General Atomics Aeronautical

Supplier Handbook

05-16-2019

GENERAL ATOMICS AERONAUTICAL

Overview

- GA-ASI strives to continually improve
- GA-ASI is implementing methods to improve quality
- Suppliers are a key part of that initiative
- This handbook shares goals and best practices to achieve the highest quality

Table on Contents

GA-ASI Company Quality Policy

- We are committed to developing, producing, delivering and supporting products that meet or exceed the requirements of our customers.
- We continually improve our products and processes through coordination with our customers, employees, and suppliers.
- We regularly review our quality objectives and assess risk associated with the QMS to ensure that we maintain customer satisfaction and business focus.
- We maintain a dedicated, competent workforce and provide them with a safe work environment.

Goals of this Handbook

- Reduce Product Defect shipped from suppliers
- Share GA expectations/best practices
- Ensure quality requirements are clearly communicated

Quality Expectations

Quality Expectations

Focus Area	Expectations
Better Together (Strive to succeed together through open, honest and timely communication)	**Succeed together** – Work together. Strive for improvements and success at both companies. Build knowledge.
	Responsiveness – Our need for support is often urgent. Respond to requests within 24 hours with acknowledgement. Agree on time to close issues.
	Transparency – Issues may occur. Work transparently and openly with GA-ASI to get to resolution quicker with the goal of protecting the customer.
	Timely CAPA responses – should an issue elevate to a CAPA, meet the CAPA timeline requirements. Work with SQE for full resolution.
	Communication – Communicate openly, honestly, and timely when there are issues and concerns.
	Honest Representation of Capability – Thoroughly evaluate requirements vs. capabilities at your company.
	Sub-tier Supplier Control – Ensure effective controls are in place for your suppliers. GA-ASI is available for consult to support you in this endeavor.
	Customer Satisfaction – Work together to meet and exceed the customers' expectations.

Quality Expectations

Focus Area	Expectations
Thorough Contract Review (Avoid issues by understanding all of the requirements vs your ability to achieve them – don't commit to delivering what you can't)	**Contract Review** – Suppliers are required to perform a thorough review of all requirements (*AND REVISIONS*) for POs and contracts. Clarify all concerns. Ultimately, the contract review it performed to achieve zero non-conformances as well as ensure accurate quoting/pricing.
	Engineering Requirements – Clarify when ambiguity exists for notes, call-outs, potential measurement issues, etc.
	Q-clauses – Review all Q-clauses for understanding and ability to meet. Raise any concerns to GA-ASI.
	Certificates of Conformance – C of C's must be accurate and complete. For requirements, see the "Documents" section of the Handbook.
	Materials Certifications – Be aware when materials certifications are required. They must be from the original manufacturer.
	Documents – Your shipping process must include a review of documents required as well as a review of the accuracy of those documents.
	Subcontract Compliance – A line by line review of all drawings, specifications, requirements documents, such as SOWs, is recommended. Compliance or non-compliance to each item should be forward to GA-ASI before committing.
	Final Requirements Review – A final requirements review prior to shipping is encouraged to ensure processes produce a zero non-compliance product.
	Delivery – notify GA-ASI of lead-times required to achieve *all* listed requirements.

Quality Expectations

Focus Area	Expectations
Quality Planning	**Management Commitment** – Quality planning starts at the top.
	Effective QMS – Strive for certification to AS9100. At minimum, you should be compliant to ISO9001 to have an effective QMS.
	Quality Plans – Effective Risk Assessment. Organizational plans for meeting100% compliance. Define how the production operation will achieve the goal. Some tools are process mapping and PFMEAs.
	Effective Process Controls/Control Plans – Define and document your process parameters and required process limits, measurement tools, test methods, intervals, and monitoring methods.
	Effective Inspection Processes – Ensure your measurements systems are capable; including tools and people. Perform measurement studies.
	Sub-tier Control - You must put effective controls in place for your suppliers. Ensure supplier verification and/or validation processes are in place.
	Reduction in Process Variability – Plan to reduce variability over time to improve performance and customer satisfaction as the product matures.
	Continuous Improvement – Strive to improve before issues occur. Notify GA-ASI before implementing changes affecting products. Approval may be required.
	100% On time delivery and 100% fulfillment – Build Quality Planning into the production schedule. It enables achievement of delivery goals.

