid and may be used. The use of earlier editions shall be prohibited for new qualifications in lieu of the current editions, unless the specific early edition is specified in the contract documents.

4.3.2 Aging. When allowed by the filler metal specification applicable to weld metal being tested, fully welded qualification test specimens may be aged at 200°F to 220°F [95°C to 105°C] for 48 ± 2 hours.

4.3.3 Records. Records of the test results shall be kept by the manufacturer or Contractor and shall be made available to those authorized to examine them.

AWS D1.1/D1.1M:2015

4.7 Preparation of WPS

The manufacturer or Contractor shall prepare a written WPS that specifies all of the <u>applicable essential vari-</u> ables referenced in 4.8. The specific values for these WPS variables shall be obtained from the procedure qualification record (PQR), which shall serve as written confirmation of a successful WPS qualification.

For the PQR, the actual joint details and the values of essential variables used in the testing should be recorded. An example of a completed PQR form is provided for guidance in filling out the form. A copy of the Mill Test Report for the material tested should be attached. Also, Testing Laboratory Data Reports may also be included as backup information or a PQR Test Result Form similar to the example in this annex may be used. Cross references to the required mechanical tests as applicable to

AWS D1.2:2014

3.12.1 Procedure Qualification Record (PQR). The specific values of conditions involved in qualifying a WPS shall be recorded in a form called the Procedure Qualification Record (PQR). On this form shall be recorded the essential variables for the specific welding process (see Annex \underline{E} for sample PQR).

References are from D1.1:2015 and D1.2:2014

275 – PQR Data (Cont'd)

- Actual values are <u>required</u> by the Codes.
- A <u>Procedure Qualification <u>Record</u> (PQR) is the <u>record</u> of [actual] welding variables used to produce an acceptable test weldment and the results of tests conducted [in accordance with the specified CODE] on the weldment to qualify a WPS.
 </u>
 - Actual variables include Material Certificates confirming the precise material alloy/properties/condition (Base Metals and Filler Metals)
 - Actual **Test Results**, not a transcription of test results on a supplier's form
 - Lab results or, if the supplier has internal testing capabilities, the test record
 - Actual welding parameters (volts, amps, electrode, gas, weld position, material thickness, joint configuration, etc.)
 - Date of qualification test and certification statements with signatures
- The best way to know what to record is to reference the essential variables in the applicable Code.



275 – Essential Variables

Essential Variables (<u>Code Specific</u>):

- AWS D1.1:2015, Table 4.5 shown below:

• NOTE: There are 37 items identified in this Code

POR Essential Varial SMAW, SAV	V, GMAW, FC	NWL and GTA	W (see 4.8.1	cation for	
			Processi		
inqualification	SIMANN	5,454	GMAN	PCAW	GTAW
iller Metal					
1) Increase in filler metal classification strange	n] N		x	×	
22 Change from loss-hydrogen to avoilore hydrogen SMAW electroate	×				
 Change from our electrode or Bas electrode classification to any other electrode or flue electrode classification⁴ 		×		×	ж
 Change ta an electroide or this electroide classification^a nor cuveted in: 	AWS A5.1 m A5.3	AW5 A5.17 m A5.23	AMS A5.18, A5.28, at A5.26	AWS A5.20, A5.29, 16, A5.29	AW5 45.13 or A5.28
5) Addition or deletion of filler monal					ж
6) Change from oxid wire fixed to but wire feed or vice write.					x
 Addition to deletone of supplemental proofneed or granular filler metal or cut wire 		ж			
B) Increase is the amount of supplemental providered or granular filter metal or wire		*		1	
(8) If the alloy content of the world neural is largely dependent on applications approximate Biller reach, any WFS changes that results in a world depend with the insportance alloying, elements nor meating the WFS characterial compression requirements.		×			
It Change is nominal filler social diseasers by:	- 1/32 ac (0.8 mm) increase	Any increase ^b	Any increase or decrease	Any secretate	- 1/16 in (3.6 mm2) Increase or decrease
t) Change is namber of electroides		х	ж	×	×
rocess Parameters					
7) A change in the amperage for each diameter used by:	To a value not recommended by merufacture	> 10% increase or decrease	= 10% increase or decomes	e i= 10% increas or decrease	er > 23% increas or decreases
 A change in type of correct (ac or dc) or polarity (decloade positive or segative for dc current) 	×	х	x	×	×
A change in the anote of transfer			X		
A change from CV to CC output			N	×	
A change is the voltage for each diameter sound by:		> 7% increase se decrease	> 7% increase or docrease	e > 7% income or docrease	
An increase or decrease in the wire feed speed for each electrode diameter (if not sequence controlled) by:		> 10%	+ 10%	> 10%	

PQR Essential Variable SMAW, SAW,	e Chang GMAW, I	es Requiring FCAW, and G	WPS Requali TAW (see 4.8.	fication for .1)	
			Process		
reputition version of the second seco	SMAW	SAW	CMAW	PCAW	GTRAW
recess Parameters (Corr's)					
E A charge in the torvel speed' by:		> 15% increase or decrease	> 25% increase or decrease	> 22% Increase or decrease	> 50% increase or decrease
Molding Gas					
20 A change in shielding gas from a single gas to any other satingle gas or minimum of gas, or in the specified meetinal percentage composition of a gas existing, or to ma gas			×	×	×
2 A change in sstal ges flow sate by:			Increase > \$0% Decrease > 20%	Increase > 50% Decrease > 20%	Increase > 32% Decrease > 30%
0 A clowar <u>Error the actual classification</u> should be get and converted to:			AUV5 A3-18, A3-28, wr A3-28, Ever A3-28 Elsevit and intern characteristics, intern characteristics, intern characteristics, from cha	AWS A5.20, A5.20, ar A5.30, Esc A5.30, Insert and term, constitution in the absolution and an anti- tion researched in insert in the sector whether the sector absolution settor from the sector absolution settor from the the sector absolution settor from the the sector absolution settor from the the sector absolution settor from the the sector absolution settor from the sector settor as a sector absolution settor as a sector as a sector absolution settor as a sector as a sector absolution settor as a sector as a sector as a sector settor as a sector as a sector as a sector as a sector settor as a sector as a sector as a sector as a sector as a sector settor as a sector as a sector settor as a sector	
AW Parameters					
D A change of = 10%, or 1/8 in [3 mm], whichever is greater, is the longitudinal spacing of the arex		×			
9 A change of > 10%, or 3/8 in [3 mm], whichever is greater, in the lateral spacing of the arcs		x			
An increase or decrease of more than 10° is the arguitar crimination of any paraflet sheawide		×			
For mechanized or summaric SAW; an increase or decrease of more than 3° in the angle of the electrode		х			
For mechanized or automatic SAW, sa tocrease or decrease of more than 5° normal to the direction of travel		x			

the second se	Process							
Inqualification	SMAW	5AW	GMAW	FCAW	GTEAM			
ienerat								
7) A charge in position not qualified by Table 4.1 or 9.9	×	x	×	×	×			
8) A change in diameter, or thickness, or both, not qualified by Table 4.2 or 9.10	×	×	×	×	x			
 A change in base metal or combination of base metals not listed on the PQR or qualified by Table 4.8 	×	x	×	×	x			
 Werrical Welsting: For any pass from uphili to downhill or vice versa. 	×		×	×	×			
O A change in groove type (e.g., single-V in drahle-V), except qualification of any CJP groove world qualifier for any groove detail conforming with the requirements of 3.12, 3.13, 6.10, er 9,11	x	x	×	x	×			
A change in the type of genove to a square groove and vice versa	х	×	×	×	×			
A change exceeding the inferences of 3.12, 3.13, 5.21, 4.1, or 0.10, 0.11, 0.11, 2, and 5.24, 2.1 working: a) A decrease in the groove angle b) A decrease in the groove angle b) A decrease in the root face	×	×	x	×	- ×			
The omission, but not inclusion, of backing in backgouging	×	×	×	×	×			
beerease from preheat temperature ¹ by:	> 25"F [15"C]	> 25*F [15*C]	> 25*F [15*C]	× 25*F (15*C)	> 100*P [55*C]			
verease from interpass temperature ² by:	» 25*F [15*C]	> 25*F [15*C]	> 25"F [15"C]	> 25"F [15"C]	> 100*f [55*C]			
ddition or deletion of PWHT	×	×	×	×	×			

For WTPs using alloy flux, any increase or decrease in the decrede diameter shall require WTP requiring the source of the source

qualification mas. The production model product on interpart temperature may be less than the TQR prefacet to interparts temperature provided that the providences of 5.6 are tests, and the have model temperature and nucle less than the WPS temperature at the less 4 discontrast weaking. WPS TAM ISC Unait sterected or its some classification may be used in their of the AVAS AT U.S. Conservative Unait affectation.



