Supplier Launch Manual
Global Supplier Quality Manual

AAM has combined the Supplier Launch Manual and the Global Supplier Quality Manual to ensure suppliers have access to all Global Supplier Quality Engineering requirements in one document.
All Printed copies of this manual are not controlled. The only controlled copy of this manual is available online at AAM's iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab, on aam.com, and in the Policies and Procedures section of AAM Powerhouse.

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PREFACE

All Direct Material Suppliers and Processors:

The purpose of this Supplier Launch Manual is to provide an overview of American Axle and Manufacturing Inc.'s (AAM) requirements and expectations for Launch Activities. Suppliers are required to read and understand the contents of this manual in its entirety. Any questions regarding this document should be directed to your Supplier Quality Engineer or Buyer.

In order to meet or exceed customer expectations and be successful in today's global marketplace, AAM must provide Product Launches that are on-time, seamless and flawless to our customers every time. This cannot be accomplished without a robust supply base that understands AAM's expectations and is committed to the same high standards demanded by our customers. By selecting only those suppliers which can fulfill the Launch requirements set forth in this manual, AAM can remain confident that the materials and services supplied will be world class in quality and delivery.

AAM welcomes your supplier team and looks forward to a prosperous relationship together. By accepting a purchase order from AAM, you are accepting the requirements identified in this manual, which is incorporated by reference into the purchase order.

Wayne Uhrick
Director, Global SQE

Note: AAM reserves the right to change or eliminate this manual with or without notice to suppliers.

AAM Supplier Launch Manual Overview

I. Process Description:

This manual defines the AAM process for engaging with the supply base driving successful completion of the APQP Deliverables to launch with quality parts which meet AAM and Customer program timing. The AAM Supplier Launch Manual Process first and foremost is a **cross-functional process** that recognizes supplier success as a function of the combined talents and input of many disciplines within AAM.

- The AAM Supplier Launch Manual Process is governed by the following principles:
- The single point for controlling and documenting all part/supplier status information is the Oracle R12 PPAP System.
- Applied to but not limited to all programs that are being tracked by the AAM Program Launch Team.
- Application of the On-site / Virtual AAM Supplier Launch Manual Process is limited to a subset of the suppliers on a program which are identified as Priority Suppliers. The SQE Site Lead will target the most critical suppliers based on the AAM Risk Assessment (AAM-9F-236-1), procedure that assesses risk related to supplier site readiness, part criticality, and program specific concerns. Remaining suppliers will follow the same process and element deliverables but may be managed with fewer On-site visits or electronic communication with AAM SQE's.
- Cross-functional engagement with the supply base is initiated at the following Program Launch milestones:
    - Kick-Off Meeting: Site SQE, Plant SQA, PE, Buyer, Scheduler, Program Manager / Business Planner
    - On-site / Virtual Evaluation 1: Site SQE, (PE and Buyer if required)
    - On-site / Virtual Evaluation 2: Site SQE, (PE and Buyer if required)
    - On-site / Virtual Evaluation 3: Site SQE, (PE and Buyer if required)
    - On-site / Virtual Evaluation 4: Site SQE, (PE and buyer if required)
- Cross functional Launch Team members include:
    - Product Engineer (PE)
    - Procurement (Buyer)
    - Global Supplier Quality Engineer (Site SQE)
    - Plant SQA (SQA)
    - Scheduler, Supply Chain Management (SCM)
    - Program Manager / Business Planner (PM / BP)
    - Manufacturing Engineer (ME)
    - Supplier Team
    - Global Launch SQE
- Cross functional team activities will continue until the supplier has successfully completed all Quality and Capacity Verification (APQP / PPAP) requirements and fully meets all program ramp-up volumes.

- AAM SQE Site Lead will implement the supplier engagement process consistently on a global basis in alignment with AAM policies and procedures.

II. Phased PPAP Gates:

The APQP steps required for PPAP are split into phases, which are aligned with the AAM PLM Gate Review process:

	APQP Verification Deliverables	Buyer	SQE	PE	
Pre-sourcing	Tech Review	R	A	A	
Pre-Sourcing	SQ[4], CQI, and AAM Process Specific Requirements (Commodity Control Plan), Risk Assessment	S	A	S	
Pre-sourcing	Agree/Disagree	R	A	A	
Kickoff Meeting	Notification of PO	R	A	A	
1	Supplier Timing	S	A	I	Eval 1
3	Supply Chain Map	S	A	I	
4	Tiered Risk Assessment	I	A	I	
5	Design FMEA	I	S	A	
6	Design Validation Plan	I	S	A	
7	Design Records	I	S	A	
8	Process Flow	I	A	I	Eval 2
9	Floor Plan Layout	I	A	I	
23	SP-12 Early Containment	I	A	S	
10	Process FMEA	I	A	C	
2	Fixtures / Tooling / Gaging	I	A	I	
12	Preventive Maintenance Plan	I	A	I	
13	Error Proofing	I	A	I	
14	Vision System	I	A	I	
15	Operator Instructions	I	A	I	Eval 3
16	Visual Aids	I	A	I	
17	Measurement System Analysis	I	A	I	
18	Sub-Supplier PPAP	I	A	I	
19	Dimensional Results	I	A	S	
20	Material Certifications	I	A	I	
21	Shipping and Packaging	I	A	I	
22	Capability Studies	I	A	S	
11	Process Control Plan	I	A	C	
24	Design Validation Plan & Report	I	S	A	
25	Run at Rate	S	A	I	Eval 4
26	Launch Readiness Review	S	A	S	
27	Interim Approval Action Register	I	A	S	
PPAP	Interim PPAP Approval	I	A	A	
PPAP	Full PPAP Approval – Plant SQE	I	R	I	

R: Responsibility A: Approve; S: Support; I: Inform; C: Consult; N/A

** For all deliverables, each function may play a key support role at certain times in the program.*

** Plant SQE is responsible for and approves the final PPAP approval.*

III. Process Overview

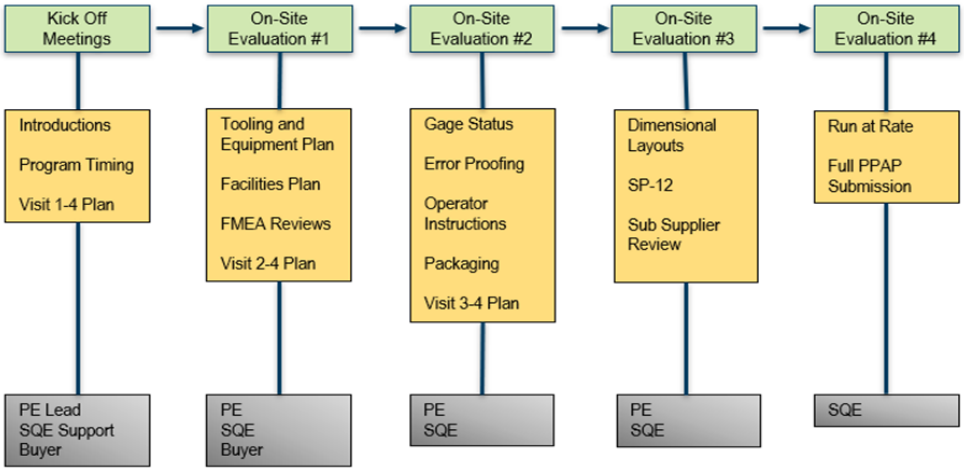
a. Meeting Descriptions:

Meeting	Location	Timing	Duration	AAM Participants
Pre-sourcing Activities Tech Reviews	AAM, Supplier Facility or Teleconference	Pre-sourcing	As needed	• Site SQE, PE, Buyer • Plant SQA, SCM • PM / BP
Kick-Off Meeting	AAM, Supplier Facility or Teleconference	At time of PO	2-3 Hours	• Site SQE, PE, Buyer, • Plant SQA, SCM, • PM/BP
On-site / Virtual Evaluation #1	AAM, Supplier Facility or Teleconference	Within Two Weeks of PO	2-3 Hours	• Site SQE, (PE & Buyer if necessary).
On-site / Virtual Evaluation #2	Supplier Facility	6 Weeks prior to Interim PPAP	1 Day	• Site SQE, (PE & Buyer if necessary).
On-site / Virtual Evaluation #3	Supplier Facility	At Interim PPAP Submission Date	1-2 Days	• Site SQE, (PE & Buyer if necessary).
On-site / Virtual Evaluation #4	Supplier Facility	At Run at Rate Submission Date	1-2 Days	• Site SQE, (PE & Buyer if necessary).

Note: Timing of On-site / Virtual Evaluations may vary depending on length of PPAP timing.

IV. Leadership Accountability:

Over the course of the program, leadership of the process resides with Procurement, Site SQE and Product Engineering for pre-sourcing deliverables and Kick-Off meeting. The leadership of On-site / Virtual Evaluation #1, 2, & 4 is the responsibility of the Site SQE.



a. **AAM Leadership during the Program:** Leadership of the process involves the following responsibilities:

1. Schedule the Kick-Off meetings and On-site / Virtual Evaluations
2. Communicate the agenda for the On-site / Virtual meetings and Evaluations
3. Ensure that the outcomes of each meeting are accurately recorded in the APQP/PPAP Checklist of each PPAP so that Schedule A (see section 6.f) is accurate.
4. Chair the Kick-Off meetings and On-site / Virtual Evaluations
5. Act as the spokesperson for the team when required

While there is a team lead at all times, each team member still has the responsibility between meetings to resolve open concerns, to communicate with other team members including the team leader, and to bring together other team members to close out concerns as necessary.

It is recognized that AAM team members will interface with the supplier regularly between On-site / Virtual Evaluations, and in many cases, this interaction will occur at the supplier site.

Further, although the process provides specific attendance requirements for each team meeting, it is expected that all team members with open issues should attend the corresponding On-site / Virtual Evaluation for which their issue(s) apply.

V. **Process Details:** Priority Supplier Selection

a. Purpose:

Outline the selection process for the suppliers determined to be "High Priority" manufacturing sites for a given program. High Priority sites will receive specific cross-functional support from AAM. Cross-functional support will begin from the time the source has been identified, through successful completion of all SQE Gate Review PPAP requirements.

b. Timing:

The Priority Supplier Selection Process is not a one-time only event. The process is dynamic and requires the SQE Launch leads to continuously monitor the supply base for emerging concerns that would result in "incremental" supplier sites being added to the overall “High Priority” supplier list.

The process for selecting High Priority suppliers is documented in AAM-9-236, but it should also be noted that suppliers who continuously (2 – 3 months in a row) submit SQE Gate Review documentation with RED deliverable status should be evaluated by the SQE Site leads for possible inclusion to the High Risk supplier list.

c. Participants:

Lead: Site SQE
Support: Launch SQE, PE, PM / BP, Buyer, ME

d. Selection Process:

Initial Selection Process:

Start: AAM Program Management Gate 3: (-3) months
Finish: AAM Program Management Gate 3: by Gateway

Note: *Actual completion timing will be dependent upon the specific needs/situations of the program.*

1) For any new Program, a Risk Assessment (AAM-9F-236-1, located in Oracle in the "Supplier Quality" section of the "Requirements & Specifications" tab) should be performed by a Global Supplier Quality Site Engineer. All components of the new program must be assessed individually for risk based on the following a. through d. below:

    a. The Risk Assessment requires each component to be evaluated with 14 questions that the SQE must assign a 0 through 3 rating. The 0 through 3 ratings are weighted based on importance to calculate an aggregate weighted score.
    b. Any component rated as Priority-1 should be input into the Action Register (AAM-9F-236-2, located in Oracle in the "Supplier Quality" section of the "Requirements & Specifications" tab)
    c. Risk Assessments should be used to determine the amount of Launch Readiness Reviews prior to SOP.
        1. "Priority 1" components may be required to have Launch Readiness Reviews 30 and 60 days prior to SOP.
        2. "Priority 2" components may be required to have Launch Readiness Reviews 30 days prior to SOP.
        3. "Priority 3 & 4" components do not require Launch Readiness Reviews On-Site, however the supplier should submit a self-audit via email or virtual/online.
    d. Risk Assessments should be submitted to Procurement during the Technical Evaluation Meeting.
    e. Procurement must upload the risk assessment to the sourcing package.
    f. Procurement must upload the completed risk assessment to the PPAP. All action registers should be completed with all open issues closed, prior to interim approval of the PPAP.

2) For any new component sourcing, re-sourcing, new supplier, critical or new process, a risk Assessment (AAM-9F-236-1) should be performed by Global Site SQE. The risk assessment should be performed on new and existing suppliers. All components of the new sourcing should be assessed individually for risk based on the sections a. through d. above.

3) For any change to an existing component (Engineering Change), a risk assessment may also be required for a change to the component as determined by the Site SQE. The risk assessment (AAM-9F-236-1) will be performed by Site SQE if required. All components of the re-sourcing should be assessed individually for risk based on the sections a. through d. above.

High Risk Supplier Selection Criteria:

- Is the component a pass-through component?
- Is this a new technology for the supplier or is the supplier new to the auto industry?
- Is this a complex component and severity of failure rated high in DFMEA?
- Does the component have any pass-through characteristics or CIP's?
- Did AAM SQE find any major concerns during the Technical Review?
- Evaluate the supplier SQ4 score to determine risk.
- Evaluate the supplier quality performance to determine risk.
- Does the supplier site have stability? Does the supplier area have stability?
- Does the supplier have an effective process to manage their tier/sub suppliers?
- Does the supplier have any engineering related issues with PFMEA or Control Plan?
- Does supplier have issues meeting capacity demand?
- Has the supplier reported any recent organizational or leadership changes?
- Has the Launch timing been compressed or reduced since the quote?
- Are there any historical launch problems, concurrent launches issues?

4) **Current Production – Post Selection Period:**
After the supplier selection period, the Site SQE should consider adding incremental High Risk suppliers for cross-functional engagement based on the following criteria:

Resourcing:	A part is resourced (a new internal and/or external manufacturing site identified) or the supplier is unable to be developed to achieve SQE Gate Review and/or program timing requirements.
Late Part Release:	A part is released/sourced after the normal timing such that the supplier cannot meet the SQE Gate Review and/or program timing requirements.
DV / PV Failure:	A part suffers a DV/PV failure where the supplier cannot meet the SQE Gate Review and/or program timing requirements.
Compression:	A part requires significant tooling/testing compression to achieve SQE Gate Review and/or program timing requirements.
Financial Instability:	Supplier experiences financial crisis that jeopardizes their ability to meet SQE Gate Review and/or program timing requirements.
Manufacturing Process:	APQP plan indicates significant risk to achieve SQE Gate Review and/or program timing requirements.
Late / Non-Submissions:	Two or more consecutive late or non-submissions of the SQE Gate Review and/or program timing requirements.
Site Capability:	Known issues of manufacturing capability which would affect product / process performance including deterioration of SQ^4 score to a non-sourceable status.
Consecutive SQE Gate Review submissions (2 – 3 months) with Red deliverable status:	Unresolved SQE Gate Review submissions with Red deliverable status for two or more consecutive months.

VI. Pre-Sourcing Activities – Technical Review / On-site / Virtual

a. Purpose:

The purpose of the Pre-sourcing Activities – Technical Review all requirements to identify and select the appropriate supplier based on the cross-functional team's input. The team will complete the Technical Review Checklist, Agree/Disagree Matrix and the Risk Assessment.

b. Timing:

Start: AAM Program Management Gate 3: (-3) months
Finish: AAM Program Management Gate 3: by Gateway

c. Participants:

Lead: Site SQE
Support: Launch SQE, PE, PM / BP, Buyer, ME

d. Location:

AAM facility, supplier facility, or teleconference (according to team preference)

e. Elements Required:

Technical Review Checklist – AAM-7F-005
Agree/Disagree Matrix – AAM-9F-116
Risk Assessment AAM-9F-236

f. Agenda:

1. Reference Global Procurement Procedure AAM-7-401 for Technical Review information.
2. The Technical Review should include the Buyer, SQE, PE and supplier.
3. Technical Reviews are required for the following reasons:
    1. New Part Number or New Part
    2. Design Change or Print Revision
    3. Supplier Change
    4. Machine Change
    5. Tooling Change (Mold or Die Cavity).

5) Key Areas of Focus:

1. During the Technical Review, the supplier and the Sourcing Team will complete/review three documents and associated procedures.
    1. Agree/Disagree Matrix
    2. Technical Review Conference Checklist
    3. Risk Assessment
2. Prior to the Tech Review date, the Sourcing Lead will send to the supplier the Agree/Disagree Matrix form and the Technical Review Conference Checklist for the supplier to complete prior to conducting the Technical Review.
3. As part of the standard quoting package provided to the suppliers, the Commodity Control Plan may be required to be completed for the appropriate commodity being quoted.
    - The Commodity Control Plans are stored on Sharepoint and should be uploaded into the APEX Commodity Control Plan web-based tool.
    - Supplier should complete the commodity control plan prior to the Technical Review.
    - Supplier should forward the completed commodity control plan to the Global SQE at least two days prior to the Technical Review.
    - Supplier should complete the action plan for the commodity control plan for any deviations to the commodity control plan.
    - Supplier should complete the commodity control plan summary in the agree/disagree form with all exceptions noted with action plans to comply or get AAM approval for each exception.
4. If an Aluminum or Iron Casting Supplier the RFQ package must include: design best practices, simulation checklist and requirements, reference to the Okay to Tool Meeting (setup by the SQE) date and plant trail requirements.
5. The supplier may also be required to submit an applicable CQI series audit prior to the Technical Review. A typical request would be a CQI-9 audit if the supplier does in-house heat treat or has a sub-supplier that will be doing heat treat.
6. Prior to the Technical Review, the supplier may be requested to allow the Global SQE onsite for an SQ4 audit or provide an SQ4 self-assessment if applicable.
7. The objective of the Technical Review is to have all documents completed prior to the review. This allows the cross-functional team to review all elements of the Technical Review with the supplier and complete all required signoffs at the meeting.