Quality Expectations

Focus Area	Expectations
Compliance to Requirements	**Compliant products** – Ship only products that are compliant to specifications, and requirements, 100% of the time.
	Conformance to Drawings and Specifications – It is necessary for you to carefully review Drawing details and Specifications to ensure you understand requirements and to evaluate your process capability to comply to them.
	Notification of Non-Conformances - Suppliers must provide a Notification of Non-Conformances (NNC) for any escapes. NNCs to include all containment actions taken and should be provided within 48hrs of discovering the escape.
	Documentation Conformance – Ensure documentation meets requirements BEFORE shipping. Verify PO. Ensure Certificate of Compliance is correct.
	Compliance to Quality-clauses – Quality clauses are assigned by part number. Each part may have different Q-Clauses.
	Subcontract/PO Compliance – Be sure to include Ts and Cs in contract reviews along with SOWs, PO line items, Contracts, etc.
	Notify GA-ASI prior to rework – rework may need approval by the customer. Notification and approval are required prior to proceeding.
	Changes – Notify GA-ASI of changes. Class 1 changes require approval by GA-ASI. Class 2 changes require notification only. In many cases, class 2 changes can impact our process.

GA-ASI Requirements

1. **Site Audits; GA-ASI may need to**
   a. Audit your QMS/Process
   b. Conduct Capability Assessments
2. **PO/Contract/SOW Requirements**
   a. Ts&Cs - LINK
   b. Q-Clauses
   c. DFARS
   d. Critical Safety Item
3. **Specifications/Drawing Conformance**
   a. Dimensional
   b. Processing
   c. Notes
4. **Validation (Process Validation, Product Qualification)**

GA-ASI Requirements

5. **FAI** (to be in accordance with AS9102)
   a. Inspection Acceptance
   b. Dimensional
   c. Testing (if required)
   d. Material Certifications
   e. Labeling/Marking (human readable, barcode, UID)
   f. Packing/Packaging
6. **Record Keeping**
7. **Production Tooling**
8. **Communication required for**
   a. Product Changes
   b. Non-conformances
   c. Changes to POC

GA-ASI Requirements

9. **CAPA Requirements**
   a) On-time responses
   b) Thorough containment and notification
   c) Complete Root Cause Investigations
   d) Action Plans approved by GA-ASI
   e) Complete evidence based verifications
10. **Measurement tools and Production Equipment maintenance for data/process accuracy**
11. **Diminishing Manufacturing Sources and Material Shortages**
12. **Counterfeit Electronic Parts, Detection and Avoidance**
13. **Foreign Object Debris (FOD) – Suppliers to employ a FOD prevention program for product provided**

Supplier Measurements and Rewards

Supplier Rating System

a. Quality Performance
b. Delivery Performance
c. Ratings are as follows:
    1) Exceptional ≥ 98%
    2) Outstanding ≥ 95%, <98%
    3) Satisfactory ≥ 90%, < 95%
    4) Unsatisfactory < 90%
d. Suppliers achieving "Exceptional" are prioritized for:
    1) consideration of new business
    2) recognition by GA-ASI

Detail Slides

GA-ASI Supplier Rating System

- The GA-ASI Supplier Rating system focuses on the most value-add performance areas for our Customers; **Quality** and **Availability**

- The rating system is one method used to determine the GA-ASI suppliers to be considered for future business

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Supplier Performance

111111 - SUPER SUPPLIER INC

SOMEWHERE, USA

Performance Assessment

Quality	Delivery (On Time)	
Rating	Parts	Line Items In Full
92%	100%	100%
Satisfactory	Exceptional	Exceptional

Performance Classification

Exceptional	≥ 98%
Outstanding	≥ 95% - < 98%
Satisfactory	≥ 90% - < 95%
Unsatisfactory	< 90%

- Supplier Performance Assessments are sent to suppliers who have had activity in the reported quarter

- Performance Assessments include all detailed data for the quarter (see sample)

