Aerojet Rocketdyne West Palm Beach (AR WPB)
Supplier Quality Assurance Procedure

APPLIES TO: Aerojet Rocketdyne West Palm Beach (AR WPB) Suppliers

1. PURPOSE AND SCOPE

This procedure defines the baseline process and requirements required by the supplier's quality organization to release product to AR WPB.

Note: The intent of this procedure is to clarify supplier requirement expectations to perform work for AR WPB. Your assigned responsible SQE has the authority to modify or allow modifications to these requirements provided the changes are documented in writing. (PO or Form 5005-X Supplier request for Information)

2. OWNERSHIP AND APPROVAL

The Manager, Product & Process Quality, owns this document. All revisions to this document must be approved by the document owner prior to inclusion.

3. APPLICABILITY:

When SR059 is specified on the QAD for an AR P/N drawing, the following requirements are applicable to the AR assembly and / or detail drawings as well as to source control supplier drawings to the extent our flow down instructions require. (Dwg, P.O. etc.)

4. REQUIREMENTS:

4.1 Suppliers must document and maintain detailed quality records for delivered hardware. Actual measured data must be recorded during the inspection process when possible and pedigree documentation must receive a thorough review against the specification requirement prior to acceptance. Raw material, NDT and special process certificates of conformance no longer require LCS certification but do require evidence of review by a responsible supplier representative against the appropriate specification. AR will begin flowing out aides and training to assist in this activity but until then your assigned SQE will provide direction.

4.2 Suppliers who are approved for Delegated Source release (DSR) must assure the intent of this procedure is complied with. (Ref. Attachment A for DSR process and

work instructions)

5. ACRONYMS

FAI	First Article Inspection
NDT	Non–Destructive Test Specifications
CSP	Certified Special Process (formerly SQL)
P/N	Part Number
P.O.	Purchase Order
QAD	Quality Assurance Data
SID	Supplier Information Database
DSR	Delegated Source Release
SQE	Supplier Quality Engineer (Same as SQAR)
VIS–M	Visual Master
PVC	Process Verification Checklist

6. SUPPLIER PREPARATION FOR SOURCE INSPECTION

Aerospace Industry std. AS 9102 FAI Forms 1, 2 & 3 must be used for all First Article Inspections (FAI) and is preferred when documenting follow on source releases. A copy of each accepted FAI must be delivered to the attention of AR Receiving when the FAI part is delivered (Applies to all new and delta FAI's performed without exception).

Note: FAI requires submittal of AS9102 forms, certs, and a copy of the ballooned drawing. Annotate FAI submittal on applicable packing slip.

6.1 Documenting the Inspected Features

6.1.1 The Supplier shall provide actual dimensions (variable data) whenever a characteristic can be measured and variable data can be obtained.

6.1.2 Inspection data must be recorded on the AS9102 Form 3 (FAI) or approved equivalent for follow on source releases.

6.1.3 Whenever possible the supplier should record both the minimum and maximum reading (range) for each feature. (ref. 6.1.4)

6.1.4 For multiple part quantity shipments there is only one entry (range) per feature (characteristic listed on the AS9102 Form 3) required – includes the minimum and maximum for the lot of parts and the series of features.

6.1.5 For production source lots, lot identification, serial numbers, and quantity shall be

annotated on AS9102 Form's 1- 3 or approved equivalent.

Note: To lower the piece part cost, AR SQE's may allow sampling once a supplier demonstrates a stable process and their ability to consistently manufacture the product. (Reference Attachment B and your assigned SQE for details on the sampling process)

7. SUPPLIER SOURCE DOCUMENTATION PACKAGE

7.1 First Article Inspection / Source Inspection Package Format: Supplier will prepare or make available an inspection review package which includes all specified documentation:

1. Supplier packing slip for shipment.
2. Purchase Orders (POs) for shipment including supplements.
3. AS9102 Forms 1, 2 & 3 or equivalent completed per AS9102, & SR–059, including supplemental flow down docs like PVC requirements.
4. All applicable certifications including material, processes, NDTs, etc.
5. Completed manufacturing operation sheets, router, etc.
6. All applicable Part Drawings (Assembly, Detail, and QAD)
7. Process Approval Record (P&W Form 4692 or equivalent) (if applicable).
8. Non–Conformance documentation (if applicable).