8. After completion of the Technical Review and the PO is awarded, the Supplier Owned PPAP Tracker in APEX will be automatically updated based on inputs in the PPAP. The section in the Tracker will be updated for the Tech Review, SQ4-CQI, CCP, Risk Assessment and A/D.

9. Technical Review
    a. Was the SQ4 assessment performed at the supplier? What was the assessment score?
    b. Was the Generic Commodity Control plan audit performed at the supplier? What was the score?
    c. Was the appropriate CQI series audit performed at the supplier? What was the score?
    d. Was the Process Flow Diagram (PFD) shared during the tech review?
    e. Was the Manufacturing concept (Draft-Blocks) discussed during the tech review?
    f. Was the Proposed Packaging (PAF) discussed during the tech review?
    g. Has the supplier received and understands supplier confirmation of awareness of SOP, Supplier Launch Manual, SPs, Supplier Quality Manual & Supplier Requirements Manual?
    h. Were the Validation Requirements (DV/PV) discussed in the tech review?
    i. Was the DFMEA discussed during the tech review?
    j. Were the Design Requirements (PR, MS, etc.) discussed in the tech review?
    k. Was the Agree/Disagree Matrix and Drawing discussed in the tech review?
    l. Were SC/CC/CIP/PTCs, etc. & Gaging Plan discussed during tech review?
    m. Were the Key Program Milestones (AAM / Customer) discussed and understood during the tech review?
    n. Does the supplier have timing and is it aligned with the program milestones?
    o. Were the Traceability requirements discussed in the tech review?
        i. Is the proper shipping label with traceability lot number being used per the GPTL Labeling and Requirements Standard, found on AAM.com – Doing business with suppliers?
        ii. If identified on the print, is part traceability bar code being used?
        iii. Has the traceability plan been reviewed and approved by AAM SQE?
    p. Were Plant Trials and Success Criteria Discussed?

10. SQ4, CQI, and AAM Process Specific Requirements (Commodity Control Plan), Risk Assessment
    a. Was AAM-9F-236-1 used and completed for each component?
    b. When PPAP is initiated, verify priority level matches Risk Assessment.
    c. When PPAP is initiated verify all Priority Level-1 suppliers are scheduled for (4) on-site evaluations.
    d. When PPAP is initiated, verify all Priority Level-1 suppliers are scheduled for potential on-site Launch Readiness Reviews.

11. Agree / Disagree
    a. Was Agree / Disagree completed?
    b. Are all action items closed?
    c. Are all items agreed upon?
    d. Was the ballooned drawing used and every dimension and note covered on the Agree / Disagree evaluation?
    e. Are all signatures complete and uploaded into Oracle?

g. Outputs:

Output	Responsibility
1. Agreed upon supplier to be awarded PO	All

VII. Kick-Off Meeting / On-site / Virtual

a. Purpose:

The purpose of the Kick-Off meeting is to identify and introduce the AAM and supplier team members and to provide them with an overview of the AAM Supplier Engagement Process while also communicating team expectations prior to On-Site/Virtual Evaluation #1 for each of the High Risk Suppliers. A key deliverable out of this meeting will also be AAM and supplier team agreement on the required program and process timing.

b. Timing:

Start	AAM Program Management Gate 3: (-1) months
Finish	AAM Program Management Gate 4: (+3) months

Note: Actual review timing will be dependent upon the specific needs of the component and the program. The estimated duration for this meeting is 2-3 hours.

c. Participants:

Lead: Site SQE
Support: Product Engineer, Buyer, Program Manager/Business Planner, Manufacturing Engineer, Scheduler (as required)

d. Location:

AAM facility, supplier facility, or teleconference (according to team preference)

e. Agenda:

The Kick-Off meeting is focused on the preparation for On-Site/Virtual Evaluation #1. The team reviews completion of AAM-7F-234 (AAM Supplier Kick-Off Checklist form) and establish assignments relative to the deliverables outlined within On-Site/Virtual Evaluation #1.

Agenda Item:	**AAM & Supplier Leads:**
1. Introduction of team members	Site SQE
2. Present overview of AAM Supplier Engagement Process	Site SQE
3. Review the supplier's timing plan • Reconcile program timing plan, AAM facility or equipment provider milestones and component timing plan • Gain team agreement and understanding of timing plan • Agree on generic timing plan for On-Site Evaluations	Site SQE, PE and Buyer
4. Review reference material/documentation and standard forms to be used throughout the process. Functions to address functional concerns/open issues.	ALL
5. Review inputs and pre-work for On-Site Evaluation #1 (see Key Areas of Focus for more detail).	ALL
6. Document Open Issues with assigned responsibilities and timing in the Schedule A.	ALL
7. Determine date for On-Site/Virtual Evaluation #1.	Site SQE

f. Key Areas of Focus:

The kickoff meeting is focused on the preparation for On-Site/Virtual Evaluation #1 by communicating the following list of items that will be utilized during the upcoming review (On-Site/Virtual Evaluation #1):

1. **Supplier**
   - Capacity Planning
   - Facility Layout
   - Process flow diagram
   - Sub-supplier APQP plan (if available)
   - Control plan (current or surrogate process) and error proofing
   - Customer Interface Point (CIP) control methods
   - Gauging strategy for component(s)

- If applicable, DVP&R and in-process testing
- Internal Supplier CC's/SC's
- Preliminary PFMEA(s)
- Explanation of non-conforming part practices/procedures
- Contamination controls, part preservation methods (rust prevention), as applicable
- Packaging, shipping, and dunnage recommendations
- Draft of the Preliminary Design / Manufacturing feasibility form

Buyer

- Capacity Planning Volumes
- Status of Tool Orders (prototype and production) including Long lead and short lead items
- Status of Purchase Orders
- Status on piece price agreement
- Status of dunnage
- Verification of manufacturing site code
- Other commercial issues

Product Engineer

- Engineering Statement of Work (ESOW)
- Customer input requirements (part history, warranty concerns)
- Latest design requirements including GD&T drawings
- Overall Failure Mode Avoidance Strategy
- DFMEA failure modes and severity rankings including customer identified characteristics
- Special Characteristics (CIP, AC, CC and SC)
- DVP&R Requirements
- Branding requirements and/or lot/part traceability requirements including:
    1. Proper shipping label with traceability lot number being used per the GPTL Labeling and Requirements found on AAM.com – Doing business with suppliers.
    2. If identified on the print, is part traceability bar code being used?
- Timing plan for release of drawings and all associated specifications

Site SQE

- Latest SQ^4 Site Assessment
- Latest AAM Scorecard and other quality indicators
- Any related prior PRR's/8D's
- Gauging strategy requirement for part
- Required SQE Gate Review dates
- Capacity Planning (including review of Surrogate OEE and their assumptions)
- Error proofing strategy

Supply Chain Management

- Packaging requirements
- Dunnage plan and approval forms Program volumes and ramp-up curve
- Materials Management Operating Guideline (MMOG) requirements
- Shipping plan

Supplier Owned PPAP Tracker – Cross-Functional Team

- Access the Supplier Owned PPAP Tracker in APEX
- Run Schedule B report with dates
- Verify the Eval-1, Eval-2, Eval-3 & Eval-4 dates along with Full PPAP approval date in report. Monitor these dates at each eval to verify supplier compliance to schedule.
- Make any adjustments required if the calculated dates are not accurate.
- These dates will determine the compliance to schedule all elements for all PPAPs.
- Verify the supplier responsibility to update the % complete for each element in Level Checklist.

g. Outputs:

Output		Responsibility
2.	Agreed upon responsibilities for next On-Site/Virtual Evaluation.	All
3.	Document Planned dates for On Site/Virtual Evaluations in the SQE Gate Review and Supplier Owned PPAP Tracker in APEX.	All

VIII. Onsite/Virtual Evaluation #1:

a. Purpose:

The purpose of Supplier Engagement On-Site/Virtual Evaluation #1 is to validate progress of the supplier responsible APQP/PPAP elements against the corresponding APQP timing and to reconcile open issues and/or concerns using a structured agenda. The on-site/Virtual evaluation will center on planning activities for the APQP/PPAP Elements, including Failure Mode Avoidance (preliminary FMEA and Process Flow review), Capacity and Manufacturing Planning

b. Timing:

Start	**At time of PO Award**
Finish	**Within two Weeks of PO Award**

c. Participants:

Lead: Site SQE

Support: Product Engineer, Commodity Buyer, SCM Representative (required if open deliverables)

d. Location: Team decides on common venue (AAM facility, supplier facility, or teleconference)

e. Quality and Capacity Verification Deliverable Focus:

On-Site/Virtual Evaluation #1 is focused on a subset of the total 27 Quality and Capacity Verification (APQP/PPAP) deliverables noted below:

APQP Element #	Deliverable Description	Lead
1	Supplier Timing	Site SQE
3	Supplier Chain Map	Site SQE
4	Tiered Risk Assessment	Site SQE
5	Design FMEA	PE
6	Design Validation Plan	PE
7	Design Records	PE
N/A	Capacity Planning	Site SQE

f. Agenda

Agenda Items:	AAM and Supplier Responsible Leads:
1. Introduction of key team members	Site SQE
2. Review applicability and understanding of all APQP elements and determine applicability of each element and completion timing	Site SQE/Supplier
3. Conduct plant tour/facility review (if evaluation is On-Site at supplier manufacturing location)	Supplier and Team
4. Review previous Open Issues from Tech Review/Agree Disagree/Kick Off	Supplier and Team
5. Confirm there are no commercial issues and Agreements such as scrap agreements, porosity specifications, cleanliness and containerization.	Commodity Buyer
6. Deep dive and document the supplier's status on gate deliverables: • FMEAs and Failure mode severity understanding • Supply chain map and risk assessment • Assure proper released print is in the PPAP • Define and document the process design validation plan	Supplier, Product Engineer, Site SQE
7. Initiate agreements on gauging strategy and compare to the agree/disagree matrix	Supplier, Product Engineer, Site SQE
8. Confirmation on part feasibility from Tech Review	Supplier, Product Engineer, Site SQE
9. Review Supplier SQ4th Score and note progress to Action Register	Supplier, Site SQE
10. Review supplier and sub-supplier management plans including capacity plans	Supplier, Site SQE
11. Review preliminary facilities, hard tools, production process equipment and gauge timing plan including sub-suppliers	Supplier, Commodity Buyer, Site SQE
12. Document Open Issues with action plans / assigned responsibilities and percent complete	Supplier/Site SQE
13. Update visit completion and notes in the Oracle R12 APQP system	Supplier/Site SQE

g. Key Areas of Focus:

The following key areas should be focused on during On-Site Evaluation #1. Questions/actions listed below should serve as a starting point for key review areas. They are not, however, intended to be all inclusive for On-Site Evaluation #1 deliverables/expectations:

Element #1: Supplier Timing

- Does the supplier have a timing plan that will deliver parts from Production / Hard Tool(s) to support the interim PPAP timing dates?
- Has the supplier provided tooling purchase orders in time to support off tool parts in time for the process validation timing?
- Has the supplier received the proper AAM purchase orders to support program timing?

Element 3: Supply Chain Map

- Has the supplier identified and mapped the entire supply chain?

Element 4: Tired Risk Assessment

- Has the supplier used the AAM Risk Assessment (or equivalent) format to identify high risk sub-suppliers?

Element 5: Design FMEA

- Is the supplier design responsible? If yes, is the DFMEA been submitted and agreed upon by AAM?
- If AAM has provided the DFMEA, has the supplier recognized all failure severity modes and planned appropriately for production planning? Are the severity ratings carried over to the PFMEA?

Element 6: Design Validation Plan

- Is there a plan in place to complete design testing within program timing?
- Is the test plan agreed upon by the supplier and AAM product engineering?
- Is a third party being used to complete the testing? If yes, do they have the proper certification?

Element #7: Design Records

- Does the PPAP contain the latest drawing?
- Are the drawings/prints released?
- Were all quality, cleanliness, materials specifications, critical characteristics, customer interface points clearly identified and understood?
- Has all supplemental information been reviewed and agreed upon (AAM Supplier Quality Manual, Procurement T&C's, AAM Materials requirements, lab report formats, etc.)?
- For design responsible suppliers, has the supplier received sufficient engineering information from the product engineer to start and initiate the APQP/PPAP process?

Capacity Planning:

Committed Capacity

- Confirm that the supplier obtained the LCR/MCR yearly volume from commercial agreement as Tool Order, Contract, Blanket PO. Make sure the PPAP LCR/MCR numbers match the PO.
- Confirm that the supplier understands the number of weeks committed to achieve LCR/MCR. (If PPAP is initiated reference volume section of PPAP)
- Confirm the supplier has a value stream map of their manufacturing process and include the subsuppliers. Identify potential bottlenecks.

Operating Pattern

- Supplier operating pattern insures that LCR is met in 5 days/week and MCR is met in 6 days/week.
- Calculate required time to meet contractual volume and compare to supplier assumption. Is the result of the comparison satisfactory? Use AAM CAR.
- For non-dedicated process/equipment, has the supplier identified the allocation percent entered for each manufacturing process for AAM product and other customers?
- For non-dedicated process, is there a share loading plan that includes other AAM Product and other Customers? If so, is the open capacity sufficient to cover AAM volume and other Customer's volume?
- Calculate available time and compare to supplier assumption. Is the result of the comparison satisfactory?
- Is there a potential risk when comparing time required to meet LCR/MCR against available time to produce parts? If so, communicate to the Buyer, Launch SQE and request supplier for an action plan.

Timing Requirements

- Does the supplier require to develop a new process? If so, is there a timing available and support Program Milestones?
- Is the new equipment / tool unique to design? If so, define if the complexity may represent a risk for the development of the program in terms of timing.

Ideal Cycle Time

- Confirm planned ideal cycle time is calculated to meet contractual volume. Insure ideal cycle time includes number of cavities and number of machines.

Target OEE

- In case of a new process development at supplier to produce this product, verify supplier's OEE of similar process. Request the supplier to provide historical data to support their OEE calculation.
- If the process to be used is currently in production of other components (AAM or other customer), verify historical performance and request data to support the calculation. Does the data support AAM requirements? is the performance of supplier sustainable over time?

- Has the supplier identified change over and frequency? Consumables and frequency? Any other down time? Inspection and frequency? Any of these losses represent a risk?
- Confirm projected scrap rate from the supplier and document in the note section how is this obtained and calculated.
- Is there any variation between hour/hour Jobs Per Hour (JPH) during CAR Run?
- Provide Historical Unplanned Downtime (surrogate lines). Top Parato/Paynter (root cause for downtime)
- Compare time required to meet LCR/MCR to available time to produce parts. Identify a potential risk, communicate to the Buyer, Launch SQE and request supplier for an action plan.
- Verify Equipment Mean Time Before Failure (MTBF) and Equipment Mean Time to Repair (MTTR) are monitored. Are the average times supporting supplier OEE calculation? Or represent a risk?
- Confirm supplier has considered all necessary tooling required to support their PM schedule, change overs, etc. in capacity calculations.

Value Chain Constraints

- Is the sub-supplier(s) capable to meet the contractual volume per year at 47 weeks per year under an operating pattern of 5 days to meet LCR and 6 days to meet MCR? Use AAM CAR for Sub-Suppliers.
- Does the sub-supplier require to develop a new process? If so, is there a timing available and support Program Milestones?
- Is the new equipment of sub-supplier / tool unique to design? If so, define if the complexity may represent a risk for the development of the program in terms of timing.
- Has the supplier has identified raw material lead time? Does the lead time represent a risk for the launch?
- For non-dedicated process/equipment, has the sub-supplier identified the allocation percent entered for each manufacturing process for AAM product and other customers?
- For non-dedicated process, is there a share loading plan that includes other AAM Product and other Customers? If so, is the open capacity sufficient to cover AAM volume and other Customer's volume?
- Provide Critical Spare List, Supply Available for Launch/Ongoing.
- Compare with Downtime Root Cause(s) – do critical spares exist for major downtime issues.

Ramp up plan – Should use AAM Blue Bar

- Verify that supplier hiring plan and training plan support program launch curve.
- Is a safety Buffer (Bank) required to sustain ramp up or acceleration risks? (Assess sub-supplier and sub-suppliers)
- Verify sub-supplier ramp up plan supports launch curve.