 Ensure your WPS is properly prequalified or supported by a PQR.





- Essential Variable Checklists (Code Specific):
 - It is helpful to use a checklist to ensure that all essential variables have been accounted for and are compliant with the applicable Code.
 - Conducting this internal review of your documents will greatly improve First Time Acceptance by GA-EMS
 - Exercise caution when using a universal WPS, PQR, or WPQR form for all Codes as the EV(s) required to be stated in the documents may differ.

•	ELECTROMAGNETICS					ELECTROMAGNETICS			
			AWS D1.1:2015		27	Table 4.1 or 9.9 (Position)	Acceptable	3G	
3A-EMS					20	Table 4.2 or 9.10 (Diameter or	Accentable	3/0" Plate	
ocument	BWS-x00000x					Thickness of Base Metal)	Acceptance	S/O Plate	
Review		Previous Review	1		29	Table 4.8 (Base Metal Type(s))	Acceptable	A1011 Gr50	
Date	9/13/2016	Date(s), if applicable:							
ompany					30	Table 4.5 (Vertical Welding	Acceptable		
Name	The Best Welding Supplier				11	Table 4.5 (Groove Turne)	Accentable		
Part	34000Dxxxxxx F					Table 4.5 (Groove Type vs.	Acceptance		
lumber					32	Square Groove)	Acceptable		
POR	WPS 123, Nev A					Joint Design (Groove Angle,	Accentable		
Seneral						Root Opening, Root Face)			
atement	Qualitied with GTAW only				34	Backing or Backgouging	Acceptable		CT1111
		WP	Essential Variables (Table 4.5)						POP Value 70
Item	Code Reference/ Note	Vote	Comment	Calculator	35	Preheat Temp (footnote d)	Acceptable		MinX
er Metal	Table 4.5 (Classification		-						Max. FALS
1	fable 4.5 (classification Strength)	Acceptable							GTAW
2	Table 4.5, SMAW only	N/A			36	Interpass Temp (footnote d)	Acceptable		PQR Value 300
3	Table 4.5, (footnote a)	Acceptable			~	(recence of			Min. 200
4	Table 4.5, (footnote e)	Acceptable				Destuald Heat Treatment			Max. FALS
5	Table 4.5, GTAW only	Acceptable			37	(PWHT)	N/A		
6	Table 4.5, GTAW only	Acceptable			Records &	Quality Clause (273 or 275)		•	
7	Table 4.5, SAW only	N/A			38	Revision Control	Acceptable		
8	Table 4.5, SAW only	N/A				Material Certifications (Base	d ann an bha		
9	Table 4.5, SAW Only	N/A		CTAW	39	and Filler Metals)	Ассерсабіе		
				POR Value 0.13	40	Inspection Results (4.9)	Acceptable		
10	Table 4.5 (Change in Size)	Acceptable		Min. 0.06	41	Lab Test Results (4.3.3)	Acceptable		
				Max. 0.19	42	Certification Statements	Acceptable	-	
11	Table 4.5 (Change in Qty)	Unacceptable	Not specified on PQR or WPS		43	Signatures	яссерсане		
ocess Par	ameters				44	(for PWHT only)	N/A		
14 15 16 17 18 18 19 20 21 bmerged 22 23 24	Table 4.5 (AdAW only (part) Globalar (Short Creat) Globalar (Short Creat) Globalar (Short Creat) Table 4.5 (Non Fred Speed or Amperage) Table 4.5 (Non Fred Speed or Amperage) Table 4.5 (Income Create Table 4.5 (Con Composition) Table 4.5 (Con Composition)	N/A N/A N/A N/A Acceptable Acceptable Acceptable N/A N/A N/A	20 CPH	SAW PO1 Value 0.00 MA 0.00					
25 26	(Angular Orientation) Table 4.5, Auto/Mech only, (Angular Orientation) Table 4.5, Auto/Mech only, (Angular Orientation)	N/A N/A							
meral									



• Welding Procedure Essential Variable References:

- AWS (not a comprehensive list)
 - D1.1:2015 Structural Steel
 - Table 4.5
 - D1.2:2014 Structural Aluminum
 - Table 3.1
 - D1.3:2018 Structural Sheet Steel
 - Table 6.2
 - D1.6:2017 Structural Stainless Steel
 - Table 6.1
 - D9.1:2018 Sheet Metal [non-structural]
 - Section 5.3
- ASME Section IX
 - Tables QW-252 thru QW-265
- NAVSEA \$9074-AQ-GIB-010/248
 - Table V [5]



- Actions for the reviewer:
 - Develop an essential variable checklist per the applicable Code (templates are available from the <u>GA-EMS web site</u> or upon request)
 - Review all essential variables and verify them against the code limitations
- To ensure successful documentation acceptance by GA-EMS and its customers, suppliers are encouraged to review their documentation for errors prior to submittal regardless if the procedures were developed by a subcontractor, consultant, or other third party.
- Documentation will be thoroughly reviewed by GA-EMS for errors. Documentation requiring rework can add significant cost and impact to delivery schedules.



- Be advised that multi-process qualifications are not permissible if Quality Clause 275 is specified on your PO.
 - f) Multi-process PQR's are not permitted (i.e., each PQR must be for one welding process only)
 - Multiple PQR's may be referenced on a single WPS, allowing multiple welding
 processes in a single joint, in accordance with the applicable welding code.



For Example:



- Checklists are available for download at the <u>GA website</u>.
- GA-EMS will provide additional content for suppliers as needed.
- Suppliers are encouraged to use the same checklist that GA weld engineers will use to review documents.





275 - Sample Forms

Sample Forms can be found in many Codes and they're a good ۲ place to start when creating or evaluating your forms:

Sample PQR from	n Annex M in D1.1:2015	(area
Conference Confere	Exemple For Converse Form Index ST CAN Index ST CAN INFORMATION PROCEDURE CALL PROTECTION FOR ST CAN INFORMATION PROTECTION TO A ST CAN INFORMATION FOR ST CAN INFORMATION TESTS TEST TEST TEST TEST TEST TEST TEST TEST	Home Section Margin Use System Price And Section Margin Use Section Margin Price And Section Margin Use Section Margin
Trailing Oranization ADTV A131 A 1 1976 to Division Division State of the stat	2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.3 / Fig. 0.2.6 0.2.3.7 2 Versioner Prod Breck 0.2.4.7 0.2.3.7 <	Sample WPS from Annex M in D1.1:2015
	$\label{eq:second} \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	<text></text>
Other Other <th< td=""><td>Farm M-1 (Back)</td><td>Sample WPOP from Appen M in D1 1:2015</td></th<>	Farm M-1 (Back)	Sample WPOP from Appen M in D1 1:2015



275 – Navy Approval Letter(s)

- GA-EMS will consider acceptance of approval letters issued by the Navy for WPS/PQR/WPQR in accordance with NAVSEA S9074-AR-GIB-010/278.
- GA-EMS will still review the applicability of the Navy approved weld documentation to the GA-EMS PO.