Sample
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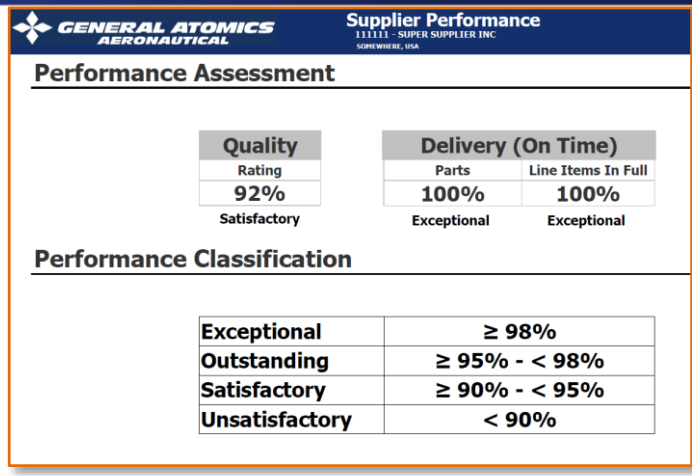
Supplier Rating System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Unsatisfactory	< 90%

- **Suppliers should strive to achieve 98% minimum for both Quality & Delivery**
  - **Quality Performance / Rating (Monthly/Annual)**
    Quality Score; The Quality Score (%) is the number of weighted QNs normalized by the number of receipts in the period.
    Overall Quality; A twelve-month rolling calculation.
    The Weighting Factor; A multiplier against each QN indicating the severity of impact to operations Low, Medium, High).
  - **Delivery Performance / Rating (Monthly/Annual)**
    On Time – Parts; The Monthly Score (%) is a ratio of parts received on time, in accordance with the PO Contract Date, to the number of total parts received. Overall Delivery is a twelve month rolling calculation.
    On Time Line Items In Full (OTIF); The Monthly Score (%) is a ratio of receipts made On Time and Full based on the schedule line total quantity, to the number of schedule line receipts.

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Contract Review

- Verify part number and revision; Compare PO to latest released drawings /specifications in your system.
- If an SCD, ensure you can abide by requirements
- Review all Contract/PO/SOW details including Q-clauses and Ts&Cs
- Contact the GA-ASI Buyer for any fiduciary discrepancies
- Review each drawing note and dimension for understanding, clarity, ability to measure, and ability to comply.
- Each BOM item must be certified from the manufacturer with acceptable life
- Review each reliability, test and tool requirement for compliance
- Clarify unclear requirements & share concerns about being compliant

Helpful hint: A compliance matrix and design review matrix ensure a thorough review.

Receive PO and Specifications → Verify Revisions → Review Requirements → Validate understanding and compliance → Ask Questions

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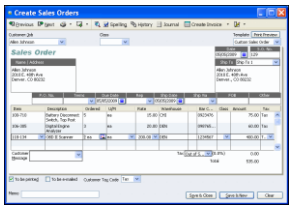
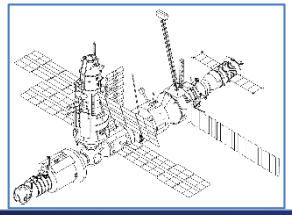
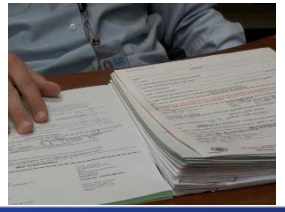






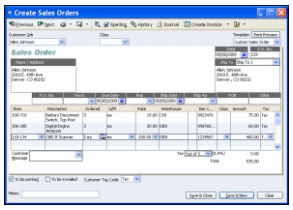
	A	B
1	*Requirement*	*Compliance*
2	Rev. C	
3	Q-Clause 9	
4	Black Annodize	
5	Dwg Dim 1	
6	Dwg Dim 2	

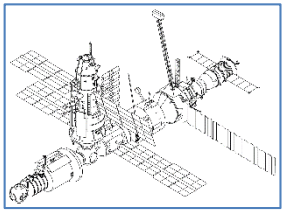
Contract Review

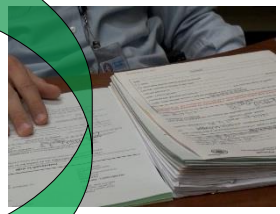
What to do if a discrepancy if found

- Drawing Changes
  - Drawings follow a strict ECN process within GA-ASI.
  - Suppliers should only ship against released drawings and specifications. Exceptions may be granted with written approval. For drawing changes sent that are not formal, please contact your buyer before proceeding.
  - For drawings revisions received without an updated PO during a production build, contact the buyer to verify the expected revision to be produced.