Customer specific requirements

- Verify with New Launch Team if OEM has requested to use their specific format for R@R (CAR) as per CSR.
- "Verify CSR for Capacity Planning and Execution of the R@R and insure the supplier is aware of the requirements.
- Verify that supplier had cascaded any Customer Specific Requirement to their sub-suppliers.

h. Outputs

Output	Responsibility
1. Summary Report for On-Site/Virtual Evaluation # 1 – Document in APQP Checklist	Supplier / Site SQE
2. Confirm Deliverable status for:	All
a. Element #1 – Supplier Timing	Buyer/ Site SQE
b. Element #3 – Supply Chain Map	Buyer / Site SQE
c. Element #4 – Tiered Risk Assessment	Buyer / Site SQE
d. Element #5 – Design FMEA	Supplier / Product Engineer
e. Element #6 – Design Validation Plan	Supplier / Product Engineer
f. Element #7 – Design Record	Buyer/SQE/Product Engineer
3. Completed Supplier Manufacturing Commodity Control Plan Audit.	Supplier / Site SQE
4. Completed APQP People Hiring Plan. (Greenfield/Brownfield Suppliers).	Supplier HR Manager
5. Agreement on PFMEA	Site SQE
6. 6. Agreement that the Capacity Plan is achievable and Capacity Requirement	Site SQE
7. Agreement on timing plan to achieve APQP/PPAP to support program timing	Supplier / Site SQE
8. Commitment from supplier on feasibility of design and manufacturing to produce the part(s) as specified.	Supplier / Product Engineer / Site SQE
9. Review of supplier's sub-tier APQP/PPAP tracking document.	Supplier
10. Updated Manufacturing Site Assessment (SQ4th)	Site SQE
11. Agreed upon timing for next On-Site evaluations	All
12. Document and upload meeting notes in APQP Element #27	Site SQE

IX. On-site / Virtual Evaluation #2: Planning for Launch

a. Purpose:

The purpose of Supplier Engagement On-site / Virtual Evaluation #2 is to validate progress of the supplier responsible APQP/PPAP elements against the corresponding APQP timing and to reconcile open issues and/or concerns using a structured agenda. The On-site / Virtual evaluation will center on planning activities for the APQP/PPAP Elements, including Failure Mode Avoidance (preliminary FMEA and Process Flow review), Capacity and Manufacturing Planning.

b. Timing:

Start:	**At the completion of Kick-Off**
Finish:	**6 weeks prior to Interim PPAP approval**

Note: *Actual review timing will be dependent upon the specific needs of the component and the program. The estimated duration for this meeting is 1 day.*

c. Participants:

Lead: Site SQE
Support: PE, Buyer, SCM (required if open deliverables)
Location: Team decides on common venue (AAM facility, supplier facility, or teleconference)

d. Quality and Capacity Verification Deliverable Focus:

On-site / Virtual Evaluation #2 is focused on a subset of the total 27 Quality and Capacity Verification (APQP/PPAP) deliverables noted below:

APQP Element #	Deliverable Description	Lead
8	Process Flow	Site SQE
9	Floor Plan Layout	Site SQE
23	SP-12 Early Containment	Site SQE
10	Process FMEA	Site SQE
2	Fixtures / Tooling / Gaging	Site SQE
12	Preventative Maintenance Plan	Site SQE
13	Error Proofing	Site SQE
14	Vision System	Site SQE

e. Agenda:

Agenda Item:	AAM and Supplier Leads:
1. Introduction of key team members.	All
2. Review previous Open Issues.	All
3. Review understanding of all APQP elements and determine applicability of each element along with completion timing.	All
4. Confirm there are no commercial issues and all agreements are in place, such as; scrap agreements, porosity specifications, cleanliness and containerization.	Buyer
5. Conduct plant tour/facility review (if evaluation is On-site / Virtual at supplier manufacturing location).	All
6. Deep dive audit and document the supplier's status on gate deliverables: • DMFEA, PFMEA and understanding Failure mode severities • Supply chain map and risk assessment • Assure proper released print is in the PPAP • Define and document the process design validation plan	Supplier / Site SQE
7. Review preliminary facilities, hard tools, production process equipment and gage timing plan including sub-suppliers.	Supplier / Site SQE
8. Review requirements to support capacity plan.	Supplier / Buyer/ Site SQE
9. Review agreements on gauging strategy and compare to the agree/disagree matrix.	Supplier / Site SQE
10. Review Supplier Manufacturing Commodity CP Assessment.	Supplier / Site SQE
11. Review Supplier's hiring and training plan.	Supplier
12. Review sub-supplier management plans including capacity plans.	Supplier / Site SQE
13. Review Supplier SQ^4 score and note progress.	Supplier / Site SQE
14. Update/Add Open Issues with action plans, assigned responsibilities and timing for each issue.	Supplier / Site SQE
15. Create report for On-site / Virtual Evaluation #2.	Supplier / Site SQE
16. Agree on follow up schedule for On-site / Virtual Evaluation #3.	Supplier / Site SQE
17. Process Flow	Supplier / Site SQE
18. Floor Plan Layout	Supplier / Site SQE
19. SP-12 Early Containment • SP-12 is required if CP, PFMEA and Capability Studies are required in Level Checklist. • SP-12 is required upon customer specific requirements or management request. • SP-12 is required for any dimensional or material change.	Supplier / Site SQE

• SP-12 is not required if the PPAP is for a carry-over part with no additional machinery, no machinery moving, no plant moving, and no print revisions. • SQE must verify supplier inputs data on weekly basis.	

f. Key Areas of Focus:

The following key areas should be focused on during On-site / Virtual Evaluation #2. Questions/actions listed below should serve as a starting point for key review areas. They are not, however, intended to be all inclusive for On-site / Virtual Evaluation #2 deliverables/expectations:

Element #8: Process Flow

a. Does the process flow format follow the AIAG Process Flow requirements?
b. Is there evidence of a linkage across all quality documents and Characteristics?
c. Does the process flow cover all elements of manufacturing from receiving through shipping operations?

Element #9: Floor Plan Layout

a. Can the layout be viewed from a CAD model or another representation showing process start, end and flow through the stations?
b. Are any future equipment moves or line layouts being considered before or after PPAP?

Element #23: SP-12 Early Production Containment

a. Are all requirements outlined in SP-12 understood and agreed? Is there a display and easel displayed, or visual display to identify? No. of findings, from each shift, AAM SP-12 Check sheet to be filled out, Training matrix including photos? Has the SP-12 tag (orange) been placed on the part / box after the inspection took place?
b. Are all SP-12 characteristics previously agreed to captured. Has the SP-12 for each shift been reviewed and signed by the supervisor? Does the SP-12 Check sheet contain signature fields to make sure signatures are present. Are operator instructions firmly attached and visible to operator? Verify instructions are to the latest engineering change level.
c. Is the initial containment activity for new parts (to ensure the system is functioning as intended) separate from the "normal" process? Is the station off-line, separate, and independent from the normal manufacturing process? If not, is there an approval from the BU Director/Manager? Are the SP-12 daily results being reviewed by the Plant Manager and staff with a Fast Response opened for each item found?
d. Results from SP-12 should be loaded weekly until SP-12 is released or PPAP is fully approved.
e. Has the supplier defined the measurement plan (quality, frequency and traceability requirements) in the pre-production build control plan including sub-supplier(s) significant characteristics? Are all gages calibrated? Do gages have operator instructions? Is a reaction plan available? Does the SP-

12 checklist contain customer interface points, Areas of prior customer concerns, KPC's, Special areas where surface finish or handling can create a N/C?

f. Suppliers are required to upload the AAM SP-12 Check sheet on a weekly basis to the PPAP Element #23 "SP-12" in the PPAP Level Checklist located in AAM Oracle Portal until the end of SP-12 period as agreed with AAM SQE/procurement teams.
g. The Element #23 “SP-12” will stay open and available to the supplier to upload documents into Oracle even after the full PPAP approval has been granted. This allows suppliers to access and upload documents for extended Safe Launch periods.

Note: Suppliers are required to upload the AAM SP-12 Check sheet on a weekly basis to the PPAP Element #23 "SP-12" in the PPAP Level Checklist located in AAM Oracle Portal until the end of SP-12 period as agreed with AAM SQE/procurement teams. The SP-12 Check sheet is located in the AAM iSupplier Portal in the Supplier Quality section under Checklist Templates. All non-conformances listed on the SP-12 Check sheet must have a corresponding entry on the Action Register in the Check sheet. Each non-conformance entry onto the Action Register must include the characteristic, date, containment, root cause, corrective action, responsible person, and closure date.

The Element #23 “SP-12” will stay open and available to the supplier to upload documents into Oracle even after the full PPAP approval has been granted. This allows suppliers to access and upload documents for extended Safe Launch periods.

Element #10: Process FMEA

a. Is the PFMEA created in the correct AIAG format?
b. Are all Customer Interface Points and Special Product Characteristics (AC, CC, SC and CIP) identified and are ratings and RPN’s appropriate?
c. Has a PFMEA been completed for every operation of the manufacturing process?
d. Are all high severity ratings addressed with the appropriate detection methods? Are severity ratings carried over from DFMEA?

Element #2: Fixtures / Tooling / Gaging

a. Was the American Society of Mechanical Engineers / Geometric Dimensioning & Tolerancing (ASME / GD&T) appropriately used when creating the part drawing? Check for evidence and identify the 3-2-1 master datum points.
b. Are all Special Product Characteristics identified on the drawing?
c. Has the supplier created a master tooling list?
d. Has the supplier defined the calibration frequency for each gage?
e. Does the supplier have the correct tooling identification requirements?

f. Are all Special Product Characteristics, control points and datum surfaces, tolerances, part specifications and other special material characteristics considered?

Element #12: Preventive Maintenance Plan

a. PM plan should include spare parts list and PM checks with frequency and verification the checks are being completed. If this is an online system a representative sample may be provided.
b. Does the preventive maintenance plan have recovery plans for missed activities?

Element #13: Error Proofing

a. Are all error proofing stations captured in a matrix?
b. Suppliers are required to error proof all customer interface points. Is there evidence of this or is there a 100% inspection plan in place?
c. Are rabbit tests in place and procedures to run available?
d. Is verification frequency documented with a log that shows compliance and a reaction plan specific to the failure of these devices?

Element #14: Vision Systems

a. Suppliers are required to error proof all customer interface points. Is there evidence of this or is there a 100% inspection plan in place?
b. Are rabbit tests in place and procedures to run available?
c. Is verification frequency documented with a log that shows compliance and a reaction plan specific to the failure of these devices?

g. Outputs:

Output	Responsibility
1. **Element #8** – Process Flow	Site SQE / Supplier
2. **Element #9** – Floor Plan Layout	Site SQE / Supplier
3. **Element #23** – SP-12 Early Containment	Site SQE / Supplier
4. **Element #10** – Process FMEA	Site SQE / Supplier
5. **Element #2** – Fixtures / Tooling / Gaging	Site SQE / Supplier
6. **Element #12** – Preventive Maintenance Plan	Site SQE / Supplier
7. **Element #13** – Error Proofing	Site SQE / Supplier
8. **Element #14** – Vision Systems	Site SQE / Supplier

X. On-site / Virtual Evaluation #3: Verification of Supplier Process Development Verification of Supplier Capability

a. Purpose:

The purpose of Supplier Engagement On-site / Virtual Evaluation #3 is to focus on validating the completion of the Gate 4 PPAP requirements. The focus of this visit is to validate the capability of the production process to produce parts to the agreed upon quality levels. It will validate progress of the supplier's Quality and Capacity Verification (APQP/PPAP) deliverables and Run-at-Rate readiness.

b. Timing:

Start:	**At the completion of On-site / Virtual Evaluation #2**
Finish:	**At Interim PPAP Submission**

c. Participants:
Lead: Site SQE
Support: Buyer, SCM (required if open deliverables)

d. Location: Ideally, since the On-site / Virtual Evaluation #3 would address the process validation builds and Run-at Rate Readiness the preferred location is the Supplier's manufacturing facility. However, due to the potential time gap between the build event and supplier Run-at-Rate activity, separate meetings may be required. The team can choose the most appropriate location(s) providing that the focus elements can be fully verified.

e. Quality and Capacity Verification Deliverable Focus:
On-site / Virtual Evaluation #3 is focused on a subset of the total 27 Quality and Capacity Verification (APQP/PPAP) deliverables and all the incomplete deliverables from On-site / Virtual Evaluation #1 & #2. The deliverables are:

APQP Element #	Deliverable Description	Lead
15	Operator Instructions	Site SQE
16	Visual Aids	Site SQE
17	Measurement System Analysis	Site SQE
18	Sub-Supplier PPAP	Site SQE
19	Dimensional Results	Site SQE
20	Material Certifications	Site SQE
21	Shipping and Packaging	SCM
22	Capability Studies	Site SQE
11	Process Control Plan	Site SQE
24	Design Validation Plan & Report	PE

f. Agenda:

Agenda Item:	AAM and Supplier Leads:
1. Introduction of key team members.	All
2. Review previous Open Issues.	All

3. Review Supplier APQP/PPAP progress as submitted in R12.	Supplier
4. Review build plan discussed in Kick-off Meeting and verify supplier has access and understands the AAM Forecast in R12.	Supplier / SCM
5. Pre-Production Build Preparedness specifics: • Verify that the pre-production parts have met AAM expectations for quality and performance.	All
6. Deep dive audit and document the supplier's status on gate deliverables: • Fixtures / Tooling / Gaging • Process FMEA • Preventive Maintenance Plan • Error Proofing Plans • Vision System Strategy	All
7. Run-at-Rate Readiness specifics: • Review timing plan compared to forecast from AAM. • Conduct review of manufacturing facility: ○ Review area designated for production of parts ○ Review area designated for storage of parts ○ Review area required for any repair/containment ○ Review area used for sequencing (if applicable) ○ Review any equipment/processes already in place ○ For equipment not in place, conduct review of contingency equipment and/or processes used for different parts and document as a deviation to PPAP	Supplier
8. Review Run at Rate plan status.	Site SQE / Supplier
9. Conduct review of manufacturing facility: • Conduct Process walk with PFMEA and Control plan checking for adequacy of control measures and accuracy of the Pre-Launch Control Plan • Assess operator instructions, visual aids, to ensure suitability • Assess compliance of supplier site to Supplier Manufacturing Commodity CP and ensure the Pre-Launch Control Plan has been updated accordingly • Review each spot in the production process where an AC, CC, SC, and/or CIP is controlled • Review repair or rework area and understand part identification strategy, gauging strategy, as well as how parts are re-entered into the normal production stream (Rework & Repair must have proper AAM approval)	Site SQE / Supplier Site SQE / Supplier Site SQE / Supplier Site SQE / Supplier Site SQE / Supplier Site SQE / Supplier

• Review production gauging layout, function, and calibration • Review Gage R&R results • Review process capability results and information • Review shipping/packaging instructions • - Review status of DVP&R results	Site SQE / Supplier Site SQE / Supplier Site SQE / Supplier Site SQE / Supplier
10. Review Supplier Manufacturing Commodity CP assessment and ensure that any non-compliance has been addressed.	Supplier / Site SQE
11. Review Supplier's APQP people readiness assessment.	Supplier / Site SQE
12. Review Supplier's sub-tier APQP/PPAP tracking document.	Supplier
13. Review Supplier SQ[4] score and note progress.	Supplier / Site SQE
14. Update/Add Open Issues with action plans, assigned responsibilities and timing for each issue.	Supplier / Site SQE
15. Create report for On-site / Virtual Evaluation #3.	Supplier / Site SQE
16. Agree on follow up schedule for On-site / Virtual Evaluation #4.	Site SQE

XI. Key Focus Areas:

The following key areas should be focused on during On-site / Virtual Evaluation #3. Questions/actions listed below should serve as a starting point for key review areas. They are not, however, intended to be all inclusive for On-site / Virtual Evaluation #3 deliverables/expectations:

Element #15: Operator Instructions

a. Are Operator Instructions available by station and do they follow standardized work principles?
b. Is there a procedure in place for control of non-conforming material?
c. Are lock boxes in place and are they being used properly?
d. Are the Operator Instructions available to the operators at their workstation?
e. Review Operator instructions, Set-up sheets, Inspection instructions, Visual displays, Control charts, Rework/Repair procedures, etc. for appropriateness.

Element #16: Visual Aids

a. Are all visual aids noted on the control plan and available for operators at the workstation?
b. Are the visual standards appropriate for the characteristic being evaluated?
c. Is the product engineer and the receiving AAM plant in agreement with the visual aids being used?

Element #17: Measurement System Analysis

a. Are there gage certifications, Gage R&R, bias, linearity and stability for all new or modified gages?
b. This should also include studies for gages where tolerances have been tightened to ensure they are still acceptable.
c. Are all gages calibrated by an A2LA certified laboratory?
d. Does the supplier have a tracking system to manage the gage calibrations?
e. Were all gages and test equipment calibrated and have an acceptable Gage Repeatability and Reproducibility (GR&R) study performed in accordance to the Automotive Industry Action Group (AIAG) Measurement Systems Analysis (MSA) Manual?