v. Pertinent copies of Navy approval letters for WPS's, PQR's, BPS's, and BPQR's that have been previously approved for work related to NAVSEA S9074-AR-GIB-010/278
 Submit approval letters received regardless of the contract they were issued

			under and how the supplier intends to apply them during fulfillment of the GA-EMS PO.
CVN 79 Pr NOOQ Program Mana	oduction Contra 19-14-C-0037 gement Memor	act randum	NOTE: Procedures that were conditionally approved by the Navy for other contract will not be accepted by GA.
FROM: CVN 79 EMALS/AAG Production Deputy Progr	em Manager – Tim Held	LOG NO. 0037-16-0085	
TO: General Atomics Program Manager – Mike Santo		DATE: 8/30/2016	V PROCESSION
SUBECT: LOSS 3805/981140026 Rev A, Air Heat Exchanger Ener Qualification Fee Report LOSS 9805/99119318 Rev A, Lunch Motor Subsyste DREL & ECP Request C daws 8 Change 1 MATA REUSE REQUEST: Texto an units:	gy Storage Subsystem Mo n Welder Performance Qu NATE DEUNERED: /05/16	tor Generator Weld Procedure and Weld altification Training Program Disapproval C Approval S Nan-Cancemence	Agen Cham, Na. Agen Cham, Na.
REPLY REQUIRED: YES D NO S	ATE REQUIRED:		Envertiles, 724 37364 Million Antenna Envertiles (California California) (California) (Californi
This memorandum shall not be considered a char contract price, nor change or walve any contracts to immediately notify the Contracting Officer in v Genet	ge in scope, and does n al requirements under t riting prior to taking an sacas:	ot authorize or imply an increase in this contract. If you disagree, you are y action.	Buff. 60) Appen Chem, Into Weld Proceedure GMA.41.41.41.56.7.7 and scientigeneiting Proceedings of the Second Control of the
HELD TIMOTHY KENNETH 1004	12-323-4055	Tim.held@navy.ml	 Provedancy Contributions Rescal (CARA (2)) 4.1 Provedancy Contributions (CARA (2)) 4.1 Provedancy Contribut



275 – Welder Training Program (NAVSEA \$9074-AW-GIB-020/248)

- The following must be included for submission of supplier's training program for NAVSEA S9074-AW-GIB-020/248.
- NOTE: The training program is not required for AWS welding activities.
 - a) If no Navy approval letter has been issued approving a supplier W/WO and/or B/BO operator workmanship training program please submit the following documentation.
 - i. A copy of the suppliers' W/WO and/or B/BO workmanship training program/presentation.
 - ii. Evidence of satisfactory W/WO and/or B/BO workmanship training.
 - A copy of the training program/presentation attendance sheet.
 - A copy of the training exam for each welder with a minimum passing grade of 75%.
 - iii. A copy of the Level III examiner approval of the W/WO and/or B/BO workmanship training program.
 - iv. A summary table listing each W/WO and/or B/BO, the processes they are qualified to weld, when they were initially qualified and their most recent qualification maintenance or continuity date.



275 – PQR & WPS Requirements (NAVSEA S9074-AW-GIB-020/248)

 Weld documentation required to be in conformance with NAVSEA S9074-AW-GIB-020/248 must include, but not be limited to, the components identified in QC 275

W112 W112 W112
Solution Solut


275 – Weld Maps

Weld Map Benefits:

- Ensures accurate WPS/BPS application
- Provides better direction to the welder
- Facilitates a more efficient review of weld documentation
- Ensures proper weld and inspection planning
- Required for inspection

 Weld/braze map identifying the WPS or BPS to be used to weld or braze each specific joint on the drawing supplied by GA-EMS.

a) The WPS or BPS identification shall be shown in a contrasting color text

 (e.g., red WPS identification text on a black line/text drawing) next to the weld/braze
 symbol on the drawing supplied by GA-EMS

A "Weld Map" is a non-standard term, but the welding Codes require them

AWS D1.1 - Steel

6.5 Inspection of Work and Records 6.5.1 Size, Length, and Location of Welds. The Inspector shall ensure that the Size, length, and location of all welds conform to the require<u>ments of this confe</u> and to

the detail drawings and the no unspecified welds have been added without the approval of the Engineer.

6.5.2 Scope of Examinations. The Inspector shall, at suitable intervals, observe joint preparation, assembly practice, and the welding techniques, and performance of each welder, welding operator, and tack welder to ensure that the applicable requirements of this code are met.

6.5.3 Extent of Examination. The Inspector shall examine the work to ensure that it meets the requirements of this code. Other acceptance criteria, different from those described in the code, may be used when approved by the Engineer. Size and contour of welds shall be mea-

AWS D1.2 - Aluminum

5.5 Inspection of Work and Records

5.5.1 The Inspector shall make certain that the size, length, and location of all welds abonform to the requirements of this code, and to the detail drawings, and that no unspecified welds have been added without approval.

5.5.2 The Inspector shall make certain that only WPSs are employed which meet the requirements of 3.1 and are qualified in conformance with 3.2.

5.5.3 The Inspector shall, at regular intervals, observe joint preparation, assembly practice, the welding technique and performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code are met.

D1.3 - Sheet Steel

<u>8.1.1.6</u> Contract Document Conformance. Location, size, and length of weld shall be in conformance with drawings or other contract document requirements. Welds that exceed the minimum length or size shall be permitted.

AWS D1.6 – Stainless Steel

8.5 Inspection of Work and Records

<u>8.5.1 Size. Type, Length, and Location of Welds. The Inspector shall ensure that the size, type, length, and location of all welds conform to the requirements of this code and to the detail drawings and that no unspecified welds have been added without approval of the Engineer.</u>

<u>8.5.2 Scope of Inspection.</u> The Inspector shall, at suitable intervals, <u>observe</u> joint preparation, assembly practice, welding techniques, and welder's and welding operator's <u>performance</u>, to ensure that the applicable requirements of this code are met.

<u>8.5.3 Extent of Inspection.</u> The Inspector shall inspect the work to ensure that it meets the requirements of <u>this code</u>. Other acceptance criteria. different from those described in the code, may be used when approved by the Engineer. Size and contour of welds shall be measured using suitable gages. <u>Visual inspection for cracks in welds and base metal and other</u> discontinuities should be aided by suitable lighting and magnification, or such other devices as may be found helpful.

8.5.4 Inspector Identification of Inspections Performed. The Inspectors shall identify with a distinguishing mark or other recording methods all parts or joints inspected. Any recording method that is mutually agreeable may be used. Die stamping of cyclically loaded members without the approval of the Engineer shall be prohibited.

8.5.5 Maintenance of Records. The Contractor's Inspector shall keep a record of qualifications of all welders and welding operators, all WPS qualifications or other tests that are made, and such other information as may be required.

<u>8.5.6</u> When nondestructive testing is required, the Inspector shall ensure that procedures and techniques are in accordance with <u>Part D</u>. The Verification Inspector may view the making of nondestructive tests, examine and evaluate the test results, approve satisfactory welds or reject unsatisfactory welds, and inspect the preparation and rewelding of unacceptable welds.



275 – Weld Maps (Cont'd)

- In order to comply with Code requirements, these documents must be prepared anyway. For example, a weld map communicates a "specified" weld, which is the WPS, at a particular "location" (i.e. – joint) on the weldment.
 - There are several ways to achieve this; a simple example is included in this guide.
- "Weld Maps" are best practice throughout industry. GA-EMS is requiring a review of the weld map with the supplier's weld documentation (PQR, WPS, and WPQR) to ensure the appropriate and qualified WPS is applied/"specified" to the weld symbols on the drawing.
 - The weld map is most likely already submitted to GA with the Inspection Method Sheet (IMS) and/or Process Operation Sheet (POS).



275 – Weld Maps (Cont'd)

• Weld Maps:

- The WPS/BPS to be used to weld or braze each specific joint on the GA supplied drawing.
- The WPS/BPS identification shall be shown in a contrasting color text (e.g. Red WPS identification text on a black line/text drawing) next to the weld/braze symbol on the GA supplied drawing.
- A "bubble" method can also be used





275 – WPQR/WOPQR

- Welder Performance Qualification Records (WPQR) and Welding Operator Performance Qualification Records (WOPQR) are required to be maintained per the applicable Code requirements.
- Records shall be available for audit.
- Most welding Codes require evidence of "continuity" or "maintenance" of qualification to be recorded within 6month periods.
- There is software available that can assist in managing this function, but any tool can be acceptable.
- Common terminology is "Welder Continuity Log" and "Welder Maintenance Log".
- There must be integrity in the log in terms of verifying the welder/operator performed qualified welds successfully within the time limits.
 - Common ways of achieving this goal is by recording a job/order number that required a "qualified" (i.e. WPS) weld
 process or procedure or by having a qualified weld witnessed and inspected by a qualified company representative.
- If the WPQR/WOPQR expires, requalification is necessary for reinstatement.
- Keep in mind that different Codes have different requirements
- b) An example of objective evidence showing implementation of the SOP (e.g. A welder continuity log). Welder continuity shall be maintained in accordance with relevant Codes and Specifications.
 - NAVSEA S9074-AQ-GIB-010/248: Every three months
 - AWS D1.X: Every six months
 - AWS D9.1: Every twelve months
 - ASME: Every six months

4.2.3 Period of Effectiveness

4.2.3.1 Welders and Welding Operators. The welder's or welding operator's qualification as specified in this code shall be considered as remaining in effect indefinitely unless:

 the welder is not engaged in a given process of welding for which the welder or welding operator is qualified for a period exceeding six months, or

(2) there is some specific reason to question a welder's or welding operator's ability (see 4.24.1).