Receive PO and Specifications → **Verify Revisions** → **Review Requirements** → **Validate understanding and compliance** → **Ask Questions**







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1	*Requirement*	*Compliance*
2	Rev. C	
3	Q-Clause 9	
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5	Dwg Dim 1	
6	Dwg Dim 2	

Contact your the GA-ASI Buyer if you do not have a released drawing/specification

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GA-ASI Q-Clauses

- Quality Clauses are flowed down via the purchase order
- GA-ASI determines the Quality Clauses (Q-Clauses) appropriate for the part or service.
- Q-Clauses may be imposed on any Order to communicate requirements to suppliers.
- GA-ASI reserves the right to modify Q-Clauses if appropriate

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Critical Safety Items (CSI)

- Products may be determined as CSI through GA-ASI FMEA or by the customer
- Additional requirements, such as annual audits/reviews, may be imposed
- GA-ASI provides specific guidelines that must be adhered to for CSI

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Supplier Disposition Requests (SDR)

- **SDRs are to be used on an exception basis**
- **Notification of discrepancy to include**
  - Is Condition and Should be condition
  - PN, SN (See form)
- **Used for non-conformances when rework or scrap is not an option**
- **May be used for clarification of design, drawing notes, etc.**
- **NOT used to request acceptance of supplier engineering design errors**
  - In these cases, provide a notification of change
- **Start by completing GA-ASI SDR Form 2.PQA.025-001**
  - Use the GA-ASI SDR form or your own so long as all information is included
- **Wait for GA-ASI response about next steps**
- **If approved, the GA-ASI SAP generated approval form is sent**
- **Follow disposition requirements indicated on the approved form**

GA-ASI CAPA

- **CAPAs are issued when**
  - risks have not been properly identified and controlled
  - defects significantly impact production or the GA-ASI customer
  - Supplier QMS issues are indicated
- **Suppliers' CAPA forms may be used if GA-ASI content requirements are met**
- **When CAPAs are issues, the following details are required:**
  1. Containment (including parts that may have been shipped)
  2. Root Cause Analysis
  3. Action Plan – Requires GA-ASI Approval
  4. Notice of implementation
  5. Verification of effectiveness by GA-ASI
     - Acceptance criteria must be detailed
  6. Closure (Final GA-ASI Approval)
- **Evidence of completion must be included with the responses.**
- **Responses must meet the dates provided**

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Audits/Capability Assessments (Risk Management; Issue Prevention; Control)

- **Audits and assessments are used to evaluate risk management**
- **GA-ASI Audits are also triggered by**
  - New Supplier to GA-ASI
  - Schedule for Customer contractual requirements
  - Multiple Issues
  - Ineffective Corrective Action/Preventive Action (CAPAs) originating from hardware and or service QNs
  - CAPA Verification of Effectiveness (VOEs)

- **GA-ASI audits focus on issue prevention, risk evaluation, & controls**
  - Control of orders
  - Control of suppliers
  - Control of manufacturing and processes
  - Control of non-conforming product
  - Control of conformance to requirements at out-going
- **Audit Findings will trigger CAPAs**

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Process Validation

- **How do suppliers validate processes?**
- **Process validations include equipment, people, tests, etc.**
- **General plan should be**
  - Map the process (include all inspection points)
  - Identify potential points of variation
  - Installation Qualification; equipment is installed correctly with correct utilities
  - Operation Qualification; equipment operates as intended – Process defined
  - Performance Qualification; Defined process produce consistent results
  - Mitigate variation through process control and poke-yoke
  - Monitor process and results through data trending and appropriate reaction plans
  - Once validated, process changes outside the validated limits are to be communicated to GA-ASI
- **Inadequate process validation leads to non-conformances**
- **Process validation methods and results are evaluated during audits**