Element #18: Sub-Supplier PPAP

a. Has the supplier approved the PSW for each of the sub-supplied components?
b. Have any of the sub-suppliers had capability issues that need to be addressed?
c. For tiered sources, does the revision level at the time of submission and PPAP parts meet all customer engineering design records and specification requirements?
d. Do any of the sub-suppliers require CQI audits and have they passed?

Element #19: Dimensional Results

a. Ballooned Drawing and dimensional report for each feature on the drawing. These balloons should match the features from the drawing that was used in the Technical Review with the Agree/Disagree matrix. If required, an Appearance Approval Report is to be submitted.
b. Do the PPAP parts meet all customer engineering design records and specification requirements and production parts are manufactured at the production site using production tooling, gauging, process, materials, operators, environment and process settings?
c. Parts used for the 6-piece dimensional results must come from a significant production run, which can run from 1 hour to 8 hours with the specific production quantity to total a minimum of 300 pieces, unless otherwise specified by AAM.

Element #20: Material Certifications

a. Are all material performance results documented and meet the requirements?
b. Do all raw materials have certifications and meet the material requirements?
c. Are laboratory certifications provided?

Element #21: Shipping/Packaging

a. Verify the AAM packaging form is attached and signed by the appropriate supplier and AAM plant associates.
b. Verify there are provisions for expendable packaging if returnable containers are unavailable?
c. A sample label should be uploaded.

Element #22: Capability Studies

a. Do the capability studies have information on how each study was conducted?
b. Were capability studies completed for each Customer Interface Point, Special Product Characteristic and any other characteristics requested by AAM and/or deemed a key feature by the supplier as they are critical to their internal processing? (All dimensions need to prove capability)
c. Does supplier demonstrate the required level of capability for each study completed?

Element #11: Process Control Plan

a. Is the control plan created in the correct AIAG format?
b. Are all Customer Interface Points and Special Product Characteristics identified and are the related controls appropriate?
c. Does the control plan describe every operation of the manufacturing process including but not limited to the following: material receiving, material handling and storage, in-process operations, testing, inspections, rework / repair, and shipping?
d. Are all process and product control parameters documented (sample sizes, frequency of inspection, acceptance criteria, etc.)?
e. Are all reaction plans identified?
f. Are all related actions from applicable material specifications captured appropriately?

Element #24: DVP&R

a. The Plan (element #6) and Results (element #24) should be loaded separately.
b. For supplier-initiated changes, verify there is an approved AAM change document with all related and required approvals.
c. Have any planned tests, methods and/or quantities deviated from the Plan (element #6)?
d. Was testing successfully completed on all planned test samples?
e. Were test samples taken from PPAP run?

Special Topics: APQP People Readiness

a. Has the Supplier's HR Manager completed the hiring launch curve?
b. Have items rated green been randomly selected to review completion evidence to support the Green ratings?
c. Have the next steps for any Yellow or Red items been reviewed?
d. If the Overall Rating or High Impact Rating is rated red, have the items been escalated to the appropriate teams?

Special Topic: Run at Rate Planning

a. Is Supplier able to see forecast in R12 and receiving pulls for material?
b. Review Run-at-Rate input requirements to be in place for the production stream, including operation instructions and personnel training to support Full PPAP on time?
c. Ensure all gages (including sub-assembly gages) are tagged / labeled, calibrated and identified on the Control Plan. Verify gage calibration records and condition of gages.
d. Ensure the Pre-Launch Control Plan is planned to be used during the Full PPAP run?
e. What is the expected number of parts produced in a defined period of time?
f. Are "Bottle Neck" operations identified?
g. Will the run at rate parts be used to qualify for Full PPAP, including Gage Repeatability & Reproducibility (R&R)?
h. Are capability requirements determined for Special Product Characteristics (AC, CC, SC and CIP)?

Six Sigma Statistical Control

For product characteristics identified on AAM product drawings as AC, CC, or SC, the following inspection Cadence and Process Capability requirements apply:

Note: These requirements apply to all print dimensions unless otherwise noted on the drawing.				
AAM Symbol	AC	CC	SC	Standard
Symbol Name	Attribute Characteristic	Controlled Characteristic	Safety Characteristic	Not labeled
Inspection Cadence	100%	Stated Regular Interval	Stated Regular Interval	Control Plan Interval
Initial Process Capability Target	None	Ppk >= 1.33	Ppk >= 1.67	Ppk >= 1.00
Ongoing Process Capability Target	None	Cpk >= 1.33	Cpk >= 1.67	Cpk >= 1.00
Deviation requirements if not capable	None	100% inspection required	100% inspection required	100% inspection required

If during Product / Process development, Supplier believes there will be difficulty meeting the above capability, the Supplier shall immediately notify their Supplier Quality Engineer and develop a plan to assure compliance and/or obtain formal written approval to deviate from the capability requirements.

g. Outputs:

Output	Responsibility
1. Confirm Deliverable status for: • **Element #15** – Operator Instructions • **Element #16** – Visual Aids • **Element #17** – Measurement Systems Analysis • **Element #18** – Sub-Supplier PPAP • **Element #19** – Dimensional Analysis • **Element #20** – Material Certifications • **Element #21** – Shipping / Packaging • **Element #22** – Capability Studies • **Element #11** – Production Control Plan • **Element #24** - Review status of DVP&R results	 Supplier / Site SQE Site SQE Site SQE Site SQE Site SQE Site SQE Site SQE / SCM Site SQE Site SQE Site SQE
2. Update Supplier APQP/PPAP progress as submitted in R12.	Supplier (with cross functional team consensus)
3. Updated Pre-launch Control Plan where applicable.	Supplier / Site SQE
4. Acceptance of any Interim PPAP deviations from the production process parts to support process validation builds.	Supplier / PE
7. Agreement on manufacturing plans in support of Run-at-Rate event.	Supplier (with cross functional team consensus)
8. Update on customer build plans vs. R12 releases.	Supplier
9. Completed Supplier Manufacturing Commodity CP assessment.	Supplier / Site SQE
10. Completed APQP people readiness assessment (Hiring and training plan).	Supplier
11. Review of supplier's sub-tier APQP/PPAP tracking document.	Supplier
12. If required, the SQE updates the SQ[4] Manufacturing Site Assessment per findings.	Site SQE
13. Report for On-site / Virtual Evaluation #3 and updated action register – Load summary document in APQP Element #27.	Supplier / Site SQE
14. Agree on follow up schedule for On-site / Virtual Evaluation #3.	Site SQE

XII. On-site / Virtual Evaluation #4: Verification of Supplier Capacity

a. Purpose:

The purpose of Supplier Engagement On-site / Virtual Evaluation #4 is to verify the supplier's production system including their sub-suppliers can meet the AAM Capacity Requirements and launch ramp-up curve.

b. Timing:

Start:	**At the completion of On-site / Virtual Evaluation #3**
Finish:	**At run at rate**

c. Participants:

Lead: Site SQE

Optional Support: PE, Buyer and SCM are only required if either function has open deliverables

d. Location: Supplier's Manufacturing Facility

e. Quality and Capacity Verification (APQP/PPAP) Deliverables Focus:

On-site / Virtual Evaluation #4 is focused on validating the compliance of Capacity Verification prior to full PPAP. The emphasis is on the 3 PPAP deliverables listed below and all the incomplete deliverables from On-site / Virtual Evaluation #1 and 2. Specifically, this On-site / Virtual evaluation verifies the overall production system's capacity, ensures that the supplier achieves both the launch ramp-up curve and steady on-going production while meeting Phase 3 PPAP requirements and establishes the final process capability from a production process that is stable, normal (or expected distribution) and in control.

Capacity verification or Run @ Rate event should be executed 4 weeks before full PPAP approval date or earlier.

APQP Element #	Deliverable Description	Lead
25	Run at Rate	Site SQE
26	Launch Readiness Review	Site SQE
27	Interim Approval Action Register	Site SQE

f. Agenda

Agenda Item:	AAM and Supplier Leads:
1. Introduction of key team members.	Site SQE
2. Review previous Open Issues.	Supplier
3. Review Supplier APQP/PPAP Progress as submitted in R12.	Supplier
4. Review Capacity Analysis Report submission.	Supplier / Site SQE
5. Conduct review of manufacturing facility to verify key constraints and evidence of AAM capacity support.	Supplier / Site SQE
6. Confirm that the final process capability is established.	All
7. Review Supplier Manufacturing Commodity Control Plan Audit and ensure that any non-compliance has been addressed.	Supplier / Site SQE
8. Review Supplier's APQP people readiness assessment.	Supplier / Site SQE
9. Verify personnel hiring and training to cover for all shifts/operating pattern.	Supplier / Site SQE
10. Review Supplier's sub-tier APQP/PPAP tracking document.	Supplier
11. Review capacity verification of all sub-components (Internal and External).	Supplier / Site SQE
12. Review final PPAP Full Submission.	Site SQE
13. Review Supplier SQ^4 score and note progress.	Supplier / Site SQE
14. Update/Add Action Register for On-site / Virtual Evaluation #4 with open issues, action plans, assigned responsibilities and timing for each issue.	Supplier / Site SQE
15. Agree on follow-up evaluation schedule, if required.	Site SQE

g. Key Areas of Focus:

The following key areas should be focused on during On-site / Virtual Evaluation #4. Questions/actions listed below should serve as a starting point for key review areas. They are not, however, intended to be all inclusive for On-site / Virtual Evaluation #4 deliverables/expectations:

Element #25: Run at Rate

a. Has the supplier correctly filled in all sections of the CAR with correct AAM volume information?
b. Are shared/allocated equipment properly quantified on the Run at Rate form?
c. Was the original plan for the actual run at rate to be completed after the PPAP run and PPAP submission or during?
d. Is any surrogate data being used for any operations?
e. Verify supplier's evidence that all sub-suppliers are capable to achieve AAM capacity.
f. Are all personnel (Salary, Direct and Indirect Labor) hired and trained to support Phased PPAP, including Run-at-Rate event(s)?
g. Has the supplier demonstrated capability using mass production parts from all production streams and from a production process that is stable, normal (or expected distribution) and in control and meeting the standard operating pattern (5 days for LCR and 6 days for MCR)?

Element #26: Launch Readiness

a. Have all issues/concerns been addressed in the FMEA and Control Plan? Have all action plans implemented and proven to be effective?
b. Has the launch readiness checklist been completed and confirmed to have no open items?

Element #27: Interim PPAP Action List

a. Have all Full PPAP exceptions been closed out prior to the planned full PPAP date?

h. Outputs:

Output	Responsibility
1. Confirm Deliverable status for: • Element #25 – Run at Rate • Element #26 – Launch Readiness Review • Element #27 – Interim Approval Action Register	 Site SQE Site SQE Site SQE
2. Update Supplier APQP/PPAP progress as submitted in R12.	Supplier (with cross functional team consensus)
3. Confirmation that the final process capability is established.	Supplier / Site SQE
4. Interim Approved PPAP for Full Submission to AAM Plant.	Site SQE/PE
5. "Green" Rated Supplier Commodity Control Plan Audit and updated Production Control Plan as required.	Supplier / Site SQE
6. Completed APQP people readiness assessment.	Supplier
7. Personnel (Salary, Direct and Indirect) hired and trained for all shifts.	Supplier / Site SQE
8. Review supplier's sub-tier APQP/PPAP tracking document.	Supplier
9. If required, the SQE updates the SQ[4] Manufacturing Site Assessment per findings.	Site SQE
10. Report for On-site / Virtual Evaluation #4 and updated action register – Load Summary Document in APQP Element #27.	Supplier / Site SQE
11. If required, agreed upon timing for any follow up On-site / Virtual meetings.	Site SQE
12. Agree to a Launch Ramp-up plan, if interim PPAP not achieved by Gate 4.	Supplier / Site SQE

XIII. Program Reporting Processes

As described in the Process Overview, reporting within the AAM Supplier Launch Manual Process will center on 3 key documents. The below captured images are displayed to show the inherent relationship that exists between the different tracking documents.

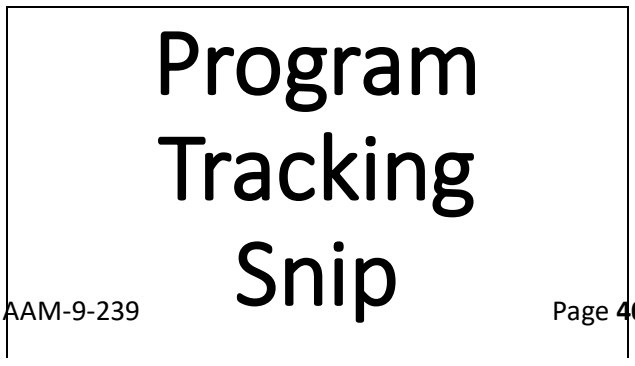
eAPQP Schedule A

External Supplier APQP/PPAP Readiness – Deliverable Action Register

Schedule B

External Supplier APQP/PPAP Readiness – SUPPLIER SCORECARD

Schedule C



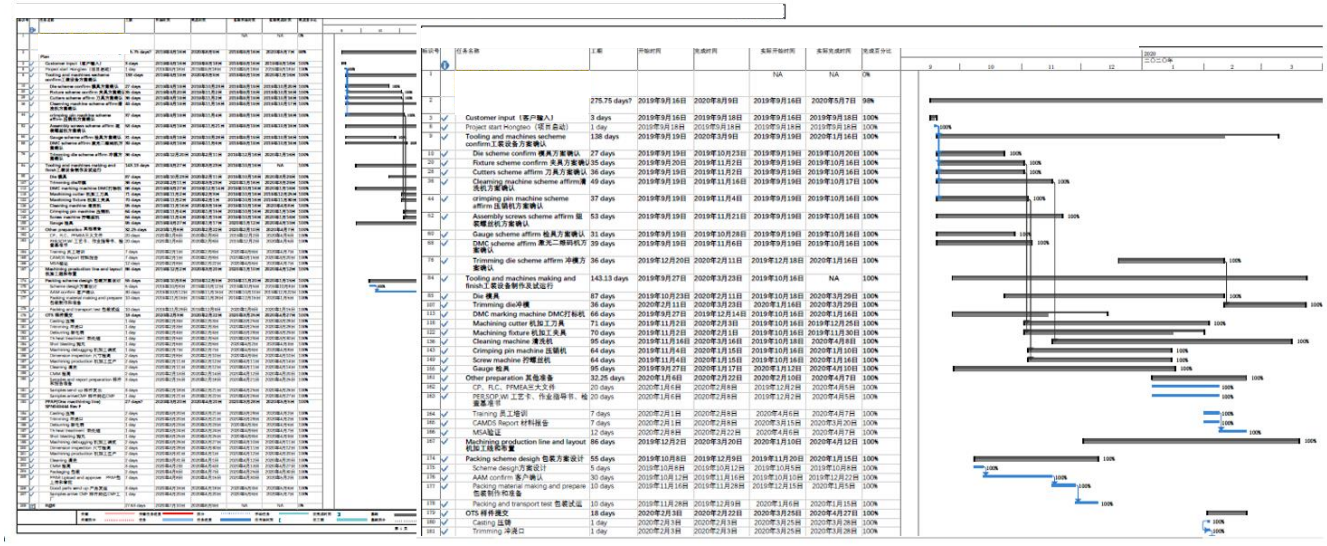
APPENDIX A: ELEMENT EXAMPLES

Element #1

Supplier Timing

(Should Include Supplier Timing for Industrialization overlayed against AAM Program Timing Milestones)

SQE weekly review following items by timing line from Kicked off until PPAPed.



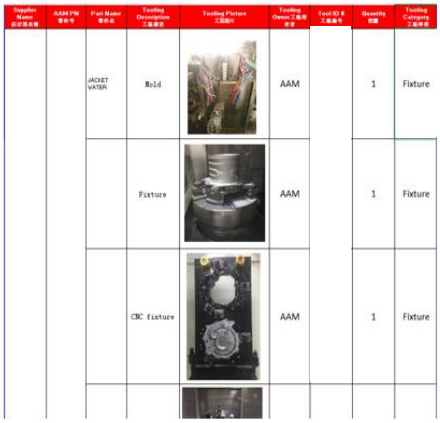
APPENDIX A: ELEMENT EXAMPLES

Element #2

Fixtures/Tools and Gages

(The supplier should provide a detailed account of what they expect to be required to manage/control their process)

All production tooling/machine/gauge are listed with pictures.



Supplier Name	AAM PN	Part Name	Tooling Description	Tooling Picture	Tooling Owner	Tool ID #	Quantity	Tooling Category
		JACKET WATER	Mold		AAM		1	Fixture
			Fixture		AAM		1	Fixture
			CNC fixture		AAM		1	Fixture

			CNC fixture		AAM		1	Fixture
			Lathe fixture		AAM		1	Fixture
			Leakage test fixture		AAM		1	Fixture
			Function gage		AAM		1	Gage
			Air gage		AAM		1	Gage

			Air gage		AAM		1	Gage
			Air gage		AAM		1	Gage
			Air gage		AAM		1	Gage
			Air gage		AAM		1	Gage
			Go-nogo gage		AAM		1	Gage
			Go-nogo gage		AAM		1	Gage
			Go-nogo gage		AAM		1	Gage
			Go-nogo gage		AAM		1	Gage

APPENDIX A: ELEMENT EXAMPLES

Element #3

Supply Chain Map

(The supplier should provide a detailed list of their BOM, sub-suppliers, locations, etc.)