4.2.3.2 Tack Welders. A tack welder who passes the test described in Part C or those tests required for welder qualification shall be considered eligible to perform tack welding indefinitely in the positions and with the process for which the tack welder is qualified unless there is some specific reason to question the tack welder's ability (see 4.24.2).



275 – Welder Summary Table (Cont'd)

- Welder Summary Tables (Form EMS-0365) replace the need to submit WPQRs for each welder.
- EMS-0365 can be downloaded from the <u>GA</u> <u>website</u>.
- Individual WPQRs shall not be submitted except for the one-time approval

Note: Prerequisite conditions prior to use.

Welder Summary Table Reference 09492L00008 EMS Standard Quality Clauses

Complete the following sections with request information and email the form to Data Management at <u>ems_cm@qa.com</u> or submit this form using other approved methods.

1 REQUESTOR INFORMATION

Supplier/Contractor Name:	Insert name
Date of Request:	Mm/dd/yyyy
Purchase Order Number:	e.g., 4700012345
Welder Qualification and Maintenance Program:	Enter approved GA-EMS document number: SUP-000001
Example WPQR Windchill #:	Enter approved GA-EMS document number: SUP-000002

2 RESTRICTIONS

This form may only be used when the following have been submitted and approved

I	a)	The supplier's standard operating procedure (SOP) defining the supplier's process for qualifying
I		welders/welding operators and tracking welder/welding operator maintenance in accordance with
I		customer-specified welding codes
I	b)	Relevant objective quality evidence (OQE) demonstrating implementation and conformance with the
I		SOP for welder/welding operator qualification maintenance (e.g., welder maintenance log or equivale
4		and a GA-EMS approved welder performance qualification record [WPQR])
1		i. Any revisions to the SOP require review and approval by GA-EMS prior to use.

- A single code-acceptable WPQR that is a representative sample of the other WPQRs used to qualify welders/welding operators listed in the summary table
- i. This requirement may be satisfied by submitting a WPQR previously approved by GA-EMS.
- 3 WELDER SUMMARY TABLE

3.1 List all welders and weld operators who will be used to fulfill the PO specified above.

Welder Name		Identification #	Qualified on These Weld Processes (limit one per line)	Original Date Qualified	Most Recent Maintenance Date
(e.g. John Smith	1)	5591	GTAW	MM/DD/YYYY	MM/DD/YYYY
(e.g. John Smith	1)	5591	GMAW	MM/DD/YYYY	MM/DD/YYYY
(e.g. John Smith	1)	5591	SMAW	MM/DD/YYYY	MM/DD/YYYY
Add/delete rows as	needeo	i	1		
EMS-0365			Revision: A		2017/11/16



275 – Document/Data Reuse

- Previously approved welding documents by be requested for reuse on a new PO (Form EMS-0364)
- EMS-0364 can be downloaded from the <u>GA website</u>.

5) Document Reuse Requirements:

- a) If the supplier would like to use previously approved welding and/or brazing procedures for new GA-EMS POs specifying parts with similar raw materials/thicknesses and similar weld/braze specifications/codes, the supplier must notify GA-EMS CDM by submitting EMS-0364 with their intent to reuse previously approved weld documentation.
- b) The supplier is still required to submit new or revised documentation for GA-EMS review. If any procedures or documentation is revised, then it needs to be submitted for review and approval prior to being used.
- Weld maps are required to exercise Document Reuse Option 2 and must be submitted with the request.



275 – Document/Data Reuse

GENERAL ATOMICS **ELECTROMAGNETICS**

Supplier Document Reuse Request Reference 09492L00008, EMS Standard Quality Clauses

Fill in the following sections with request information and email the form to Data Management at ems cm@ga.com.

1 Requestor Information

Supplier/Contractor Name: Insert Name Here Date of Request: MM/DD/YYYY

Quality Clause # for Request: Insert only one Quality Clause Number Here (e.g., 275)

2 Restrictions

Each request for document reuse shall be specific to a quality clause (e.g., 275 or 280). Documents for multiple quality clause requirements shall be submitted separately.

All document reuse requests shall be approved by GA-EMS prior to implementation.

3 Document Reuse Options

Option 1: Supplier documents that were previously approved by GA-EMS for a specific part/hardware at a specific revision may be reused for the manufacturing of an identical part/hardware as long as the new part/hardware has the same part number and revision as the original part/hardware document.

Option 2: Supplier documents that were previously approved by GA-EMS may be applicable for the manufacturing of a new part/hardware. The supplier document must meet or exceed the new part/hardware requirements of the purchase order (PO).

4 Supplier Document Identification

4.1 Option 1 Request (as applicable to the PO)

Previous PO Number	Current PO Number	Previously Approved Windchill Task Number	Supplier Document Type/Description	Supplier Document Number	Supplier Document Revision	Part Number	Part Revision
4700012345	4700045878	SLIP-000123	(e.g. – WPS, PQR, NDE Written Principa, NDE Procedure (VT, MT, PT, etc.))	(e.g WPS-123-01.1, etc.)	A	340000 123456	c

*Add rows as needed

EMS-0364

Revision: A

2017/12/05



Supplier Document Reuse Request Reference 09492L00008, EMS Standard Quality Clauses

4.2 Option 2 Request (as applicable to the PO)

Previous PO Number	Current PO Number	Previously Approved Windchill Task Number	Supplier Document Number	Suppiler Document Revision	<u>Previous</u> Part Number	Part Revision	<u>New</u> Part Number	Part Revision

*Add rows as needed

EMS-0384

Revision: A 2



275 – Welding / Brazing Requirements for Repairs

• Weld Repairs:

- First distinguish between the need to "repair" a defective characteristic or "rework" unacceptable discontinuities from a weld deposit.
- If a *repair* is necessary, an SDR may be required, and begin preparing a weld repair procedure.

6) Repairs for Weld/Braze Nonconformance
If no provisions for the repair of weld defects are made in the applicable Code, the following requirements apply:
Weld repair procedures shall be written as detailed instructions and as a minimum shall include the following:

a) Method of removal of weld or base metal
b) Method used to ensure defect removal (e.g. - Magnetic Particle Testing [MT] or Liquid Penetrant Testing [PT])
c) Method for the re-welding/brazing, using qualified welders/brazers with an approved WPS (if different from the original)
d) Extent, location and depth of the excavation, which shall be documented on an inspection report

The re-welded/brazed area shall be re-examined and documented by the methods used for the examination of the original weld.



Rework

- Any defective discontinuity, such as porosity, undercut, lack of fusion, cracks, etc. that can be reworked back into a conforming condition with an existing WPS and qualified welders.
- The final condition of the weldment will conform to contract requirements despite the rework.



CAUTION: The definitions provided herein are unique to welding processes and should not be considered as synonymous with dimensional repair/rework definitions.



from the contract requirements as a result of the repair.

 This is inclusive of altered material conditions and PWHT processes <u>not</u> previously approved on the WPS(s)



275 – Weld Planning

• While not required, having a standard approach to determining qualification will help to consolidate/reduce costs and improve document quality and completeness.