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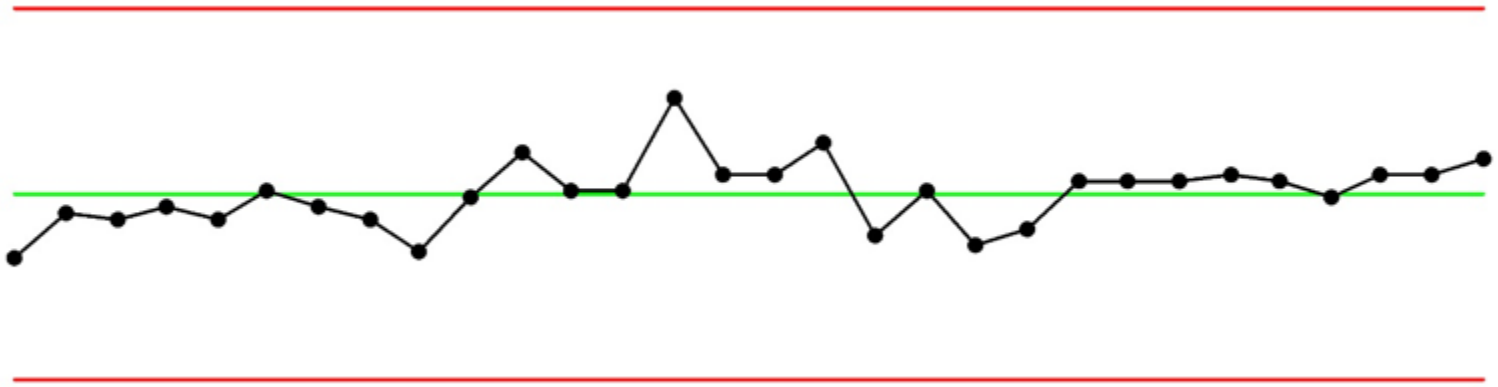
SPC/Data Trending

- **SPC may be an appropriate tool if volumes warrant**
- **Minimum requirement is data trending – to see if over time your process is drifting**
  - May or may not result in a non-conformance
  - May indicate process control issues
  - May be an indication of equipment wear or avoidable failure
  - May be an indication of material variation
  - May be an indication of measurement system issues
    - Tools
    - Fixtures
    - People



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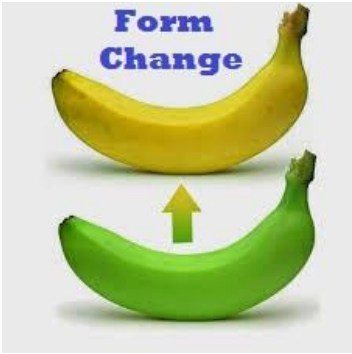
Changes

GA-ASI understands changes are required at times

- **Class 1 changes are**
  - Changes that affect FORM, FIT, & FUNCTION; visual changes are considered FORM changes
  - Changes, even to make improvements, need to be communicated
- **Class 2 changes – Administrative changes**
- **Why do we need notification of Class 2 changes?**
  - GA-ASI is the design authority on our products
  - There are different interpretations of "Administrative Changes"
  - GA-ASI can better determine the impact of changes to our products
  - GA-ASI needs to ensure there is no impact to our products
  - GA-ASI wants to help the supplier meet the product needs
- **Other changes requiring notification:**
  - Ownership, manufacturing or 'remit to' site, certification, point of contact, business code, NAICS code, quality management representative



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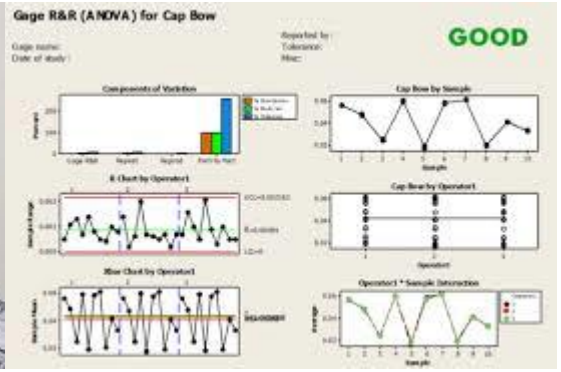
Measurement Equipment