APQP - SUPPLY CHAIN MAP

Part Description:
Supplier Name:
PPAP #:
Revision Date:

Product Structure					Supplier Feature					Manufacturing Feature				Product Feature		General Info	
					Manufacturing Plant				Business Experience		Plant/Process/Line		Method / Technology				
							Location										
Tier 1	Tier 2	Tier 3	Tier 4	Tier 5...N	Supplier Name	Plant Name	Address	State, City Country	New for the Tier N supplier	Lead Time	New for the supplier	*	New for the supplier	*	New commodity for Tier1	Sub-Supplier Risk Assessment	Contact Info	ISO/TS Certification
OIL PRESSURE TRANSDUCER									N	4w	N		N		N	N		Y
	HTV POTTING SPEC	105328-1							Y	5w	N		N		N	N		Y
	SQUARE CSE PACKARD BASE	79520-4							Y	8w	N		N		N	N		Y
	SOLDER	73942-9							N	5w	N		N		N	N		Y
	FLEX CIRCUIT ADHESIVE, LORD	76489-1							N	5w	N		N		N	N		Y
	EDGE CLIP (LEAD-FREE)	39462-22							N	5w	N		N		N	N		Y
	AP2 INTERNAL O-RING, STANDARD	106989-4							Y	8w	N		N		N	N		Y
	DIA & SUBSTRATE ASM								Y	2w	N		N		N	N		Y
		LAPPED CERAMIC SUBSTRATE	29667-4						N	8w	N		N		N	N		Y
		GOLD METALIZATION	74095-1						N	8w	N		N		N	N		Y
		LAPPED CERAMIC DIAPHRAGM	29356-5						N	8w	N		N		N	N		Y
	ALUMINUM HEXPORT								Y	4w	N		N		N	N		Y
		EXTRUDED ALUMINUM	1270-44-250						Y	5w	N		N		N	N		Y
	BASE COVER PPA	T-604934-01							Y	10w	N		N		N	N		Y
	THREAD SEALANT	76005-1							N	5w	N		N		N	N		Y
	ELECTRONICS MODULE	106733-2							Y	15w	N		N		N	N		Y

APPENDIX A: ELEMENT EXAMPLES

Element #4

Tiered Risk Assessment

(The supplier should provide an assessment of their sub-supplier risk, the AAM or comparable format can be used.)

Supplier Risk Assessment

Grading Criteria — Part Criticality (columns 1–5), Site Readiness (columns 6–10), Program Induced Risk (columns 11–14)

Score	Part Criticality					Site Readiness					Program Induced Risk			
0	It is not a pass-through component	The supplier is considered one of the best in the industry and a subject matter expert.	All items in DFMEA are rated severity below 6	The component has none of either pass through characteristics or customer interface characteristics to the end customer.	There have been no concerns or issues discovered during the Technical Review.	SQ4 Score from 90% to 100%	Supplier has an exemplary quality record with AAM.	No financial risk	The supplier follows APQP and PPAP process with its sub-suppliers and has a well established continuous performance monitoring.	The supplier has no issues with standardized engineering practices.	Supplier will have no problems meeting capacity demand, with existing equipment dedicated to AAM. With LCR at 5 days.	The supplier has reported no recent organizational or leadership changes.	The launch timing has not been compressed or reduced since the submission of the quote from the supplier AND its supporting program milestones.	There were no launch problems, unsuccessful launches or launch development issues with the supplier. Supplier poses very little risk to AAM.
1		The part or process is a core business of the supplier. The supplier is an industry known, subject expert of part or process. The part is from an accredited supplier with an effective history with AAM.	DFMEA includes items rated highest severity 6 and/or 7	The component has only one of either pass through characteristics or customer interface characteristics to the end customer.	There were concerns or issues discovered during the Technical Review and have already been closed.	SQ4 Score from 70% to 90%	Supplier is not part of 9MR or 12MR BUT has open PRRs opened more than 30 days in the system.		The supplier has a COMPLETE PPAP process BUT does not monitors its supplier base performance.	The supplier has a system BUT has no formal defined review frequency in place	Supplier accepted PPAP volume which will require new equipment or ramp-up plan	The supplier has reported Quality Engineer change (SQE counterpart).	The launch timing has been compressed by >2 CWs or reduced since the submission of the quote from the supplier.	There was a delay in AAM program timing but SOP was not delayed.
2		The part is from a capable supplier with limited history with AAM. The part or process is similar to other operations within organization. The supplier has a basic understanding for manufacturing the part.	DFMEA includes items rated highest severity 7 and/or 8	The component has MORE than one of either pass through characteristics OR customer interface characteristics to the end customer.	There have been concerns or issues discovered during the Technical Review BUT there is an action plan to resolve them.	SQ4 Score from 50% to 70%	The supplier is part of the 9MR TOPWORST regional suppliers.	Is the supplier at the moment at risk of withholding payment to their sub supplier or work force?	The supplier has a limited PPAP process (collect only coversheets from suppliers) and does not track sub-supplier performance.	The supplier does have a system in place for standardized engineering practices BUT AAM has evidence of the system not being followed.	Supplier will have staged capacity (additional tooling investments will be required on the future)	The supplier has reported Quality Manager change.	The launch timing has been moderately compressed and the supplier timing is less than 2 CWs before program milestones (Gate 4 & 5)	There was a delay in AAM SOP.
3	It is a pass-through component	This is a new supplier, part or process for supplier. The supplier lacks understanding / is entering a new domain of manufacturing for either part or process.	DFMEA includes items rated highest severity 9 and/or 10.	The component has MORE than one several pass through characteristics AND customer interface characteristics to the end customer.	There have been concerns or issues discovered during the Technical Review AND there is no action plan to resolve them.	SQ4 Score from 0% to 50%	The supplier is part of the 12MR TOPWORST regional suppliers	Is the supplier currently in bankruptcy ("chapter 11")?	The supplier does not engage in PPAP process with their sub suppliers and performance is not monitored.	The supplier does not utilize standardized engineering practices (CP, PFMEA Program management, change tracking..)	Supplier does not have a plan to meet current program volumes.	The supplier has Plant Manager change.	The launch timing has been significantly compressed and the supplier timing do not support program milestones (Gate 4 & 5)	There was a delay in customer SOP.

SQE Minimum Follow-up Requirements

Priority	Overall Weighted Score Scale	Requirement
Priority - 4	0 - 30	A Priority-4 rating requires the SQE team to perform at least 1 on-site review for the Kick-off meeting. A Self-Assessment Review is also required prior to Interim PPAP.
Priority - 3	31 - 50	A Priority-3 rating requires the SQE team to perform at least 2 on-site reviews including the Kick-off meeting. After Kick-off, the only on-site Review is required at Interim PPAP. The reviews must include evaluation to close the Risk Assessment action register (AAM-9F-236-2).
Priority - 2	51 - 70	A Priority-2 rating requires the SQE team to perform at least 3 on-site reviews including the Kick-off meeting, at Interim PPAP approval and 2 weeks after interim PPAP approval for capacity run-at-rate. The reviews must include evaluation to close the Risk Assessment action register (AAM-9F-236-2).
Priority - 1	71 - 87	A Priority-1 rating requires the SQE team to perform at least 4 on-site reviews. The on-site evaluations are within 2 weeks of the kick-off, 6 weeks prior to Interim PPAP approval, at Interim PPAP approval and 2 weeks after interim PPAP approval for capacity run-at-rate. The reviews must include evaluations to close the Risk Assessment action register (AAM-9F-236-2).

Risk Factor Drivers

PART NAME	PART NUMBER	[1] * Is the component a pass-through component? Shipped directly in its purchase form from supplier to customer or supplied through AAM to customer.	[2] Is this a new technology for the supplier or is the supplier new to the auto industry? Is this a new supplier to AAM	[3] * Is this a complex component and severity of failure rated high in DFMEA?	[4] Does the component have any pass through characteristics or Customer Interface characteristics to the end customer?	[5] Did AAM SQE find any major concerns during the Technical Review?	[6] Please evaluate the supplier performance and evaluate the right classification	[7] * Please evaluate the supplier performance and evaluate the right classification
	Weight Factors:	3	2	3	2	2	2	3
Widget	777-AB							
Widget	777-AB							

PART NAME	PART NUMBER	[8] * Does the supplier site have stability? Does the supplier area have stability? Does the supplier have any labor issues or supply chain issues?	[9] Does the supplier have an effective process and organization to manage their tier/sub suppliers?	[10] Does the supplier have any engineering related issues with PFMEA reviews, Control Plan reviews, Program Management or Change tracking as examples.	[11] Does supplier have issues meeting capacity demand? Does supplier have to purchase new equipment to meet the program volume requirements per contractual obligations.	[12] Has the supplier reported any recent organizational or leadership changes within last 12 months? Does the supplier have a robust management organizational structure including SQE, Prog mgmt., etc.?	[13] Has the Launch timing been compressed or reduced since the submission of the quote from the supplier.	[14] Are there any historical launch problems, unsuccessful launches or launch development issues with the supplier? Is the supplier launching multiple programs at the same time.	Overall Weighted Score	Grade	SQE	Assessment Date
	Weight Factors:	3	2	1	2	1	2	1				
Widget	777-AB											
Widget	777-AB											

APPENDIX A: ELEMENT EXAMPLES

Element #5

Supply Chain Map

(On a supplier “black/grey box” design, the supplier should review DFMEA with SQE/PE. On a AAM design, the PE should review the DFMEA with the supplier for all characteristics necessary to be translated to a PFMEA and into a Control Plan.)

Only if the supplier owns the design and it can be shared.

FMEA Forms Editor AIAG (4th edition, D): Capacitive Sense Element (CSE) (AAM Torque Traction Device (TTD) Pressure Sensor [Design])

Function	Requirement	Potential failure	Potential effect(s) of failure	S	C	Potential cause(s) of failure	Current preventive action	O	Current detection action	D	RPN	Recommended action	R/D
Function	Requirement	Potential failure	Potential effect(s) of failure	S	C	Potential cause(s) of failure	Current preventive action	O	Current detection action	D	RPN	Recommended action	R/D
System element: Capacitive Sense Element (CSE)													
CSE Provides repeatable capacitance change with applied pressure over temperature & humidity without hystresis		CSE does not provide repeatable capacitance change with applied pressure over temperature & humidity without hystresis	[Torque Transmission Device (TTD) Sensor] <Converts pressure of LHM+ and 70W-80 fluid in clutch housing to a voltage signal> Sensor output error > USL	7		[CSE Materials] <CSE Material is robust to LHM+ and 70W-80> CSE is not robust to LHM+ and 70W-80	Industry experience; Samples used on test vehicles with LHM+ and 70W-80 for over a year	2	Durability Testing per AAM Specification	4	64	No further revision planned	
						[CSE Dimensions] <CSE has appropirate diaphragm thick-	Industry experience; Used in other automotive applications	2	Material Compatibility testing per AAM Specification	3	48	No further revision planned	
			[Torque Transmission Device (TTD) Sensor]	8			APT CSE		Durability Test				

APPENDIX A: ELEMENT EXAMPLES

Element #6

DVP

(On a supplier “black/grey box” design, the supplier should review results from DVP with SQE/PE. On a AAM design, the PE should review the DVP with SQE, but may/may not have a need to review with the supplier)

Only if the supplier owns the design and it can be share.

DEVELOPMENT VERIFICATION PLAN AND REPORT			PVP NUMBER:	N/A	DEPT	
			PLAN DATE	1/3/17	PLAN ORIGINATOR	
	UPG NO	N/A	CONCURRENCE	TBD	MANAGER APPVL	
	SOURCE	N/A	REPORT DATE	TBD	REPORTING ENGR	

	TEST PLAN								TEST REPORT				
				SAMPLES		TIMING			SAMPLES TESTED				
ITEM NO.	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TEST STAGE	QTY	TYPE	DURATION (DAYS)	START	COMPL	QTY	TYPE	PHASE	ACTUAL RESULTS	NOTES
Leg 0: Seal Compatibility													
0.1	Seal Compatibility	Output in specifcation per customer drawing	PV	-	E	42	01/03/17		-	E	PV		Test per as specified in RP2018021404
Leg 1: Thermal Shock and Thermal Cycle Endurance													
1.1	Transfer Function	Output in specifcation per section 9.4	PV	A = 16 C = 4	D	2	05/19/17		A = 16 C = 4	D	PV		
1.2	(CS i3.5)	Performs as designed during and after test. Meets all functional requirements before and after test.	PV	A = 16 C = 4	D	9	05/23/17		A = 16 C = 4	D	PV		
1.3	Transfer Function	Output in specifcation per section 9.4	PV	A = 16 C = 4	D	2	06/09/17		A = 16 C = 4	D	PV		
1.4	Pow (C	Performs as designed during and after test. Meets all functional requirements before and after test.	PV	A = 16 C = 4	D	32	07/10/17		A = 16 C = 4	D	PV		
1.5	Transfer Function	Output in specifcation per section 9.4	PV	A = 16 C = 4	D	2	08/21/17		A = 16 C = 4	D	PV		
Leg 2: High Temperature Operating Endurance													
2.1	Transfer Function	Output in specifcation per section 9.4	PV	A = 16 C = 4	D	2	05/19/17		A = 16 C = 4	D	PV		
2.2		Performs as designed during and after test. Meets all functional requirements before and after test.	PV	A = 16 C = 4	D	40	07/17/17		A = 16 C = 4	D	PV		

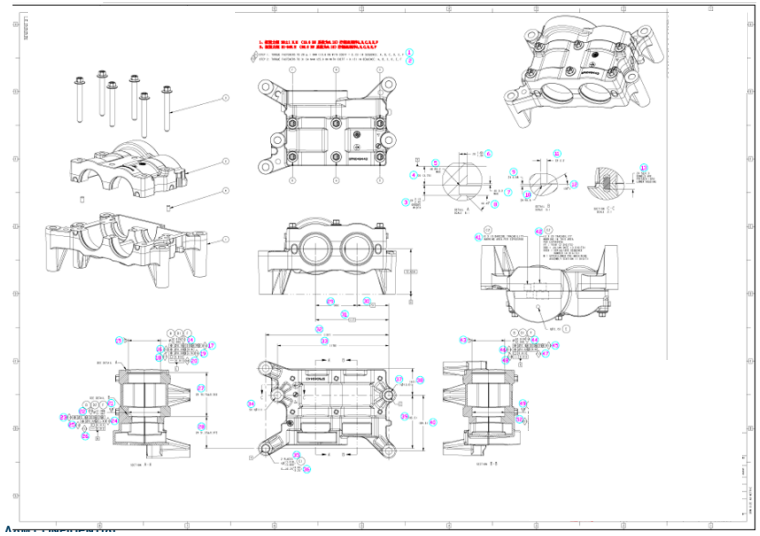
APPENDIX A: ELEMENT EXAMPLES

Element #7

Design Record

(SQE/Supplier need to review the PE Print and all Revisions to assure the latest print is being used/maintained along with the design record)

Includes balloon print and agreed A/D matrix for full dimensions .



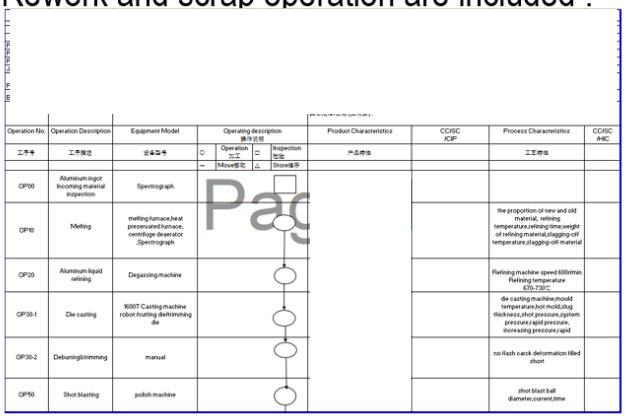
APPENDIX A: ELEMENT EXAMPLES

Element #8

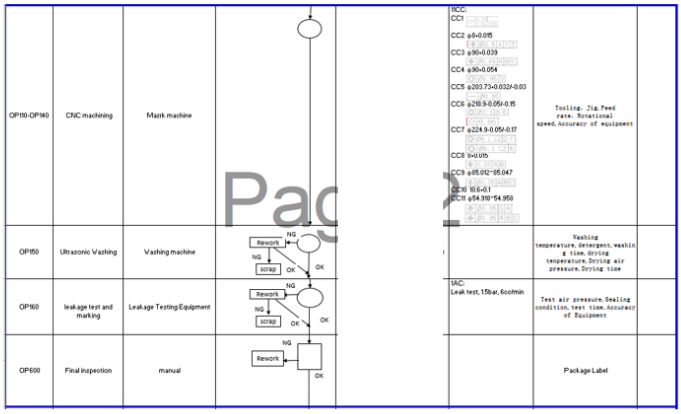
Process Flow

(The supplier should review the process production flow and understand in detail each operation)

All operations are included ;
Critical characteristic is defined by print, critical process is defined by supplier internally;
Rework and scrap operation are included .