Weld	d Planning	SOP									
Project											
Name											
P/N		D/N (if different)									
Charge #											
Weld											
Engineer											
Date											
Prepared						-					
Step #	Description	Element(s)	Sub-element(s)	Needed (Yes/No)	Planned Start Date	Due Date	Status	Cost (\$) (If applicable)	Risk(s)	Barriers	Comments
			Multi-process								
1	Identify Code(s) required	Identify qualification options	Testing Requirements								
			Prequalification								
			Joints								
	Develon Weld Man		Materials (Groups)						_		
2	(NOTE: Ref MWI)	Weldment characteristics (Ref DWG)	Positions						\sim $-$		
	(DWG Notes								
			Thickness(s)					$-\Omega$			
3	Weld Process	Determine most appropriate						ΛΥ			
		process(s)					16	<u> </u>			
		SWPS Availability					1 Or				
		Appropriate and Efficient WPS(s)				\sim	▶~.				
		Evaluate the use of existing WPS(s)	Create all/DC		-		-				
			Create pwps			· · · .					
			Budget (\$)			_	[
4	Identify PQR(s)	Create PQR(s)	Determine quantity or								
			Croate schedule			· · · ·					
			Identify Test Lab								
			Specific instruments								
		Identify additional	Chill hars								
		tools/fixtures/equipment	Temp Sticks								
		PQR	. ,								
		WPS									
5	Approve Weld Docs	WPQR									
		WOPQR									
		Release in Windchill									
6	WPQR(s)/WOPQR(s)	Continuity/Maintenance Plan	"the Log" in ProWrite			l					
7	Welder Skill	Training	-								



275 – Weld Planning (Cont'd)

- Develop a PQR that will give maximum coverage to the extent the applicable Code allows:
 - For example:
 - In several Codes, but D1.1 Table
 4.1 in particular, qualification

 (i.e. PQR weld coupon(s)) on a groove will automatically qualify for fillet, plug and slot weld joints.
 - Qualification on 1" plate, per D1.1 Table 4.2, qualifies any future WPS that's properly supported by the PQR from <u>1/8"</u> to Unlimited thickness.
 - The benefit is the reduction of overall qualification (i.e. PQR) costs.







275 – Cost Reduction Opportunities





277 – Special Process Certifications

(277) Special Process Certifications

Special processes include but are not limited to plating, coating, passivation, and heat treating. Prior to each shipment of the product, the supplier shall include a process certification to GA-EMS, verifying conformance to the drawing requirements, and stating that the special process performed complied with an identified industry specification.

Heat treat certifications shall be accompanied by time/temperature charts and a summary description of the heat treat time and temperature data indicating the furnace and heat treat lot number. The certification shall state the name of the processor, date of processing, and the printed or typed name and signature of the responsible representative of the processor.

At a minimum, the special process certification shall include the purchase order (PO) number, the part description, the part/drawing number with revision letter or engineering change notice (ECN), if applicable, the name and location of the special processor, and the special process being performed (must match drawing note including the specification, class, type, and color, where applicable).

- "Special Processes" will be identified as such by GA-EMS, such that this Quality Clause will appear in your PO.
- Special Process Certifications are to be delivered using one of three methods as detailed in the data submittal instructions section of 0949L00008 EMS Standard Quality Clause document, prior to shipment (not physically with shipment).

280 – Nondestructive Examination (NDE) Requirements

Note: Clause 280 is a time sensitive submittal.

- For blank report form content requirements see Clause 280 section c.
- A "Technique Sheet" is a work instruction detailing the NDE method and test parameters to be used for inspection of a specific material or part. The Technique Sheet should be prepared (or approved) by the supplier's Level III Inspector.
- See slides 84 thru 87 for examples of Technique Sheets for 3 NDE disciplines (PT, MT & UT).
- The "Seller's Written Practice" is a procedure developed by the supplier detailing its required aualification and certification, and responsibilities of NDE personnel. Included should be the minimum required education, training hours, examinations and experience.
- **Important:** The supplier's Written Practice must be approved by the supplier's NDE Level III.
- Requirements for NDE personnel certification and gualification records have been clarified in 09492L00008 Rev U.
- In some cases, the supplier's written practice is not required (see exceptions on next page) if the inspector is an AWS Certified Welding inspector (CWI). See NEXT PAGE for more details and continuation of Clause 280 requirements.

(280) Nondestructive Examination Requirements

IMPORTANT: This clause requires one or more documents that must be approved by GA-EMS prior to use. Once a document has been approved by GA-EMS. Suppliers are not to make any changes to GA-EMS approved procedures or other documents without re-submittal and re-approval by GA-EMS. Changes cannot be implemented at supplier until subsequent revision has been officially approved by GA-EMS.

The supplier shall provide the documents associated with (a) and (b) below to GA-EMS for review and approval within thirty (30) business days prior to use:

- a) Procedures
 - A nondestructive examination (NDE) procedure for each NDE method utilized. including a blank report form. This is a one-time submittal unless the procedures are revised.

All NDEs, Leak Testing (LT), Magnetic Particle Testing (MT), Liquid Penetrant Testing (PT), Radiographic Testing (RT) and Ultrasonic Testing (UT) shall be performed in accordance with detailed written procedures that meet the requirements of the applicable specifications called out on GA-EMS released drawings.

NOTE: Visual examination of welds (VT) does not require a written procedure unless specified by the governing weld code/standard (e.g. NAVSEA S9074-AR-GIB-101/278).

A part-specific inspection method/technique sheet for LT, MT, PT, RT, and UT shall be submitted to GA-EMS for review and approval for each part to be inspected. Technique sheets are not required for VT. Revisions to technique sheets are not required unless a revision to the drawing or engineering change notice (ECN) changes the NDT requirements.

Personnel qualifications

The supplier's written practice

All NDE processes shall be performed and interpreted by personnel gualified / certified in accordance with a written practice developed by the supplier to the requirements of SNT-TC-1A. The recommended practices of SNT-TC-1A are mandatory as modified by specifications. The supplier's written practice must be approved by the supplier's NDE Level III.

NOTE: When personnel are certified in accordance with AWS QC1, as allowed below, the requirements for a written practice do not apply.



280 – Nondestructive Examination (NDE) Requirements

- Important: All NDE inspections must be performed by an NDE Level II with the exception of Visual Examination of Welds (VT) which may be performed by an AWS CWI unless the drawing calls out NAVSEA welding. New for Rev U!
- Requirements for NDE personnel certification and qualification records have been clarified in 09492L00008 Rev U and shall include the following:
- New for Rev U! AWS/CWI certifications are now accepted for parts requiring VT of welds unless the drawing call out NAVSEA welding.

Personnel certification records

NOTE: An inspector with a current AWS/CWI certification is considered qualified to perform VT inspections of welds, unless the drawing or applicable weld specification (e.g. NAVSEA S9074-AR-GIB-101/278) mandates Level II VT certification to SNT-TC-1A.

SNT-TC-1A certification submittal requirements are as follows:

- · The records shall be submitted separately (individual files) for each inspector.
- The records shall include each method that the individual is certified for and the most recent eye exam date and results.
- The certifications shall include a certifying statement stating that the individual is certified in the methods (e.g., MT, PT, UT, BT) and meets the requirements of the company's written practice (include document number).
- The records shall be signed by the certifying authority and title along with typed/printed name.
- AWS/CWI certification submittal requirements are as follows:
- The records shall be submitted separately (individual files) for each inspector.
- Current copy of AWS/CWI certificate.



280 – NDE Requirements (continued)

Note: It is imperative that the NDT reports are legible (including GA and Government stamps/signatures) and contain all elements of section c) as the NDT reports may be subject to further examination by GA-EMS NDT Level 3 Quality Engineer and /or during data package buy-off by GA-EMS Customer Quality Representatives.