7.2 Supplier Raw Material and Special Process Documentation and Reporting

Note: Only CSP and NDT suppliers listed and approved in the supplier portal may be used for processing hardware.

Suppliers shall provide certifications for all raw materials, special processes and NDTs, including processes performed internally. All certifications must include the following information and be reviewed and signed by a responsible supplier representative. Internal processing may be documented on a C of C providing supporting documentation assures the following:

Required Certification Validation:

1. Supplier name and verification that the supplier is approved for the process. (Approved in AR supplier portal - Note: Spec Rev. Approval letter not binding)

2. Requirement is stated exactly as specified from reference document (i.e., dwg, specification, QAD).

3. Metallic Raw Material Certifications: Assure Test results provided are from an ISO17025 approved US based test lab (Reference AR raw material ISO list in attachment C) and fully meet ALL of the specification chemical and metallurgical requirements. (Using AR provided raw material check sheet) If not, supplier must have a sample of the raw material tested at an approved AR (portal listed) lab designated as Appendix 56 or RC5166. Attachment C also provides directions on how to add a test lab that is qualified).

   Non-metallic certs and testing must comply with spec requirements.

   Special Process Certifications: When applicable, assure that values reported are within the limits. (Example: heat treat temp. or hardness) Otherwise N/A step 3.

4. Signature of responsible quality representative from vendor who performed process.

5. Certification contains an Approval/Acceptance statement or identifies which parts were acceptable.

6. Traceability identification to product being inspected. (S/N , Lot, W.O., P.O. etc)

7. Signature and date of supplier's rep that performed review for steps 1 – 6 above.

   Supplier shall draw a circle and number (ref. above) next to the area on the cert that was identified confirming compliance to each requirement. These seven items will be re–verified by the SQE periodically to assure compliance.

8. Information:

Aerojet Rocketdyne's WPB linkage to the PW LCS supplier network has been severed. As a result of this, many of the PWA 300 MCL driven test requirements to obtain LCS certification are no longer required. In some cases unique testing to the PW MCL manual "E" sections or other testing specified within procedures may still be flowed to you on the face of the drawing or within a converted spec and will require evidence of compliance with the testing specified or written alternative instructions on how to proceed from AR. Work through your assigned SQE or Buyer on how to proceed until all of these flowed requirements are addressed in AR flowdown instructions. (See Attachment C for additional information).

All shipments must include the packing slip, a CofC, and copies of FAI's if performed. Any additional documentation deliveries will be required only if specified. Specific instructions for the contents of the packing slip are detailed in a P.O. note.

9. RECORDS:

The records identified in this procedure must be retained by the supplier until such time as the responsible AR program quality organization and supply chain management directs otherwise. Suppliers must request and receive permission in writing prior to destroying or transferring any original records back to AR. Suppliers going out of business must notify their buyer at AR 90 days in advance and gather and prepare all records for transfer to AR.

10. REFERENCES:

9.1	AS9102 Form1, 2, 3 (Not Available by Hyperlink)	Aerospace First Article Inspection Requirement
9.2	P&W Form 4692	ESA Process Approval Record

11. NATURE OF CHANGE:

Complete re–write to remove obsolete instruction and procedures.

*** * * End of Document * * ***

SR059 Attachment A: AR WPB Delegated Supplier Source Release Process
WPB Standard Work Instruction Guideline

Applies to: AR WPB **Doc Owner: SQE Manager WPB**

1.0 SCOPE

- This work instruction provides guidance to the selection, approval, oversight, and removal guidelines used by AR to manage suppliers who are approved for delegated source release.
- Suppliers who are listed on the AR APL, are rated appropriately as defined in the QMA-AP005, are above the threshold on the supplier rating system, and who consistently deliver conforming products to AR may be recommended by their assigned SQE for Delegated Source Release.