Operation No.	Operation Description	Equipment Model	Operating description	Product Characteristics	CC/SC ICIP	Process Characteristics	CC/SC AHC
OP00	Aluminum ingot Incoming material inspection	Spectrograph					
OP10	Melting	melting furnace,heat preservated furnace, centrifuge deaerator ,Spectrograph				the proportion of new and old material, refining temperature,refining time,weight of refining material,slagging-off temperature,slagging-off material	
OP20	Aluminum liquid refining	Degassing machine				Refining machine speed 600r/min Refining temperature 670-730℃	
OP30-1	Die casting	1600T Casting machine robot /cutting deHrimming die				die casting machine,mould temperature,hot mold,slug thickness,shot pressure,ngitem pressure,rapid pressure, increasing pressure,rapid	
OP30-2	Deburring&trimming	manual				no flash carck deformation filled short	
OP50	Shot blasting	polish machine				shot blast ball diameter,current,time	



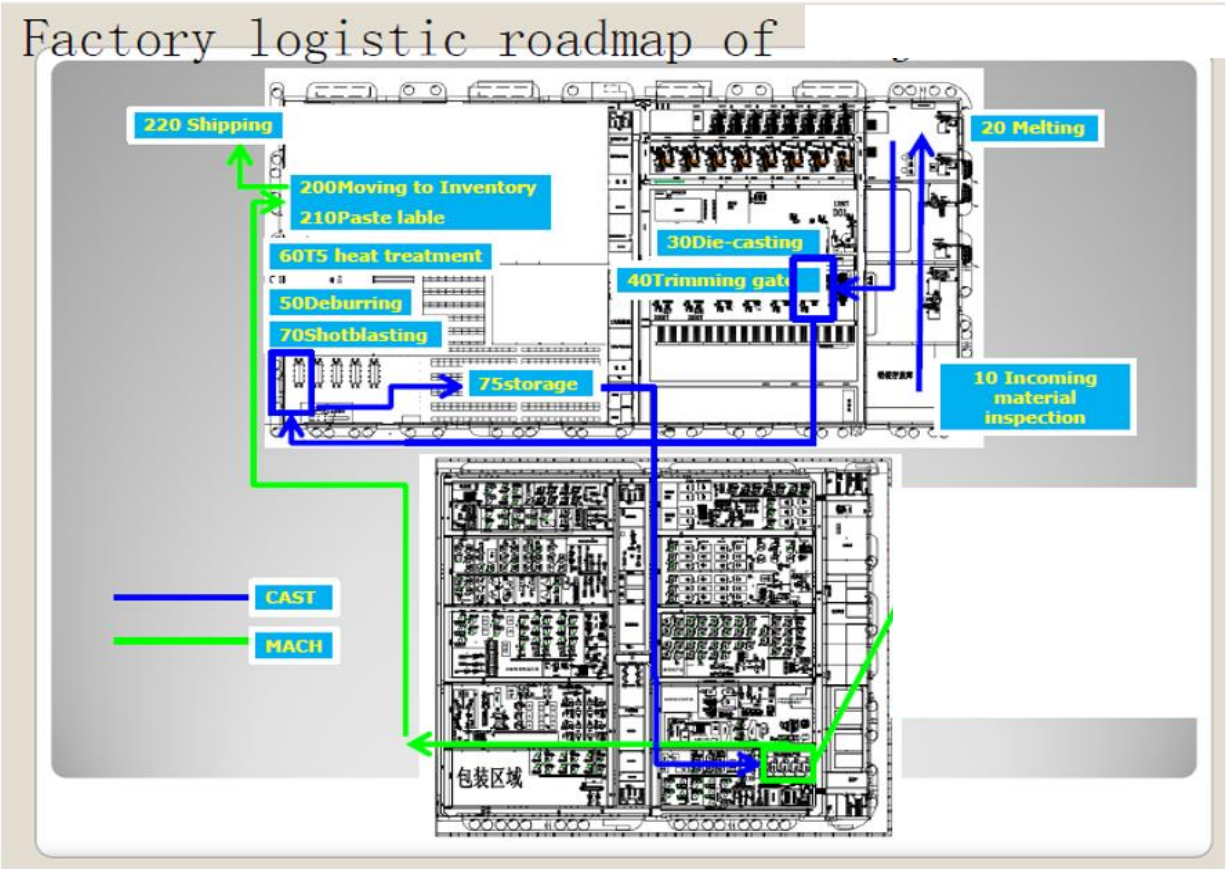
OP110-OP140	CNC machining	Mazak machine		IICC: CC1 CC2 φ8+0.015 CC3 φ90+0.029 CC4 φ90+0.054 CC5 φ203.73+0.032/-0.03 CC6 φ218.9-0.05/-0.15 CC7 φ224.9-0.05/-0.17 CC8 φ0.015 CC9 φ85.012~85.047 CC10 10.6+0.1 CC11 φ54.910~54.950	Tooling, Jig, Feed rate, Rotational speed, Accuracy of equipment
OP150	Ultrasonic Vashing	Vashing machine	Rework NG NG scrap OK OK		Vashing temperature, detergent, washing time, drying temperature, Drying air pressure, Drying time
OP160	leakage test and marking	Leakage Testing Equipment	Rework NG NG scrap OK OK	IAC: Leak test, 15bar, 6ccl/min	Test air pressure, Sealing condition, test time, Accuracy of Equipment
OP600	Final inspection	manual	NG Rework OK		Package Label

APPENDIX A: ELEMENT EXAMPLES

Element #9

Process Layout

(The supplier should provide a process floor layout for the location of each operation and where in the plant it will be setup, as well as logistics for material flow and delivery and critical area such as labs, CMM rooms, etc.)



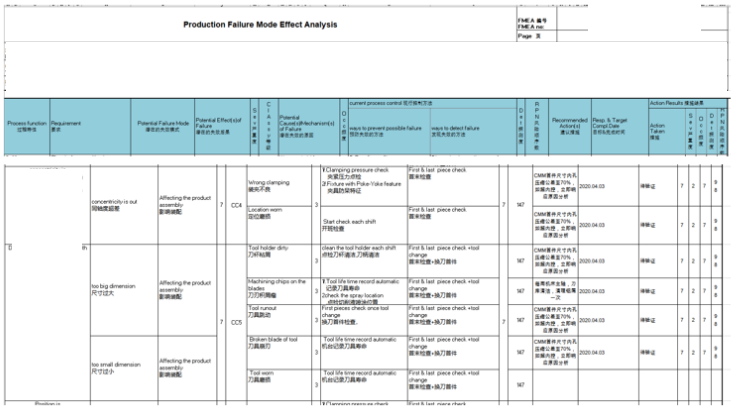
APPENDIX A: ELEMENT EXAMPLES

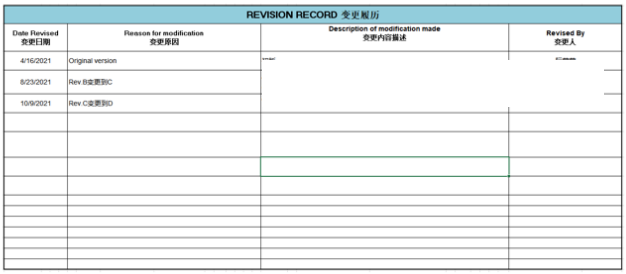
Element #10

PFMEA

(The supplier should provide a Process Failure Mode Effect Analysis “PFMEA” and review how they captured the high RPN’s from the DFMEA and established controls in the process to manage those risks.)

RPN score by AIAG. RPN reduction plan and action is verified.
Revision record is necessary.





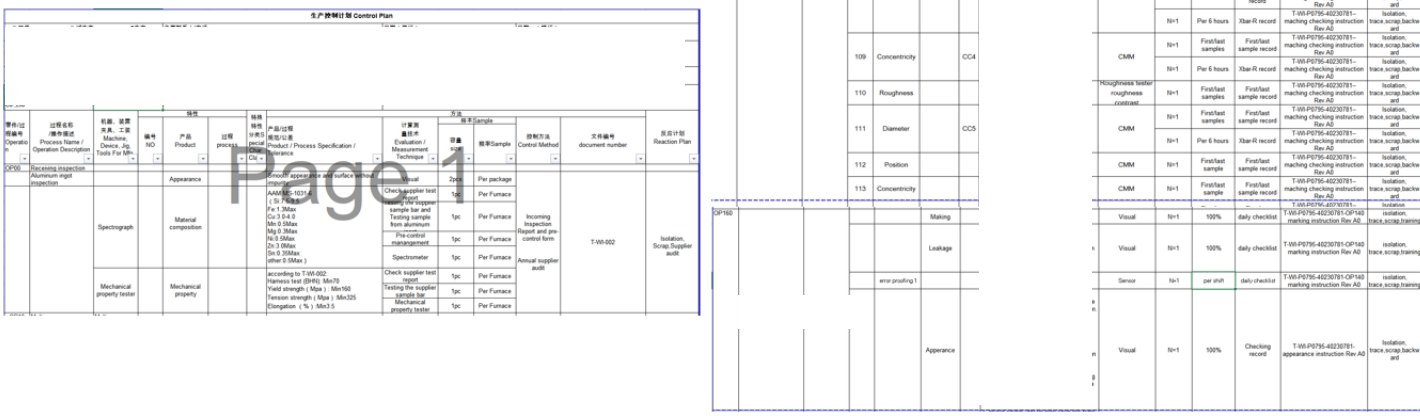
APPENDIX A: ELEMENT EXAMPLES

Element #11

Control Plan

(The supplier should provide and review a Dynamic Process Control Plan to establish how they will establish, manage high RPN concerns in the process. The supplier should also review their process for containment of non-conforming parts, management of scrap, and any non-standard work agreed to by SQEs to assure control plan is robust)

Established by PFMEA.



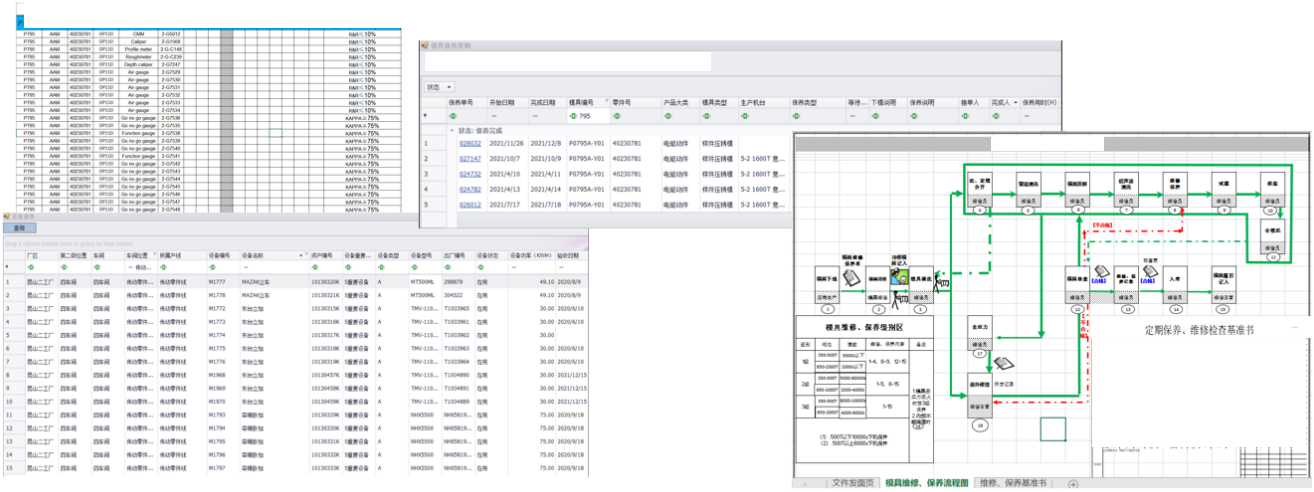
APPENDIX A: ELEMENT EXAMPLES

Element #12

Preventative Maintenance Plan

(The supplier should provide detailed review of their PM plans, critical spares, tooling room, etc.)

Includes production tooling maintains plan / records.

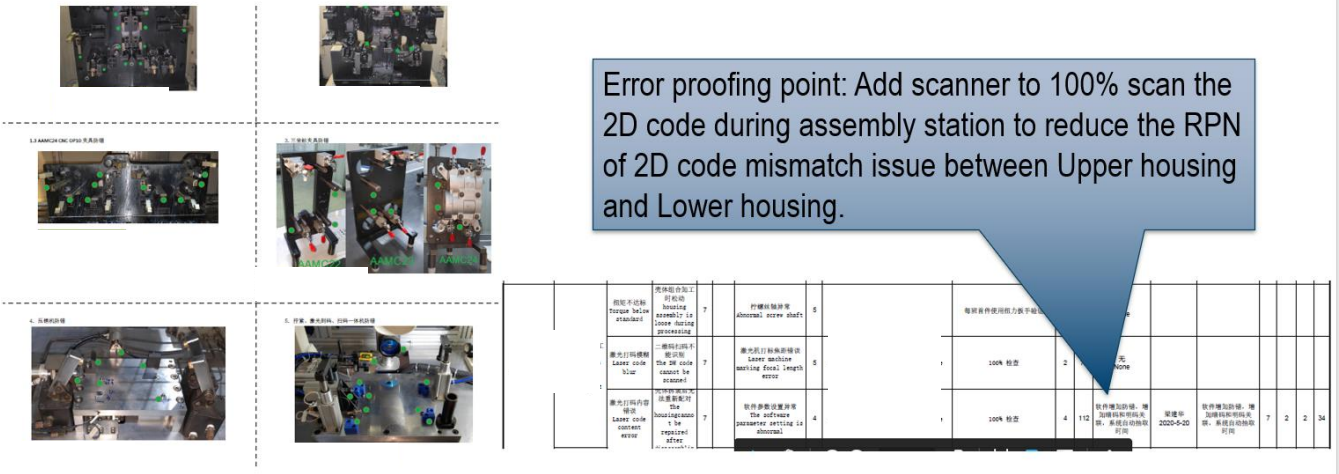


APPENDIX A: ELEMENT EXAMPLES

Element #13

Error Proofing

Error proofing is defined by which high RPN score and lesson learned .



APPENDIX A: ELEMENT EXAMPLES

Element #14

Vision Systems

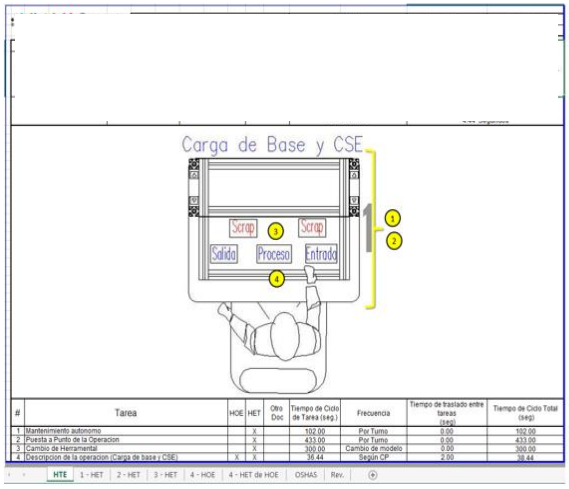
SISTEMA DE VISION.						
N°	Canal	Máquina	Dispositivo	MARCA DISPOSITIVO	Aplicación	Codigo
1	76	ENS-54	CHECKER 4G7	COGNEX		PKY 39
2			ISM 1100	COGNEX		PKY 38
3			ISM 1100	COGNEX		PKY 37
4	53-A	IDENT-02	821-0036-1R	COGNEX		
5		ENS-35	IS5100-00	COGNEX		PKY 14
6			IN-SIGHT 2000	COGNEX		PKY 12
7	53	IDENT. SLEEVE	CA-200M	KEYENCE		
8			CA-035C	KEYENCE		
9		IDENT-15	IN-SIGHT 2000	COGNEX		
10		ENS-13	ISM 1403	COGNEX		PYK 09
11			IN-SIGHT 7010C	COGNEX		PKY 04
12			IN-SIGHT 8000	COGNEX		PKY 08

APPENDIX A: ELEMENT EXAMPLES

Element #15

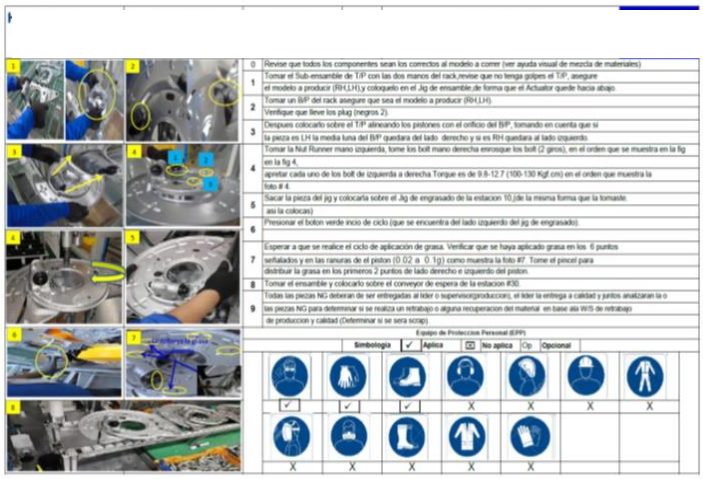
Operator Instructions

(Supplier should review Operating Instructions, critical to quality call outs, safety call outs, posting locations, etc.)