- **Calibration is essential**
- **Gage Repeatability and Reproducibility and Measurement System Analysis**
  - If your measurement system does not measure properly, the results are invalid
  - Measurement systems may not align, causing disagreements on results
    - For critical parts, align of measurement systems may be required
- **Awkward and calculated measurement points can cause issues**



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Equipment Maintenance

- **Maintenance of equipment is essential to proper function**

- **Equipment maintenance plans need to be developed base on**
  - Manufacturer recommendations
  - Use in cycles
  - Equipment Trend Data
  - Product Trend data
  - Usually a combination of the above

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Commitment to Certification and Compliance

- **Supplier should have a certified QMS**
- **Regardless of certification, the expectation is that suppliers**
  - Determine and implement processes and procedures that
    - Prevent issue
    - Meet customer requirements
  - Continuously evaluate processes to in order to improve
- **If certified, GA-ASI can focus on process during audits, rather than holistic audits**

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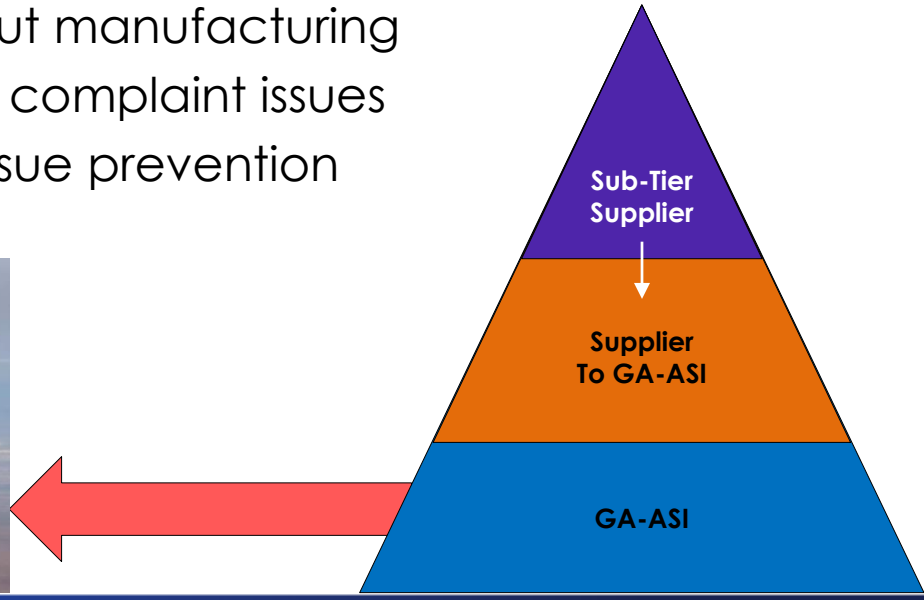
Sub-Tier Supplier Management

- **Sub-tier supplier management is an issue observed at GA-ASI**
- **GA-ASI requirements should flow to sub-tier suppliers**
- **Sub-tier suppliers should be continuously monitored**
- **Sub-tier suppliers should**
  - Hold a Quality Management System Certification
  - Have proven knowledge of processes
  - Have proven success
  - Have exemplary control throughout manufacturing
  - Carefully and completely address complaint issues
  - Have a clear implementation of issue prevention