2.0 Applicable Documents

- This instruction meets the requirements of QMA-AP007

3.0 Terms and Definitions

- DSR – Delegated Source Release
- DSQR – Delegated Supplier Quality Representative

4.0 Requirements – Selection, Qualification, Maintenance, Removal

4.1 Selection

4.1.1 Suppliers who qualify as defined in the scope above may be recommended by their assigned SQE to AR SQE management for DSR consideration.

4.1.2 SQE management reviews the recommendation and the supplier's performance resulting in a determination of the supplier's level of approval. Additional factors considered in the decision include volume of future work, complexity of hardware, supplier's willingness to participate and the availability of qualified resources. Potential outcomes include:

- Not approved
- Delayed approval pending more information or improvement
- Limited Approval, for example - by part number
- Supplier Approval (Unrestricted - for all parts)

4.1.3 Once a supplier is approved by AR management, the SQE prepares for and schedules a meeting with the supplier's management to confirm their willingness to participate in the DSR program.

The following contents should be considered during the preparation and discussions:

- A copy of QMA-AP007
- A copy of this procedure – including
  - Blank QMA-AF005 (or equivalent) forms for approving the DSQR's
  - A Master Blank copy of the document that will be used for recording of the delegated parts list and for recording of released items
  - The supplier approval form
- A copy of applicable standard work like SQE's SOP 5.6.1.1
- Contact information sheet

4.2 Supplier DSQR Qualification

4.2.1 The purpose of the supplier meeting is to share and align expectations between the parties. The following topics must be discussed and agreed to before moving forward:

- Supplier's willingness to perform the DSR review on behalf of AR.
- Supplier's ability to provide two qualified candidates to perform the DSR.

Note: SQE may proceed with one candidate at their discretion.

- Supplier's willingness to comply with the SQE oversight instructions and provide the required documentation and records.
- Suppliers understanding that the original inspector and the DSQR cannot be the same person.

4.2.2 Agreement between the parties will be documented on a completed DSR supplier approval form QMA-AF005 signed and dated between AR SQE and the supplier. A copy of this will be maintained in the supplier's records as well as at AR.

4.2.3 Before authorizing the DSQR to represent AR, the SQE must either have extensive previous knowledge of the DSQR's capability or must interview and witness the candidate's knowledge, experience, and inspection techniques. The following factors must be considered before approval:

- Experience - Minimum of 5 years (machining and or inspection).
- Clear understanding of various inspection tools and techniques including

CMM.

- Demonstrated Strong GD&T understanding.
- Demonstrated ability and understanding of effective RCCA process.
- Demonstrate Attention to Detail and commitment to stamp warranty.

4.2.4 AR's SQE will work with each DSQR to provide the required training on expectations related to communication, oversight inspection and documentation management. Approved DSQR's will be documented on a DSQR approval form (QMA-AF005) which is signed and dated by both parties.

4.2.5 DSQR's stamp that will be used to release parts on behalf of AR must be placed on the QMA-AF005 form at the time of approval.

4.3 Supplier DSR Maintenance, Suspension, Removal

4.3.1 The responsible AR SQE will periodically monitor the supplier's performance to assure compliance to expectations. The interval and frequency of supplier site visits may vary by supplier based on experience, performance, volume of work and complexity of products but site visits should occur a minimum of twice per year. During these on-site reviews the SQE will:

- Witness or perform product over-inspection.
- Review previously released data packages for consistency and compliance to procedure.
- Discuss post release findings by AR.
- Evaluate the suppliers DSR part number and release accountability records.
- Review the suppliers QMS system and training records.
- Review the findings reported by the supplier as well as NCR activities.
- Discuss RCCA actions and effectiveness.
- Provide training, discuss changes and share awareness.
- Audit approved special process records performed by the supplier.

4.3.2 Escapes found after the supplier has released products will drive corrective action reviews and assessment for continued approval.