#	Tarea	HOE	HET	Otro Doc	Tiempo de Ciclo de Tarea (seg.)	Frecuencia	Tiempo de traslado entre tareas (seg)	Tiempo de Ciclo Total (seg)
1	Mantenimiento autonomo		X		102.00	Por Turno	0.00	102.00
2	Puesta a Punto de la Operacion		X		433.00	Por Turno	0.00	433.00
3	Cambio de Herramental		X		300.00	Cambio de modelo	0.00	300.00
4	Descripcion de la operacion (Carga de base y CSE)	X	X		38.44	Según OP	2.00	38.44

HTE | 1 - HET | 2 - HET | 3 - HET | 4 - HOE | 4 - HET de HOE | OSHAS | Rev.



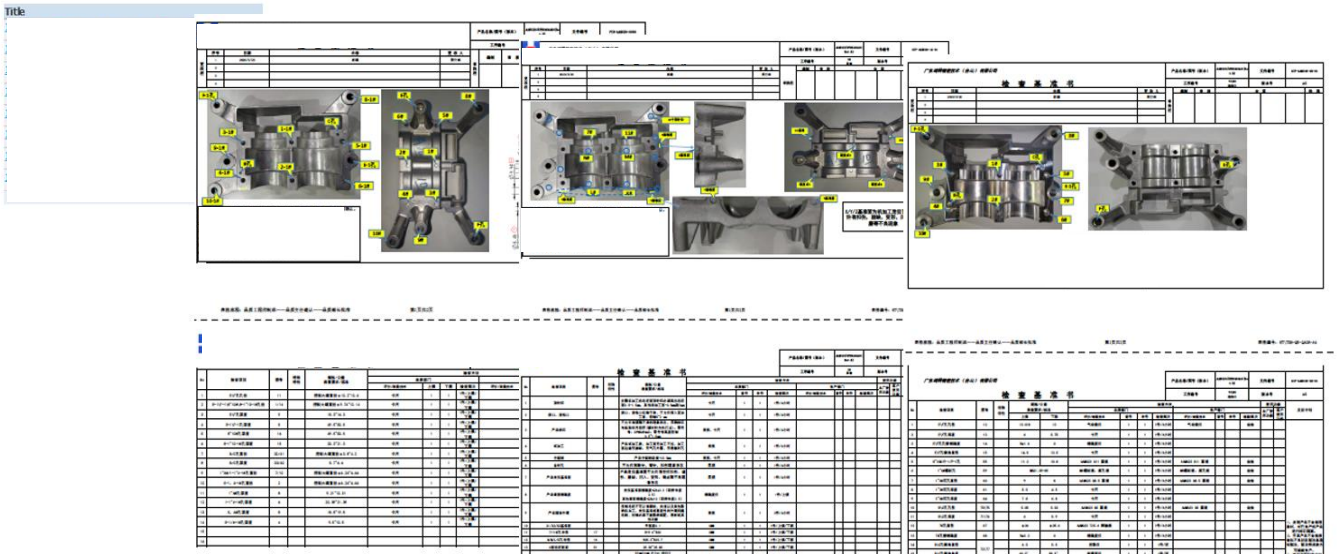
APPENDIX A: ELEMENT EXAMPLES

Element #16

Visual Aides

(The supplier should review the location of the visual aides, the content and the accuracy/ease of reading/understanding)

document of inspection standard reference book.



APPENDIX A: ELEMENT EXAMPLES

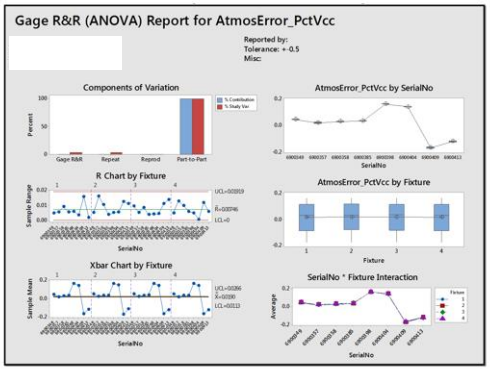
Element #17

MSA

(A complete MSA should be completed and reviewed/agreed to by the SQE).

MSA for all the gauges

% Tolerance or % Study Variance	% Contribution	System is...
10% or less	1% or less	Ideal
10% - 20%	1% - 4%	Acceptable
20% - 30%	5% - 9%	Marginal
30% or greater	10% or greater	Poor



Gage R&R

Source	VarComp	%Contribution (of VarComp)	
Total Gage R&R	0.0000198	0.15	Ideal
Repeatability	0.0000193	0.15	
Reproducibility	0.0000004	0.00	
Fixture	0.0000004	0.00	
Part-To-Part	0.0132087	99.85	
Total Variation	0.0132284	100.00	Ideal

Source	StdDev (SD)	Study Var (6 × SD)	%Study Var (%SV)
Total Gage R&R	0.004447	0.026681	3.87
Repeatability	0.004397	0.026382	3.82
Reproducibility	0.000664	0.003987	0.58
Fixture	0.000664	0.003987	0.58
Part-To-Part	0.114929	0.689574	99.93
Total Variation	0.115015	0.690090	100.00

Number of Distinct Categories = 36 Ideal

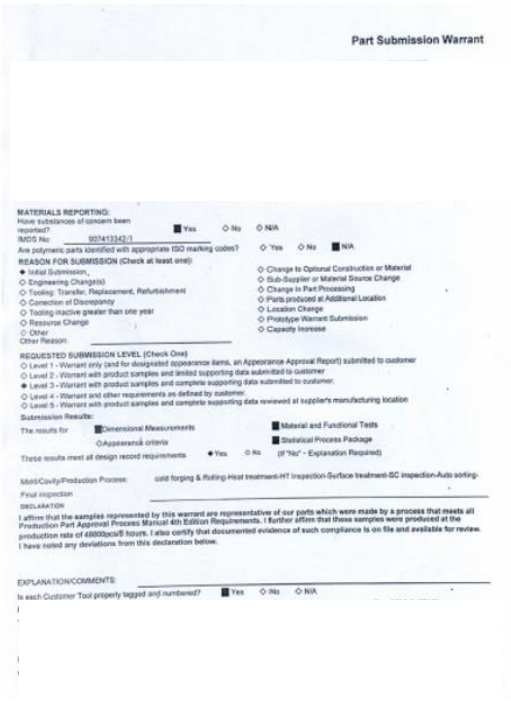
APPENDIX A: ELEMENT EXAMPLES

Element #18

Sub-Supplier PPAPs

(Supplier should provide completed PPAP evidence for all Sub-Suppliers listed in the Supply Chain Document).

Signed PSW for sub-supplier of Bolt and Dowel Pin.



Part Submission Warrant

MATERIALS REPORTING:
Have substances of concern been reported? ■ Yes ◇ No ◇ N/A
IMDS No: 907413342/1
Are polymeric parts identified with appropriate ISO marking codes? ◇ Yes ◇ No ■ N/A
REASON FOR SUBMISSION (Check at least one):
◆ Initial Submission
◇ Engineering Change(s)
◇ Tooling: Transfer, Replacement, Refurbishment
◇ Correction of Discrepancy
◇ Tooling inactive greater than one year
◇ Resource Change
◇ Other
Other Reason:
◇ Change to Optional Construction or Material
◇ Sub-Supplier or Material Source Change
◇ Change in Part Processing
◇ Parts produced at Additional Location
◇ Location Change
◇ Prototype Warrant Submission
◇ Capacity Increase

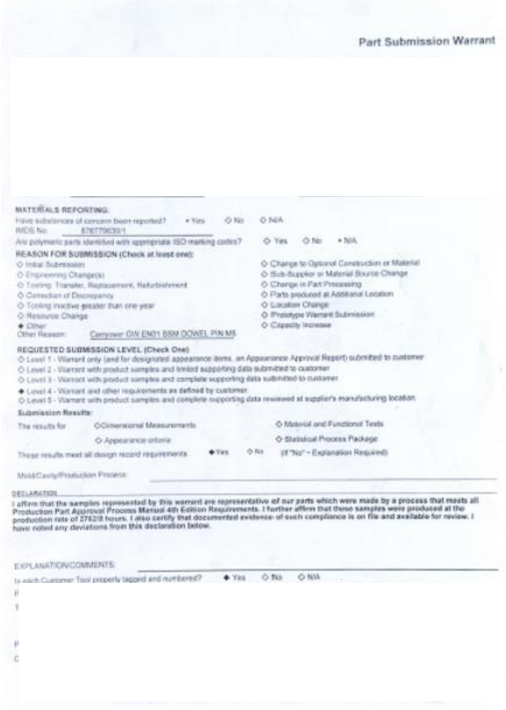
REQUESTED SUBMISSION LEVEL (Check One)
◇ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer
◇ Level 2 - Warrant with product samples and limited supporting data submitted to customer
◆ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
◇ Level 4 - Warrant and other requirements as defined by customer.
◇ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location

Submission Results:
The results for ■ Dimensional Measurements ■ Material and Functional Tests
◇ Appearance criteria ■ Statistical Process Package
These results meet all design record requirements ◆ Yes ◇ No (If "No" - Explanation Required)

Mold/Cavity/Production Process: cold forging & Rolling-Heat treatment-HT Inspection-Surface treatment-SC inspection-Auto sorting-
Final inspection

DECLARATION
I affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of 48000pcs/8 hours. I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS:
Is each Customer Tool properly tagged and numbered? ■ Yes ◇ No ◇ N/A



Part Submission Warrant

MATERIALS REPORTING:
Have substances of concern been reported? ◆ Yes ◇ No ◇ N/A
IMDS No: 876779039/1
Are polymeric parts identified with appropriate ISO marking codes? ◇ Yes ◇ No ◆ N/A
REASON FOR SUBMISSION (Check at least one):
◇ Initial Submission
◇ Engineering Change(s)
◇ Tooling: Transfer, Replacement, Refurbishment
◇ Correction of Discrepancy
◇ Tooling inactive greater than one year
◇ Resource Change
◆ Other
Other Reason: Carryover OW EN01 BSM DOWEL PIN M5
◇ Change to Optional Construction or Material
◇ Sub-Supplier or Material Source Change
◇ Change in Part Processing
◇ Parts produced at Additional Location
◇ Location Change
◇ Prototype Warrant Submission
◇ Capacity Increase

REQUESTED SUBMISSION LEVEL (Check One)
◇ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer
◇ Level 2 - Warrant with product samples and limited supporting data submitted to customer
◇ Level 3 - Warrant with product samples and complete supporting data submitted to customer
◆ Level 4 - Warrant and other requirements as defined by customer.
◇ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location

Submission Results:
The results for ◇ Dimensional Measurements ◇ Material and Functional Tests
◇ Appearance criteria ◇ Statistical Process Package
These results meet all design record requirements ◆ Yes ◇ No (If "No" - Explanation Required)

Mold/Cavity/Production Process:

DECLARATION
I affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of 2762/8 hours. I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS:
Is each Customer Tool properly tagged and numbered? ◆ Yes ◇ No ◇ N/A

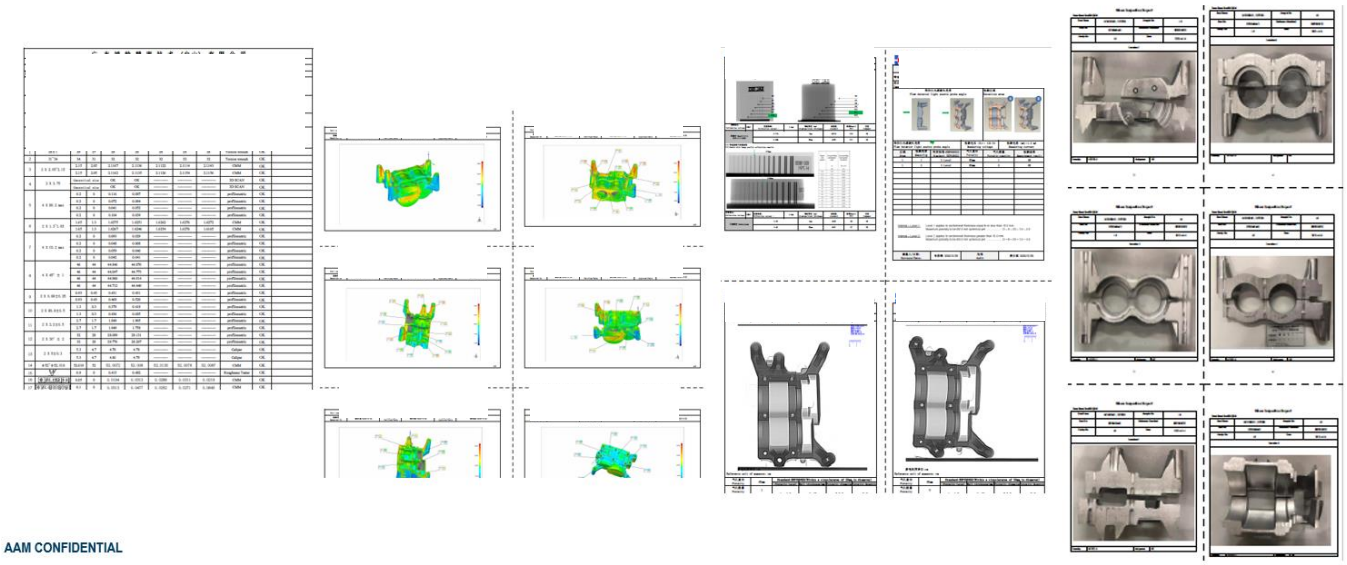
CONFIDENTIAL

APPENDIX A: ELEMENT EXAMPLES

Element #19

Dimensional Results

Include full dimension report, CC&CIP inspection data, 3D scan report, X-ray report and section report .



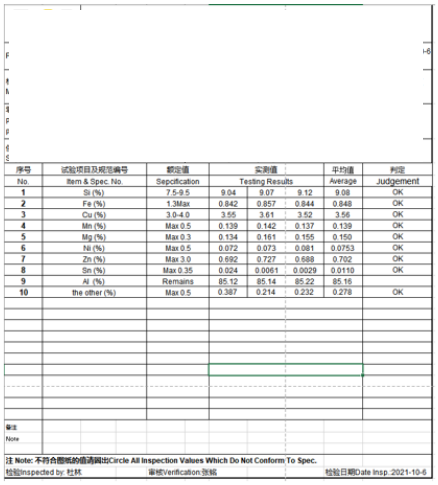
AAM CONFIDENTIAL

APPENDIX A: ELEMENT EXAMPLES

Element #20

Material Certifications

Material report and IMDS/CMDS report

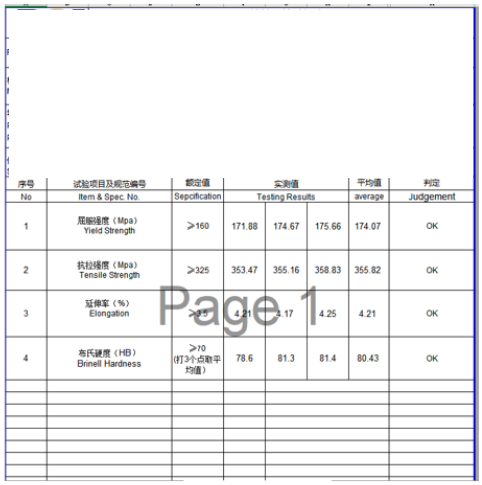


序号 No.	试验项目及规范编号 Item & Spec. No.	额定值 Sepcification	实测值 Testing Results			平均值 Average	判定 Judgement
1	Si (%)	7.5-9.5	9.04	9.07	9.12	9.08	OK
2	Fe (%)	1.3Max	0.842	0.857	0.844	0.848	OK
3	Cu (%)	3.0-4.0	3.55	3.61	3.52	3.56	OK
4	Mn (%)	Max 0.5	0.139	0.142	0.137	0.139	OK
5	Mg (%)	Max 0.3	0.134	0.161	0.155	0.150	OK
6	Ni (%)	Max 0.5	0.072	0.073	0.081	0.0753	OK
7	Zn (%)	Max 3.0	0.692	0.727	0.688	0.702	OK
8	Sn (%)	Max 0.35	0.024	0.0061	0.0029	0.0110	OK
9	Al (%)	Remains	85.12	85.14	85.22	85.16	
10	the other (%)	Max 0.5	0.387	0.214	0.232	0.278	OK

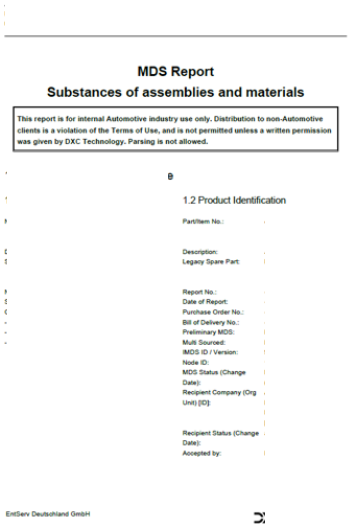
None

注 Note: 不符合图纸的值请圈出Circle All Inspection Values Which Do Not Conform To Spec.