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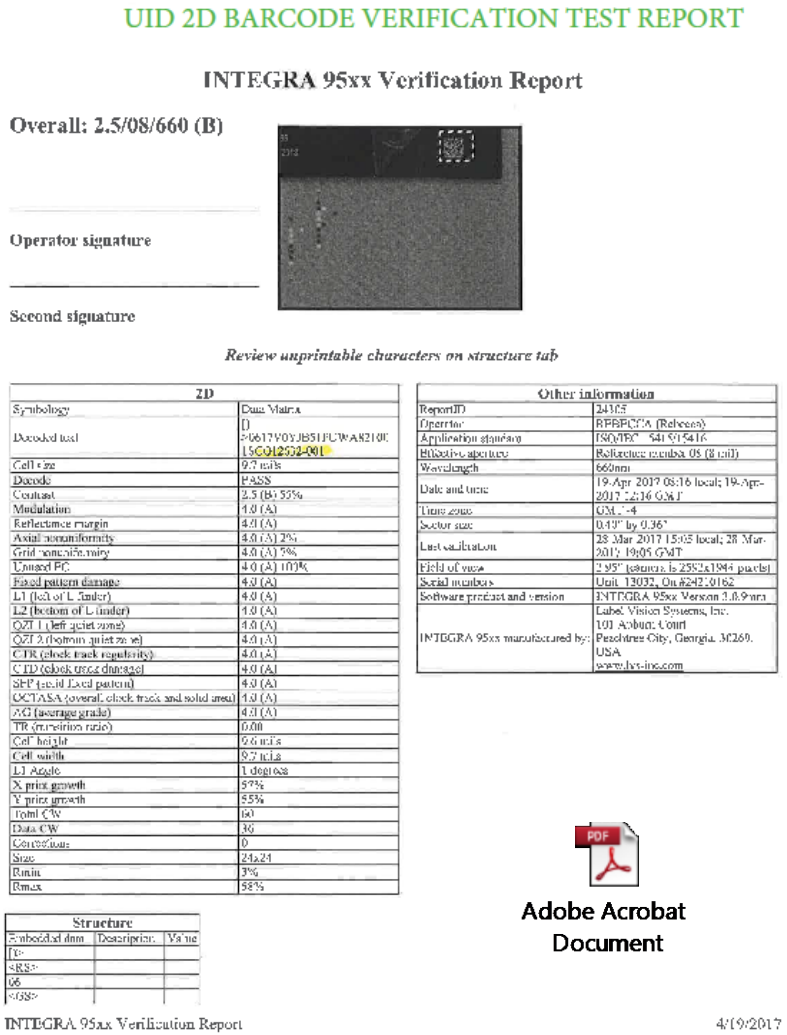
Details of Part Marking and Labeling

- **Parts are required to be marked (according to the drawing locations and method) with the following information:**
  - Per MIL-STD-130
- **For adhesive labels, ensure the adhesive is permanent (usually requires testing to ensure adhesive can stand up to environmental conditions)**
- **In additional to part drawings, requirements for information to be included on labels may be flowed down as Q-Clause 35 (which may include)**
  - Cage Code
  - GA assigned Vendor Code
- **Barcodes must be readable! See example of:**
  - Acceptable 2D Barcode Test Results



UID 2D BARCODE VERIFICATION TEST REPORT

INTEGRA 95xx Verification Report

Overall: 2.5/08/660 (B)

Operator signature

Second signature

Review unprintable characters on structure tab

2D	
Symbology	Data Matrix
Decoded text	[) >06172V0YJB51FUWA82180 15GQ12502-001
Cell size	9.7 mils
Decode	PASS
Contrast	2.5 (B) 55%
Modulation	1.0 (A)
Reflectance margin	4.0 (A)
Axial nonuniformity	4.0 (A) 2%
Grid nonuniformity	4.0 (A) 5%
Unused EC	4.0 (A) 100%
Fixed pattern damage	4.0 (A)
L1 (left of L finder)	4.0 (A)
L2 (bottom of L finder)	4.0 (A)
QZ 1 (left quiet zone)	4.0 (A)
QZ 2 (bottom quiet zone)	4.0 (A)
CTR (clock track regularity)	4.0 (A)
CTD (clock track damage)	4.0 (A)
SHP (solid bar pattern)	4.0 (A)
OCTASA (overall, clock track and solid area)	4.0 (A)
AG (average grade)	4.0 (A)
TR (transition ratio)	0.00
Cell height	9.6 mils
Cell width	9.7 mils
L1 Angle	1 degrees
X print growth	57%
Y print growth	55%
Total CW	160
Data CW	86
Corrections	0
Size	24x24
Rmin	3%
Rmax	58%

Other information	
ReportID	24305
Operator	BFBPCCA (Rebecca)
Application signature	ISO/IEC 15415/16
Effective aperture	Reflective aperture 05 (8 mil)
Wavelength	660nm
Date and time	19-Apr-2017 08:16 local; 19-Apr-2017 12:16 GMT
Time zone	GMT-4
Sector size	0.43" by 0.36"
Last calibration	28-Mar-2017 15:05 local; 28-Mar-2017 19:05 GMT
Field of view	2.95" (camera is 2592x1944 pixels)
Serial number	Unit 13032, On #242:0162
Software product and version	INTEGRA 95xx Version 3.0.9-ma
INTEGRA 95xx manufactured by:	Label Vision Systems, Inc. 101 Abbott Court Peachtree City, Georgia 30269. USA www.lvs-inc.com