4.3.3 Any indication of DSQR or supplier's negligence or not fully complying with oversight expectations will result in immediate revocation of the approval.

Specific events that were missed will be discussed to determine if it was an interpretation of requirements cause or to determine how the escape occurred. Multiple findings will require increased AR SQE engagement including increased AR sourcing and more frequent and detailed reviews at the supplier.

4.3.4 At the discretion of the assigned SQE, suppliers may be completely removed from the DSQR list or may be subject to suspension until they demonstrate compliance or complete an assigned action

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4.3.5 Removing a supplier from the DSR list must be documented by the SQE on a QMA-AF005 form with copies provided to SQE management and the supplier.

NOTE: Ultimately the assigned SQE is responsible for the supplier's performance and the products they release. This accountability also provides them with the authority to use their discretion on how each supplier will be managed.

5.0 DSQR Process

5.1 When a supplier is ready to schedule a source and shipment they begin by entering the planned source event into the ASIRS system. This entry creates and sends an e-mail to the assigned SQA informing them of the planned product release.

NOTE: Each suppliers DSQR must be registered on the supplier portal

5.2 AR's SQE reviews the notification and responds with either a DSQR release or AR SQE release approval in ASIR's. ASIRS will send an e-mail confirmation to the supplier confirming the plan for this release.

5.3 Once a DSR approval is granted, the supplier may proceed with the 2nd inspector over-sight review in compliance with flowed AR expectations and assigned SQE direction. The DSQR is required to document their over-inspection by stamping or initialing the characteristics and documentation reviewed.

5.4 Once the overinspection has been completed the DSQR must send a reply e-mail to the assigned SQE which documents any findings they had during the review.

NOTE: Documenting even the smallest findings is a very important step in the process as it demonstrates the attention to detail being provided by the DSQR.

5.5 The DSQR is authorized to permit rework (to requirements) of both documentation and minor product issues (burr removal etc) as required and at their own riskThe DSQR does not have MRB authority to accept any non-conforming conditions and must submit all findings to the responsible SQE.

5.6 AR's SQE reviews the DSQR's task completion email, updates the SID database, and responds authorizing the supplier to mark, final package and ship the product. The suppliers delegated stamp or marking must be placed on the packing slip to document the accepted source release.

5.7 The DSQR is responsible for assuring that the parts are packaged correctly and correct documentation (based on general and flowdown instructions) is submitted with product.

SR059 Attachment B **: AR WPB Supplier PVM Low Volume Sampling Process**
WPB Standard Work Instruction Guideline

Applies to: AR WPB **Doc Owner: SQE Manager WPB**

1.0 SCOPE

- To reduce the cost of products being manufactured by the supply base AR has created a sampling process which is designed around process variation management and the low volume environment we work in.

2.0 Applicable Documents

- None

3.0 Terms and Definitions

- PVM – Process Variation Management
- SILVIR – Supplier Initiative Low Volume Inspection Reduction

4.0 Requirements

4.1 Performance – Suppliers demonstrating high performance levels of quality and delivery may become candidates for sampling approval. No supplier can sample parts without approval in writing from your assigned SQE via form 5005-X reference Quality Clause ARJ01.

4.2 Only part characteristics which are produced using automated (programed) repetitive manufacturing equipment may be sampled.

4.3 Part characteristics that are designated on the drawing or other documentation as critical, major, or that have tolerances of less than .005 total (+ or - .0025) or angle tolerances less than 2 degrees total may not be sampled unless specific approval is granted by the SQE.

4.4 Supplier must establish repeatability and control on a part before initiating the sampling process. (Usually achieved by checking the first lot of parts or a minimum of the first 5 pieces sequentially produced)

4.5 Suppliers must demonstrate that they can maintain the sequential manufacturing order of the parts during ALL manufacturing processes.