 To obtain document DI-NDTI-81936, refer to the website below and enter number into the "Document ID" section and click Submit button:



WARNING: UNAUTHORIZED ACCESS TO THIS UNITED STATES GOVERNMENT COMPUTER SYSTEM AND SOFTWARE IS PROHIBITED BY PUBLIC LAW 99-474 (THE COMPUTER FRAUD AND ABUSE ACT OF 1986) AND CAN RESULT IN ADMINISTRATIVE, DISCIPLINARY OR CRIMINAL PROCEEDINGS. c) NDE Reports

Upon completion of the examination, the supplier shall submit NDE reports that must include the following:

- i. Company name/identifier
- The part/drawing numbers, revision (including ECNs, if applicable), and part description
- iii. Item serial numbers, lot number, heat number, etc., or other appropriate identification
- iv. NDE procedure number and revision number or letter
- v. The approved part-specific inspection method/technique number
- vi. The method used
- vii. Equipment and materials used
- viii. Acceptance criteria
- ix. Date of examination
- x. The test results
- xi. Weld map and/or data sheet (if used)
- xii. The typed/printed name, signature and NDE certification level of persons performing and authenticating the test on each page
- xiii. The typed/printed name, signature and NDE certification level of persons interpreting the test results
- xiv. Indication of acceptance by GA-EMS and Government representatives. NOTE: This is only applicable when Clauses 214 or 214a (Source Inspection Hold Points) and/or 215 and 215b (Government Source Inspection) are invoked on the GA-EMS PO.
- xv. All pages shall be paginated
- d) Visual inspection of welds/braze joints

All welds/braze joints shall be visually inspected per drawing/specification requirements and written procedures. Results shall be documented on a visual inspection report that meets the requirements of Subsection c) above.

e) Low Halogen Penetrant Materials

When liquid penetrant materials with low halogen content are required, the test report shall include the material manufacturer's lot/batch number used and a certification of chemical analysis showing the actual halogen content for the applicable lot/batch.

See NEXT PAGES for technique sheet examples.

280 – Nondestructive Examination (NDE) Requirements (GA-EMS Generated Liquid Penetrant Technique Sheet Example)

				Dag	o 1 of 2			
	RANT TECHNI	QUE		1 43	012			
01_b	Technique No.:	GA-16-PT	-0002	Rev.:	0			
EXAMINATION	REQUIREMENT	S						
IENT PUCK TROUGH	I CLEVIS							
1572895-01_B	NDE Procedure	: QDI	3801-PT	-PE Iss	ue J			
5 CVN 79	Examination Sp	ec.: AST	M E1417					
1	Fabrication Spe	c.: N/A						
NO	Material Spec .:	AMS	5629					
chined surfaces	Surface Condition	on: Mac	hined					
STEM		MATERIALS						
	Cleaner/Rem	over: She	Sherwin DR-60					
fiable	Penetrant:	She	Sherwin RC-77					
	Emulsifier:	rwin ER-	win ER-83-A					
wder	Developer: Sherwin D-			D-90-G				
PRE	CLEAN							
	Pre-clean Method: DR-60 Dip							
nin. minimum								
PENETRAN	APPLICATION							
)-100° F	Application	Method:	Immers	ion				
nimum—30 min.	n. maximum.							
PENETRANT REM	IOVAL AND DR	(ING						
Emulsifier Spr	ay / Water Was	h						
20 PSI minimu	m — 40 PSI ma	ximum / {	50 100°	F				
Dema Spray 1	-5 % concent	ration						
Spray 3 min. n	naximum / Wate	er Wash 3	min. max	kimum				
Dryer Oven: 14	40° F / 5-30 mii	n, check a	fter 10 m	in. ≤ 12	5° F			
	LIQUID PENETF 01_b EXAMINATION IENT PUCK TROUGH 1572895-01_B \$ CVN 79 Chined surfaces STEM fiable wder PRE nin. minimum PENETRANT 0-100° F inimum—30 min. PENETRANT REM Emulsifier Spr 20 PSI minimu Dema Spray 1 Spray 3 min. n Dryer Oven: 14	LIQUID PENETRANT TECHNI 01_b Technique No.: EXAMINATION REQUIREMENT TENT PUCK TROUGH CLEVIS 1572895-01_B NDE Procedure \$ CVN 79 Examination Sp MO Material Spec.: chined surfaces Surface Condition STEM fiable Penetrant: Emulsifier: Developer: PRECLEAN Pre-clean Methon nin. minimum PENETRANT APPLICATION 0-100° F Application inimum—30 min. maximum. PENETRANT REMOVAL AND RN Emulsifier Spray / Water Wass 20 PSI minimum — 40 PSI maton Dema Spray 1—5 % concent Spray 3 min. maximum / Wate Dryer Oven: 140° F / 5-30 min	LIQUID PENETRANT TECHNIQUE 01_b Technique No.: GA-16-PT EXAMINATION REQUIREMENTS TENT PUCK TROUGH CLEVIS 1572895-01_B NDE Procedure: QDI 5 CVN 79 Examination Spec.: AXS R Fabrication Spec.: AXS R Fabrication Spec.: AXS R Fabrication Spec.: AXS R Cleaner/Remover: She Fiable PRECLEAN PRECLEAN PRECLEAN PRECLEAN PRECLEAN PRECLEAN PRETRANT APPLICATION 0-100° F Application Method: Inimum—30 min. maximum. PENETRANT REMOVAL AND DRYING Emulsifier Spray / Water Wash 20 PSI minimum — 40 PSI maximum / 3 Dema Spray 1—5 % concentration Spray 3 min. maximum / Water Wash 3 Dryer Oven: 140° F / 5-30 min, check a	LIQUID PENETRANT TECHNIQUE 01_b Technique No.: GA-16-PT-0002 EXAMINATION REQUIREMENTS TENT PUCK TROUGH CLEVIS 1572895-01_B NDE Procedure: QDI 3801-PT. 5 CVN 79 Examination Spec.: ASTM E1417 CVN 79 Examination Spec.: N/A MO Material Spec.: AMS 5629 chined surfaces Surface Condition: Machined STEM Fiable Fiable Prectean PRECLEAN	Page LIQUID PENETRANT TECHNIQUE 01_b Technique No.: GA-16-PT-0002 Rev.: EXAMINATION REQUIREMENTS ASTM E1417 Cleaner/Remover: Sherwin DR-60 PRECLEAN PRECLEAN PRECLEAN PRECLEAN			

DEVELOPING

MIL-STD-2035A (SH); O.D. Surfaces Para. 7.6 / 6.4

I.D. DWG. Note 7: NO LINEAR INDICATIONS ALLOWED POST CLEAN

Dwell Time: EXAMINATION

				Pag	e Z of Z
	LIQUID PENETRANT TECHNIQUE				
Part No.	34000D1572895-01_b	Technique No.:	GA-16-PT-0002	Rev.:	0

Include pictures, drawings sketches etc. to show complete coverage has been obtained if required.
Drawing Note 🏷 No Linear Indications Permitted.

Ultrasonic Clean / Water Rinse / Hot Air Dry

Dynamic Cloud

Black Light 1000 µw/cm²

Application Method:

Acceptance Criteria

Illumination:

10 min. – 30 min. maximum

• GENERAL ATOMICS

280 – Nondestructive Examination (NDE) Requirements (GA-EMS Approved Supplier Generated Magnetic Particle Technique Sheet Example)