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INTEGRA 95xx Verification Report 4/19/2017

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Details of C of C requirements

Certificates of Conformance are requested per Q-Clauses

- **Q-11 to certify that:**
  - Vendor meets all requirements on the Drawings
  - Vendor meets all requirements on specifications
  - Vendor meeting all requirements on Purchase Orders and Contracts

  Note: The SDR process requires inclusion of the SDR number on the C of C
- **Q-12 to certify:**
  - all raw materials and or process specifications used in the manufacture of the item – (must be made available, upon request, within 48 hrs)
- **Q-21 when required to :**
  - Provide C of Cs from outside process sub-tier providers
- **Q-23 to certify that:**
  - Vendor has completed all inspections
- **Q-33 when required:**
  - To provide certifications for raw material chemical and physical characteristics.
  - For Titanium, a certified test report from an independent laboratory for the specific lot of material used to make the unit, shall be submitted.

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Diminishing Manufacturing Sources and Material Shortages & Obsolescence Management

- **Diminishing Manufacturing Sources and Material Shortages (DMSMS) Plans include:**
  - Means and approach for identifying DMSMS issues such as; monitoring tools, parts list screening, GIDEP alerts, supplier EOL notifications, etc.
  - Means and approach for providing notifications of identified DMSMS issues to the Buyer
  - Means and approach for establishing obsolescence and DMSMS solutions and/or mitigations including selected alternative cost analysis
  - Parts list monitoring
  - Planned resolution of current obsolescence and DMSMS issues
  - Proactive activities to avoid future DMSMS risks.
- **Obsolescence Management**
  - Participate in the Government Industry Data Exchange Program (GIDEP)
  - Review and address GIDEP Diminishing Manufacturing Source and Materials Shortages Alerts that impact products sold to GA-ASI
  - Notify GA-ASI when discovered per contract requirements

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Counterfeit Parts Management

- **Counterfeit Electronic Parts, Detection and Avoidance**
  - GA-ASI requires adherence to the National Defense Authorization Act, Section 818, Detection and Avoidance of Counterfeit Electronic Parts
  - The Act requires implementation of processes to detect and avoid the sale or use of counterfeit electronic parts or suspect counterfeit electronic parts in all products supplied
  - Only obtain electronic parts that are in production or currently available in stock from
    - Original manufacturers of the parts
    - Authorized dealers
    - Trusted suppliers who obtain such parts exclusively from the original manufacturers of the parts or their authorized dealers.

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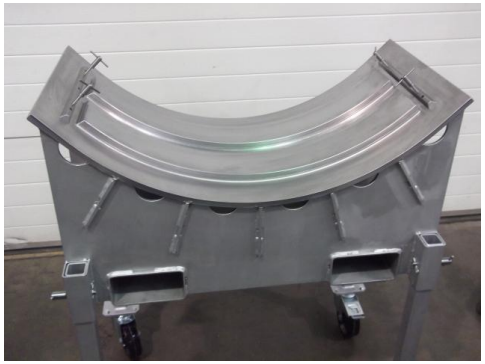
Tools / Support

- **Suppliers possessing GA-ASI tooling are responsible for:**
  - Care and Maintenance
  - Periodic Inspection
  - Calibration
  - MDB/DPD files, databases and tool designs
  - Having ability to proof out tools
  - Ensuring inspection tools and test equipment are adequate
  - Aligning with GA-ASI on supported software
  - Ensuring tool processing equipment is qualified and well maintained
  - Validation to latest design
  - Reporting any non-conformances in the tool



- **Tools must be inspected upon arrival at supplier for shipping damage**
  - Immediately inform GA-ASI of the damage
  - Damaged / nonconforming tools must not be modified or used without first receiving written instruction from GA-ASI.
- **Never modify or rework GA-ASI owned tools without written authorization**
- **Immediately communicate damage discovered after initial inspection to GA-ASI**
- **Supplier is responsible for replacement cost for Supplier caused damage**
- **It is preferred that design and build of tools is a core competency**

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