4.6 All sampled part results must be within 60% of the allowed tolerance – If any sampled part exceeds 60% that individual characteristic must be inspected 100%

4.7 Issues creating variation in a part, like clamping for example must be addressed prior to initiating sampling.

4.8 Retargeting some dimensions - Often times programming target the high material side of a diameter or surface to assure extra material is available if needed. Suppliers will find additional savings by retargeting some of these dimensions closer to nominal to stay inside the 60% tolerance limits required for sampling.

5.0 Sampling Process

5.1 SQE provides the supplier with letter of delegation to sample – may be by specific part or for all assigned parts using the QMA-AP005 form.

5.2 Supplier identifies a part that is being produced with automated equipment and is demonstrating low variation characteristics.

5.3 Supplier may choose to update the inspection report with 60% tolerance limits for characteristics which exceed the minimum tolerance limits allowed for sampling (.005 total).

NOTE: One sided tolerances may be sampled also providing the inspection results exceed the allowed total tolerance. Using 60% of .005 the inspection result would need to be .003 or greater to initiate sampling.

5.4 Based on the 1st piece "set-up" part inspection results the supplier may designate all qualifying characteristics for sampling if the value is inside the 60% threshold

NOTE: Tool changes, power outages or any other unusual event will require revalidation of the affected characteristic(s) on next part.

5.5 Supplier samples to the following guideline unless otherwise agreed to with SQE.

- Lot Size 1- 6 pieces - Inspect 1st and Last part
- Lot Size 7 – 12 pieces - Inspect 1st, Middle, and Last part
- Lot Size 12 – xx pieces - Inspect 1st , every 6th part, and Last part

5.6 Record actual values for sampled parts

5.7 Any part sampled that exceeds the 60% tolerance threshold requires all parts in lot to be inspected for that characteristic.

SR059 Attachment C **: List of Approved Test Labs, Adding Test Labs and CSP (Certified Special Process) instructions**

WPB Standard Work Instruction Guideline

Applies to: AR WPB **Doc Owner: SQE Manager WPB**

1.0 SCOPE

- Provides additional awareness and guidelines for how to manage special processing requirements while AR transitions from the heritage PW MCL process.
  - Section 1 – Initial approved material test labs list – replaces LCS requirements
  - Section 2 – Instructions on how to add an approved test lab to list

2.0 Applicable Documents

- None

3.0 Terms and Definitions

- CSP – Certified Special Process

4.0 Requirements

Section 1 - Approved material test labs list (1/1/2015)

Suppliers may use the attached reference list to validate their raw material certifications. If the raw material test report is from any listed lab the supplier is not required to do any retesting unless the certification is found not fully complying with all of the specification requirements. Suppliers must review the certification against the appropriate material specification using the AR WPB provided check sheet obtained from the AR supplier portal. This check sheet must be fully completed and maintained as a record and may be required for review during source inspection of completed hardware.

The raw material check sheets are located at:
http://www.rocketdynesuppliers.com/check-sheets.htm