Company	/ Logo Name Here Date: 10/03/2016
Magnetic	Particle Technique Sheet
Approved for use for Thomso General Atomics: Ramon	on, Bight synchr homos, honor, Bight synchr homos, honor, Bight synchr homos, honor, Bight synchr homos, honor, Bight synchr homos, hom
Customer: GENERAL ATOMICS Part #: 3400001542433.5W2 Ref Part Desc: SW2 PORT RAIL SUPPORT FABRICATION R Procedure: NDT-3 GA REV 1 Specification: NAVSEA 10074-AS-GIB-010/271 Fab Spec / Code: NAVSEA 59074-AR-GIB-010278 Acceptance Criteria: MIL-STD-2035A (SH) CLASS 3	Cust Appr Req'd Technique #: MT060116-3 Rev:1 tev: C Router Op #(s):130 Material Type:HY-100 1 REV. 1 8 1AUG1995 TABLE VIII M2 CATEGORY A
Welds Weld process: GHAN / GTAN WELD PROCEDURE: M-HYL00-73,740 T-HY100-741 SURFACE CONDITION: AS WELDED	Other Test Items
Proce	essing Requirements
Blacklight (Min 1200uw/cm^2) Area to be Inspected: WELDS: 145,146,147,148,147 NUMBERS	Whitelight (100fc Min) 19,149A,150,151,152 AND ALL NEWLY MACHINED SURFACES SAME WELD
Preclean Method: WIPE Precle	ean Material:N/A Manufacturer:
Amps deadstocks clamps Prods Coll X Yoke	
PL10 Coil	
PL10 Coil Particle Type: DRY POWDER, BP-68	Manufacturer: CIRCLE SYSTEMS
PL10 Coil Particle Type: DRY POWDER, BP-68 Carrier: NA Application: POWDER BULB Part:	Manufacturer: CIRCLE SYSTEMS
PL10 Coil Particle Type: DRY POWDER, BP-68 Carrier: N/A Application: POWDER BULB Part: Demag Method: VERIFY <=2 Postclean Method: WIPE Postcl Rust Preventative: N/A	Manufacturer: CIRCLE SYSTEMS Sicle Conc: Lean Material:ACETONE Manufacturer:
PL10 Coil Particle Type: DRY POWDER, BP-68 Carrier: NA Application: POWDER BULB Part: Demag Method: VERIFY <=2 Postclean Method: WIPE Postcl Rust Preventative: N/A Sp	Manufacturer: CIRCLE SYSTEMS sicle Conc: Lean Material:ACETONE Manufacturer: becial Instructions
PL10 Coil Particle Type: DRY POWDER, BP-88 Carrier: NA Application: POWDER BULB Part: Demag Method: VERIFY <=2 Postclean Method: VERIFY <=2 Postclean Method: WIPE Postcl Rust-Freventative: N/A During inspection, the magnetic particles can fail off the if examination of the inspection area, and the evaluation of any deter The magnetic field shall be induced with the prods or yoke legs pain inspection of adjacent areas of the weld, and royke legs pain inspection of adjacent areas of the weld, the prods or yoke legs pain inspection of adjacent areas of the weld, the prods or yoke legs pain inspecton of adjacent areas of the weld, the prods or yoke legs pain inspected shall be invited to one-fourth of the prod or yoke legs pain inspected shall be limited to one-fourth of the prod or yoke legs pain	Manufacturer: CIRCLE SYSTEMS sicle Conc: Lean Material:ACETONE Manufacturer: Decial Instructions the period the magnetic particles are being applied and while excess particles are being tem before the inspection is complete, the magnetizing current shall remain on during the calcid indications. aced diagonally, afth is test along the opposite diagonal of the weld. During hall overlap the previous placement by a minimum of 1 inch. Subsequent to the iongliudinal placement, the weld shall the prods or yoke legs parallel to be iongliudinal axis of the Subsequent to the iongliudinal placement, the weld shall the indiverse of a line joining the prods or yoke legs.

Prepared By: Approved By:

Date: 10/03/2016







280 – Nondestructive Examination (NDE) Requirements (GA-EMS Approved supplier generated Ultrasonic Inspection Technique Sheet Example)

PROCESSED By: Tina M Bell General Atomics

Document Title: Ultrasonic Te	chnique Card IAW		
AMS-	STD-2154 Page 1 of 4		
Card #: 020893-0004-UT Rev. 0	Approval Date: 7/9/2015		
Customer Approval: Required	Customer Approval Date: Required		
Name and address of testing facility			
Number of the procedure this technique card is in accordance with including latest revision letter, if applicable, and date.	INS-ALL-NDT-16828 Rev. 6 Dated 8/18/14		
Number of the governing procedure(s) or specification(s) these procedures and technique cards are in accordance with including latest revision letter, if applicable, and date.	⁸ AMS-STD-2154A 10-2012		
Personnel requirements.	Certified Level 2 or 3 in accordance with XYZ Company Written Practice #12345678910. XYZ Company's written practice is in accordance with SNT-TC-1a and NAS-410 requirements.		
Inspection method type and acceptance class of classes to be applied	No indication larger than .045 per MIL-STD-2035.		
Inspection mode (shear longitudinal, etc.).	Longitudinal Wave Only		
Inspection zones, if applicable.	Reference curves may be divided into "Zones" if material properties do not allow for full coverage of a single scan.		
Specific part number and configuration to be tested.	B/P: 3890AS000392-01 Rev:C See Scan Plan for Configuration		
Specific material and form for which the procedure is being prepared.	Material: 15-5 PH Form: Forged Shape		
Manufacturer and model numbers of any instrumentation to be used in the test Include any recording equipment, alarm equipment and electronic distance-amplitude correction equipment.	GEIT USM 36, USM-Go, Phasor XS, USN-58L, or any equipment with equivalent capabilities to these model: Electronic DAC and/or TCG may be used as needed. These options will be used from integrated software already included in the flaw detector.		
Transducer Description:	Type: Single or dual element contact		
APPROVED FOR USE DN: cn=Gerald Schmidt,	Size: Ø.5-1.0 inch		
FOR GENERAL ATOMICS 0=CM/S Quality Assurance, ou=General Atomics,	Frequency: 2.25-10 MHz		
Gerald Schmidt email=gerald.schmidt@ga	Material: Piezoelectric Element		
EMS QE-NDE Level III .com, c=05 ASNT Cert # 11503 Date: 2015.08.07 06:35:07	Sound Beam Angle: 0°		
-07'00'	Wedge or Shoe Description: N/A		
Description of manipulating and scanning	None		
Surface condition requirements.	125 RMS or better on scanning surfaces		
Special material handling and processing of	None		
Couplant.	Esgard PL-2, SAE 30 Motor Oil, or Water based Gel		

Company / Logo Name Here

Company / Logo Name Here

Page 2 of 4

which the tests will be performed and the	See Scan plan below
ultrasonic beam paths to be used.	
Method of applying transfer, if utilized	Transfer technique: The transfer technique shall be used to compensate for differences in sound transmission characteristics that may exist between th reference standards and each part or piece of material to be tested. Transfer shall be accomplished by noting the dB or gain difference in the responses received from reflectors in the reference standard and the part or piece of material to be inspected. These reflectors may be the back surfaces for straight beam inspections, "V" notches for angle beam inspections, or any other reflectors which will aid in accomplishing transfer. If possible, a minimum of four reflections for different locations in the part or piece of material to be tested shall be noted and the lowest response shall be used for comparison with the response from the reference standard. The instrument response shall be corrected by first calibrating on the applicable reference standards and the lowest response shall be of the instrument by the difference in gain or dB noted above. Note: This comparison (reference standard) shall be taken on a similar metal path as the back reflection of the forging under test, transmitting sound in the same direction as the certifying test, and shall have the sam configuration. For example, a round standard's radial gain setting cannot be used for comparison for an axis test through flat surfaces. If the forging is 6 in. round then the reference standard comparison shall be from 6 in round radial surface. Exception: The use of the transfer technique is not required for establishing scanning sensitivity if the signal amplitude from a reflector in each part of each piece of test material is in the range between 60 and 160 percent of the signal amplitude from an equivalent reflector in the reference standard.
Test blocks and methods of standardization	rest blocks: SB2198-031 in. FBH at TMD of .25 & 1.125 in. SB2198-031 in. FBH at a TMD of 3.0 in. SB853-062 in. FBH at a TMD of 4.75 in. Gain extrapolation shall be used in order to accomplis a .045 in. FBH sensitivity. Establish the curve by adjusting the instrument gain such that the reference reflector which produces the largest response is at 80 percent of the vertical limit. This is the primary reference response. At this instrument gain setting, record all other reference block responses over the desired metal path range. The DAC curve is constructed by joining the peak responses from each reference block with a smooth curve. An electronic DAC curve, or Time Corrected Gain (TCG) may also be constructed by collecting and correcting all the responses electronically to a minimum of 80 percent of the vertical limit utilizing the established

See next slide for pages 3 & 4 of UT Technique Sheet >>>>



280 – Nondestructive Examination (NDE) Requirements (GA-EMS Approved Supplier Generated Ultrasonic Inspection Technique Sheet Example) Pages 3 & 4 of 4