Supplier	City	State
AADFW	Euless	Texas
Accutek Testing Laboratory	Fairfield	Ohio

Acuren	Richburg	South Carolina
Advanced Plastic and Material Testing, Inc.	Ithaca	New York
AK Steel Corporation Research Center	Middletown	Ohio
A-Lab Corporation	Dayton	Ohio
Alcoa Technical Center	Alcoa Center	Pennsylvania
ALLEGHENY TECHNOLOGIES, INC. => ATI WAH CHANG	Albany	Oregon
Anamet, Inc.	Hayward	California
Anatase Products	Tehachapi	California
Anderson Laboratories, Inc.	Greendale	Wisconsin
Applied Technical Services, Inc.	Marietta	Georgia
ArcelorMittal - Indiana Harbor	East Chicago	Illinois
Assured Testing Services	Ridgway	Pennsylvania
ATI Flat Rolled Products	Brackenridge,	Pennsylvania
Atlas Testing Laboratories	Rancho Cucamonga	California
Bowser-Morner, Inc.	Dayton	Ohio
Carpenter Technology Corporation	Reading	Pennsylvania
Charter Steel Saukville Melting	Saukville	Wisconsin
Cincinnati Testing Labs Inc.	Cincinnati	Ohio
CONNECTICUT METALLURGICAL INC	East Hartford	Connecticut
Constellation Technology Corporation	Largo	Florida
CPP-INDUSTRY	City of Industry	California
Dickson Testing Co Inc.	South Gate	California
DIRATS LABORATORIES	Westfield	Mass
DURKEE TESTING LABS., INC.	Paramount	California
Element Charlotte	Charlotte	North Carolina
Element Cleveland	Cleveland	Ohio
Element Houston	Houston	Texas
Element Huntington Beach	Huntington Beach	California
Element Materials Technology Broken Arrow LLC	Broken Arrow	Oklahoma
Element Materials Technology Daleville LLC	Daleville	Indiana
Element Midway	Midway	Georgia
Element New Berlin	New Berlin	Wisconsin
Element Newtown	Newtown	Pennsylvania
Element Wixom	Wixom	Michigan
EMSL Analytical, Inc.	Cinnaminson	New Jersey
Exova Inc.	Houston	Texas
Exova Inc., Chicago Laboratory	Glendale Heights	Illinois
Exova Inc., Warren Laboratory	Warren	Michigan
EXOVA MATERIALS TESTING INC. => EXOVA TESTING GROUP -	Portland	Oregon

AMERICAS		
Ft. Wayne Metals Research Corp.	Ft. Wayne	Indiana
HITCHCOCK INDUSTRIES INC => CONSOLIDATED PRECISION PRODUCTS-MN	Minneapolis	Minnesota
Howmet Research Corp	Whitehall	Michigan
Huntington Alloys Corporation LLC	Huntington	West Virginia
IMR KHA - Portland LLC	Portland	Oregon
IMR Metallurgical Services	Louisville	Kentucky
IMR Test Labs	Lansing	New York
Industrial Testing Laboratory Services, LLC	Pittsburgh	Pennsylvania
Kohler Co. Chemical and Metallurgical Laboratory	Kohler	Wisconsin
Laboratory Testing, Inc.	Hatfield	Pennsylvania
Lehigh Testing Labs, Inc.	New Castle	Delaware
Lucideon M+P	Greenville	South Carolina
Massachusetts Materials Research, Inc.	West Boylston	Massachusetts
Metallurgical Solutions Inc.	Middletown	Ohio
METALS TECHNOLOGY INC	Northridge	California
METALTEK INTERNATIONAL INC => WISCONSIN CENTRIFUGAL DIVISION	Waukesha	Wisconsin
Modern Industries, Inc.	Erie	Pennsylvania
NSL Analytical Services Inc.	Cleveland	Ohio
NSL Metallurgical	Cleveland	Ohio
Omega Research	Justin	Texas
RTI Laboratories, Inc.	Livonia	Michigan
Sensata Technologies	Attleboro	Massachusetts
Severstal North America	Dearborn	Michigan
SGS MSi TESTING AND ENGINEERING, Industrial Services Division	Melrose Park	Illinois
Special Metals Corporation	New Hartford	New York
St. Louis Testing Laboratories, Inc.	St. Louis	Missouri
Sturbridge Metallurgical Services Inc	Sturbridge	Massachusetts
Tensile Testing Metallurgical Lab	Cleveland	Ohio
TUV Rheinland Industrial Solutions, Inc.	Aliquippa	Pennsylvania
Westmoreland Mechanical Testing*	Youngstown	Pennsylvania
Westmoreland Mechanical Testing*	Latrobe (Cherry Hill)	Pennsylvania
Westmoreland Mechanical Testing	Latrobe (Bay Hill)	Pennsylvania

Section 2 – Adding additional test labs to the Approved list

Suppliers may request the addition of new suppliers to this list by providing objective evidence to AR WPB CSP personnel confirming that the test lab is U.S. Based and fully accredited to ISO 17025.

Keep in mind that a supplier must have full chemical and metallurgical accreditation to qualify for acceptance. Suppliers may work through their buyer or assigned SQE to help facilitate this approval.