Company / L	ogo Name Here Page 3 of 4
Scanning speed and index	Scanning Speed: The scanning speed shall not exceed the maximum scanning speed which provides for detection of all discontinuities in the reference standards used to set up the test and shall not exceed 6 in. per second. Index Determination: Reference standards with the same metal travel distances as the work piece thickness and as specified for near surface resolution shall be used in this check. The calibration reflectors shall be the same as the class specified for acceptance. Using a gain setting where the reflector is peaked out at 80%, determine the total traversing distance across the reference standard through which no less than 50% of the primary reference response is obtained from the reference standards. One-half to 80% of the least of the distances determined shall be used as the maximum scanning index. This index distance and reestablished for each individual transducer and reestablished whenever there is a metal travel distance change, equipment change, or alteration.
Method of establishing scan sensitivity for concave and convex surfaces, if applicable	N/A
Limits on reject, noise level, gate levels,	Reject: off 2:1 Noise Level or Higher is Required Gate/Alarm level shall be set at 50% of reference height.
Discontinuity evaluation procedure	Multiple discontinuities: Determine the distance apart of multiple discontinuities by positioning the transducer over the center of each discontinuity where the Signal is a maximum. Reject any part or material where the distance between the centers of any two discontinuities is closer than the minimum allowed in the applicable class. Linear discontinuities: Estimate the length of linear discontinuities having Signal amplitudes, corrected by the transfer technique, which are greater than 30 percent of the primary reference response or 50 percent of the distance- amplitude curve. Position the transducer over one extremity of the discontinuity where signal amplitude is reduced to 50 percent of the primary reference response or distance- amplitude curve. Move the transducer toward the opposite extremity of the discontinuity until the signal amplitude is again reduced to 50 percent. The distances between these two positions indicate stringer length. Reject any material or part with linear discontinuities longer than the maximum allowed in the applicable class. Note and evaluate all discontinuities found at the scanning gain sensitivity which have amplitudes greater than the alarm set level. All recordable discontinuities found shall be mapped out and described on XYZ Company Ultrasonic Indication Evaluation Form.
Complete post inspection cleaning instructions, or reference to procedures containing such instructions.	Remove Excess Couplant at the completion of the examination
Any other pertinent data	None
⊠ Verify current revi	sion of this document is being used.



REVISION	ACTION	DATE	APPROVED BY
0	Original	7/9/2015	

302 Counterfeit Parts Prevention

- This Quality Clause applies to <u>PCA</u> manufacturers (as opposed to component supplier suppliers).
- GA-EMS expects the supplier to have a documented program.

(302) Counterfeit Parts Prevention (Subassemblies)

The Supplier shall have a counterfeit detection process that meets the intent of SAE standard AS5553, *Counterfeit Electronic Parts, Avoidance, Detection, Mitigation, and Disposition.*

The Supplier shall have a counterfeit parts program to ensure it does not receive counterfeit parts into inventory, use them in manufacturing, or inadvertently sell them to other parties. The plan shall meet the intent of AS5553 paragraph 4.1 and all appendices.

All electrical, electronic, electro-mechanical and electro-optical component parts delivered and/or used in the manufacture of deliverable products shall be from the Original Component Manufacturer (OCM)/Original Equipment Manufacturer (OEM) or franchised distributors or Authorized Aftermarket Manufacturer (AAM).

In the event a part is not directly available from the OCM/OEM/AAM or franchised distributors (electronics) or authorized distributor (non-electronics), purchase from independent distributors may be made but the evidence of supply chain traceability (chain of custody) back to the OCM/OEM/AAM shall be provided. The certification shall clearly identify the name and location of all of the supply chain intermediaries from the original manufacturer to the final source of the product delivered to GA-EMS.

Parts shall not be used or reclaimed and misrepresented as new.

The Supplier shall flow this requirement down to all their sub-tier suppliers to prevent the inadvertent use of counterfeit parts and materials. Component certifications from the OCM/OEM/AAM must be readily retrievable and made available upon request.

If evidence of supply chain traceability (chain of custody) to the OCM/OEM/AAM is not available, the Supplier must request GA-EMS to evaluate the risk of using material without a pedigree - suspect counterfeit, by submitting a Supplier Disposition Request (SDR) (GA form EMS-0196) and contact GA-EMS Authorized Representative to obtain a copy of the SDR form. The SDR provides a tracking system that ensures issue resolution. If Supplier has Design Authority, a technical assessment and recommended disposition shall be provided, and any other accompanying documentation shall be attached to the SDR. If GA-EMS elects to accept the material as-is or requests additional risk mitigation tests or inspections, the Supplier shall mark the material/ packaging and final shipping documentation with the SDR document number for tracking purposes.

NOTE: Definitions of OCM/OEM/AAM and Franchised Distributor can be found in AS5553. OCM and OEM are considered interchangeable in this document.



303 Counterfeit Parts Prevention (Components)

 This Quality Clause applies to <u>component</u> manufacturers only.

(303) Counterfeit Parts Prevention (Components)

The supplier shall have counterfeit detection processes and procedures in place which are compliant with AS6496, IDEA-STD-9090 or AS6081.

Franchised Distributors must retain on file and provide upon request the OCM/OEM/AAM

certification. The certificate shall include the following as a minimum: manufacturer name and address, manufacturer and/or GA-EMS part number and dash number, batch identification for the item(s) such as date codes, lot codes, heat lot, serializations, or other identifications, signature or stamp with title of the supplier's authorized personnel signing the certificate.

Independent Distributors must provide the OCM/OEM/AAM certification to GA-EMS by the time the material is received by GA-EMS.

If the Independent Distributor is not capable of providing OCM/OEM/AAM certification, the Independent Distributor shall provide results of their own testing prior to shipment of the product to ensure authenticity of the parts. Test reports are to be provided to GA-EMS for all parts in this PO, and include testing listed in Table 6.

ltem	Quantity	Comments
Certificate of Conformance	For each date code/lot code	From the original manufacturer, when possible
Visual and X-ray	100% on all parts being provided, as required	X-ray will be commodity dependent and defined by GA-EMS in the Request for Quotation (RFQ)
Decapsulation	1 piece per date code/lot code	
Date/lot code verification	For each date code/lot code	Verification against Government- Industry Data Exchange (GIDEP) counterfeit report database Verified with OCM, when possible
Marking permanency test	1 piece per date code/lot code	Solvent testing (Acetone/Dynasolve) Scrape test
X-ray Fluorescence (XRF)	1 piece per date code/lot code	Plating composition confirmation
Solderability.	1 piece per date code/lot code	Minimum 95% coverage
Electrical testing	Based on GA-EMS engineering requirements	
Verification of proper packaging	Each reel and box	Per JEDEC STD-033B

Table 6. Test Result Documentation Requirements

NOTE: In addition to information in this table, Distributors shall include their company's certification for each part number shipped.



Corrective Action Requests (sCAR)

- GA-EMS expectation for SCAR turnaround time:
 - An acknowledgement of SCAR receipt to be provided to GA-EMS within 2 days of issuance.
 - Action plan to be provided to GA-EMS within 10 working days, unless other arrangements have been made with GA-EMS.
- Use structured problem solving tools to identify true root cause Cause & Effect Diagrams, 5-Whys, 8-D Methodology.
- Provide objective evidence of corrective action implementation; for example, excerpts of modified procedures, operator training records.
- Return completed SCAR report via email to the GA contact from whom you received the SCAR.



Supplier Performance Program

Overall Score is composed of 4 components:

Components	Description	Weighting
Quality	2 sub-criteria: Goods Receipt/Source Inspection and	45%
	SDR/NRs	
Delivery	2 sub-criteria: Goods Receipt/Source Inspection and	35%
	SDR/NRs	
Price	Ranges from customer service to warranty terms.	15%
	Evaluations use standardized criteria worksheets so all	
	suppliers are treated equally	
Service		5%

- Supplier Performance Reports are reviewed by GA purchasing personnel and distributed to you on a monthly and quarterly basis.
- Performance Benchmarks exist in 3 of the categories: Quality, Delivery, and Overall.

Performance Benchmarks		
Quality	95%	
Delivery	95%	
Overall	98%	



SPP Notification Letter Nov 13 2013

- Suppliers meeting benchmarks through the entire calendar year will be recognized as top performing GA-EMS suppliers.
- Suppliers whose Overall score is below 85% in 2 successive quarters may be issued a Corrective Action Request (SCAR).
- Suppliers who underperform for 2 consecutive quarters may have a SCAR issued relative to the category of poor performance.