检验Inspected by: 杜林　　审核Verification:张铭　　检验日期Date Insp.:2021-10-6



序号 No	试验项目及规范编号 Item & Spec. No.	额定值 Sepcification	实测值 Testing Results			平均值 average	判定 Judgement
1	屈服强度（Mpa） Yield Strength	≥160	171.88	174.67	175.66	174.07	OK
2	抗拉强度（Mpa） Tensile Strength	≥325	353.47	355.16	358.83	355.82	OK
3	延伸率（%） Elongation	≥3	4.21	4.17	4.25	4.21	OK
4	布氏硬度（HB） Brinell Hardness	≥70 (打3个点取平均值)	78.6	81.3	81.4	80.43	OK



MDS Report

Substances of assemblies and materials

This report is for internal Automotive industry use only. Distribution to non-Automotive clients is a violation of the Terms of Use, and is not permitted unless a written permission was given by DXC Technology. Parsing is not allowed.

1.2 Product Identification

Part/Item No.:

Description:
Legacy Spare Part:

Report No.:
Date of Report:
Purchase Order No.:
Bill of Delivery No.:
Preliminary MDS:
Multi Sourced:
IMDS ID / Version:
Node ID:
MDS Status (Change Date):
Recipient Company (Org Unit) [ID]:

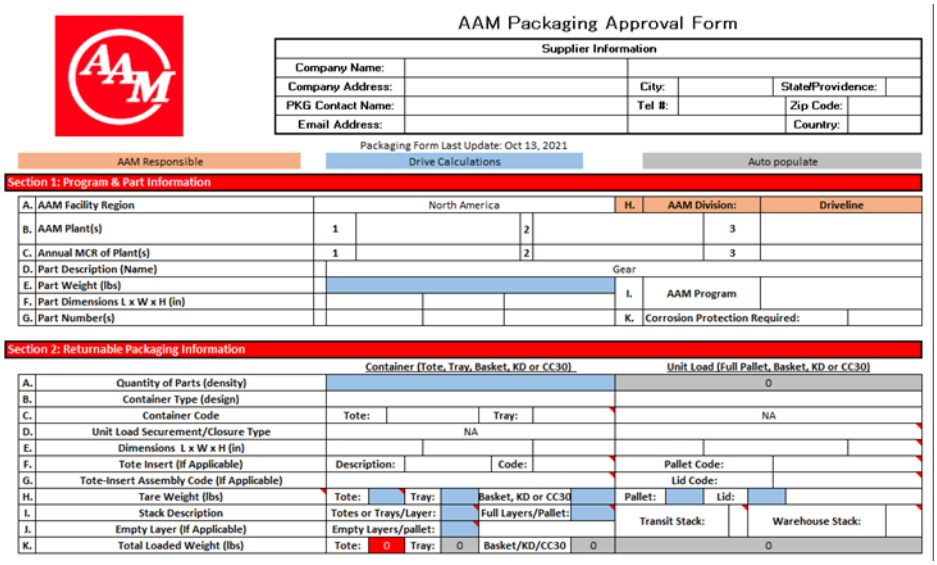
Recipient Status (Change Date):
Accepted by:

EntServ Deutschland GmbH

APPENDIX A: ELEMENT EXAMPLES

Element #21

Shipping and Packing (In Materials section in Oracle)



AAM Packaging Approval Form

Supplier Information					
Company Name:					
Company Address:		City:		State/Providence:	
PKG Contact Name:		Tel #:		Zip Code:	
Email Address:				Country:	

Packaging Form Last Update: Oct 13, 2021

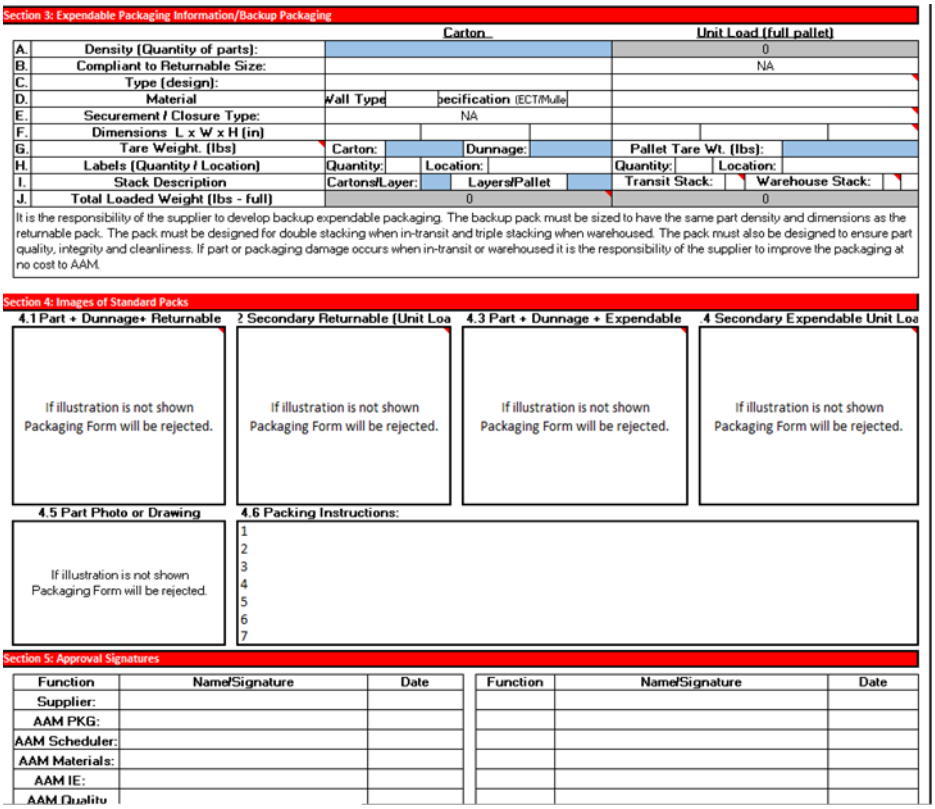
AAM Responsible | Drive Calculations | Auto populate

Section 1: Program & Part Information

A.	AAM Facility Region	North America			H.	AAM Division:	Driveline
B.	AAM Plant(s)	1		2		3	
C.	Annual MCR of Plant(s)	1		2		3	
D.	Part Description (Name)	Gear					
E.	Part Weight (lbs)				I.	AAM Program	
F.	Part Dimensions L x W x H (in)						
G.	Part Number(s)				K.	Corrosion Protection Required:	

Section 2: Returnable Packaging Information

		Container (Tote, Tray, Basket, KD or CC30)				Unit Load (Full Pallet, Basket, KD or CC30)	
A.	Quantity of Parts (density)					0	
B.	Container Type (design)						
C.	Container Code	Tote:		Tray:		NA	
D.	Unit Load Securement/Closure Type	NA					
E.	Dimensions L x W x H (in)						
F.	Tote Insert (If Applicable)	Description:		Code:		Pallet Code:	
G.	Tote-Insert Assembly Code (If Applicable)					Lid Code:	
H.	Tare Weight (lbs)	Tote:	Tray:	Basket, KD or CC30		Pallet:	Lid:
I.	Stack Description	Totes or Trays/Layer:		Full Layers/Pallet:		Transit Stack:	Warehouse Stack:
J.	Empty Layer (If Applicable)	Empty Layers/pallet:					
K.	Total Loaded Weight (lbs)	Tote: 0	Tray: 0	Basket/KD/CC30	0	0	



Section 3: Expendable Packaging Information/Backup Packaging

		Carton	Unit Load (full pallet)
A.	Density (Quantity of parts):		0
B.	Compliant to Returnable Size:		NA
C.	Type (design):		
D.	Material	Wall Type / pecification (ECT/Mulle	
E.	Securement / Closure Type:	NA	
F.	Dimensions L x W x H (in)		
G.	Tare Weight. (lbs)	Carton: / Dunnage:	Pallet Tare Wt. (lbs):
H.	Labels (Quantity / Location)	Quantity: / Location:	Quantity: / Location:
I.	Stack Description	Cartons/Layer: / Layers/Pallet	Transit Stack: / Warehouse Stack:
J.	Total Loaded Weight (lbs - full)	0	0

It is the responsibility of the supplier to develop backup expendable packaging. The backup pack must be sized to have the same part density and dimensions as the returnable pack. The pack must be designed for double stacking when in-transit and triple stacking when warehoused. The pack must also be designed to ensure part quality, integrity and cleanliness. If part or packaging damage occurs when in-transit or warehoused it is the responsibility of the supplier to improve the packaging at no cost to AAM.

Section 4: Images of Standard Packs

4.1 Part + Dunnage+ Returnable	2 Secondary Returnable (Unit Loa	4.3 Part + Dunnage + Expendable	4 Secondary Expendable Unit Loa
If illustration is not shown Packaging Form will be rejected.	If illustration is not shown Packaging Form will be rejected.	If illustration is not shown Packaging Form will be rejected.	If illustration is not shown Packaging Form will be rejected.

4.5 Part Photo or Drawing	4.6 Packing Instructions:
If illustration is not shown Packaging Form will be rejected.	1 2 3 4 5 6 7

Section 5: Approval Signatures

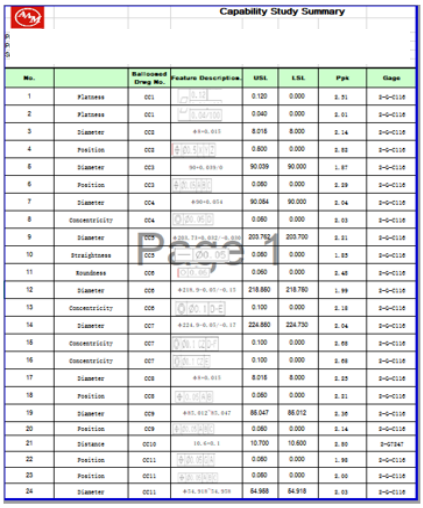
Function	Name/Signature	Date	Function	Name/Signature	Date
Supplier:					
AAM PKG:					
AAM Scheduler:					
AAM Materials:					
AAM IE:					
AAM Quality					

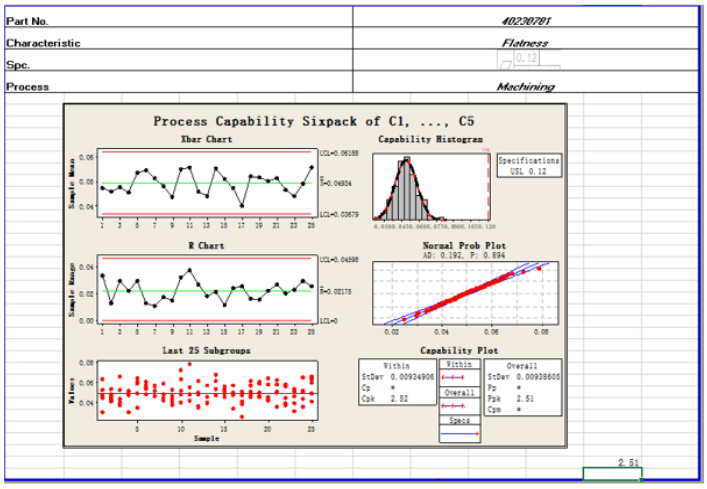
APPENDIX A: ELEMENT EXAMPLES

Element #22

At least 125pcs data for capability study.

CC CPK≥1.33, SC CPK ≥ 1.67 (according to AAM-2-004)





Capability Studies

APPENDIX A: ELEMENT EXAMPLES

Element #23

SP12 - Containment

(Robust and enhanced inspection for all functional, critical, special and safety features. Is not limited to only CC, CIP or Special Characteristics.).

工序号 Process Number	工序内容 Process Name/ Operation Description	设备、工装 Machine, Device, Jig, Tools For Mfg.	特性 Characteristics 编号 No	产品 Product	过程 Process	特性分级 Special Char Class	方法 Method 产品/工序规格公差 Product/Process Specification/Tolerance mm	评价测量技术 Evaluation/ Measurement Technique	抽样 Sample 样本量 Sample Size	抽样 Sample 频率 Sample Freq.	控制方法 Control Method	反应计划 Reaction Plan
130			14	L孔 L Hole	孔径 Diameter	F3	Ø52.000-52.019	三坐标 CMM	1件 1 Piece	全检 Check 100%		
			17		位置度 Position	F4	⌖ Ø0.1Ⓜ D E Ⓜ F Ⓜ	三坐标 CMM	1件 1 Piece			
			18		位置度 Position	F5	⌖ Ø0.05Ⓜ K-M	三坐标 CMM	1件 1 Piece			
			19		位置度 Position	F6	⌖ Ø0.02Ⓜ L-N	三坐标 CMM	1件 1 Piece	全检 Check 100%		
			18		圆度	F7	○ 0.013	三坐标 CMM	1件 1 Piece			
			20		直线度	F8	— 0.013	三坐标 CMM	1件 1 Piece			
			22	N孔 N Hole	孔径 Diameter	F9	Ø51.967-51.986	三坐标 CMM	1件 1 Piece	全检 Check 100%		
			23		位置度 Position	F10	⌖ Ø0.1Ⓜ D E Ⓜ F Ⓜ	三坐标 CMM	1件 1 Piece			
			24		位置度 Position	F11	⌖ Ø0.02Ⓜ L-N	三坐标 CMM	1件 1 Piece	全检 Check 100%		
			25		圆度	F12	○ 0.013	三坐标 CMM	1件 1 Piece			
			26		直线度	F13	— 0.013	三坐标 CMM	1件 1 Piece			
			44	K孔 K Hole	孔径 Diameter	F14	Ø52.000-52.019	三坐标 CMM	1件 1 Piece	全检 Check 100%		
			45		位置度 Position	F15	⌖ Ø0.1Ⓜ D E Ⓜ F Ⓜ	三坐标 CMM	1件 1 Piece			
			46		位置度 Position	F16	⌖ Ø0.02Ⓜ L-N	三坐标 CMM	1件 1 Piece	全检 Check 100%		
			47		圆度	F17	○ 0.013	三坐标 CMM	1件 1 Piece			
			48		直线度	F18	— 0.013	三坐标 CMM	1件 1 Piece			
			50	M孔 M Hole	孔径 Diameter	F19	Ø51.967-51.986	三坐标 CMM	1件 1 Piece	全检 Check 100%		
			51		位置度 Position	F20	⌖ Ø0.1Ⓜ D E Ⓜ F Ⓜ	三坐标 CMM	1件 1 Piece			
			52		位置度 Position	F21	⌖ Ø0.02Ⓜ L-N	三坐标 CMM	1件 1 Piece	全检 Check 100%		
			53		圆度	F22	○ 0.013	三坐标 CMM	1件 1 Piece			
			54		直线度	F23	— 0.013	三坐标 CMM	1件 1 Piece			

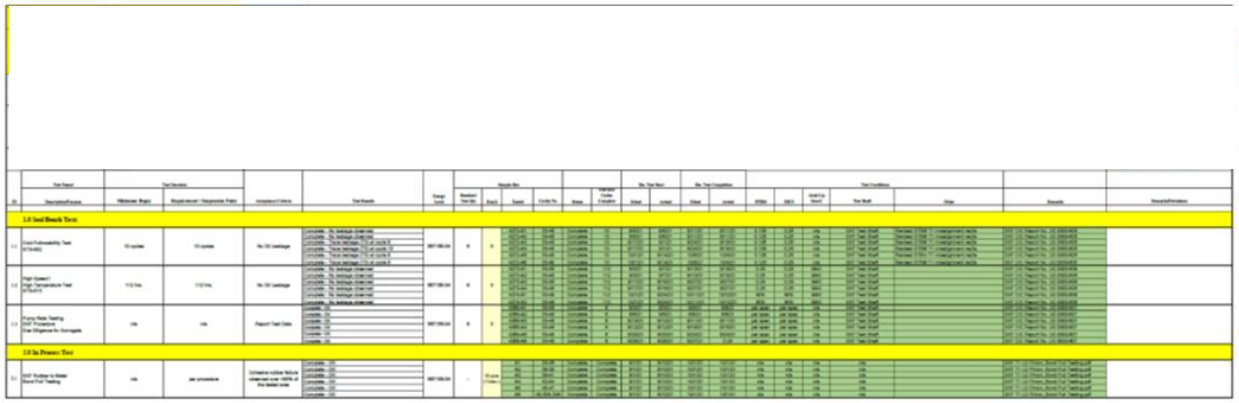
APPENDIX A: ELEMENT EXAMPLES

Element #24

DVP&R

(On a supplier "*black/grey box*" design, the supplier should review results from DVP with SQE/PE. On a AAM design, the PE should review the DVP with SQE, but may/may not have a need to review with the supplier)

Only if the supplier owns the design and it can be share.

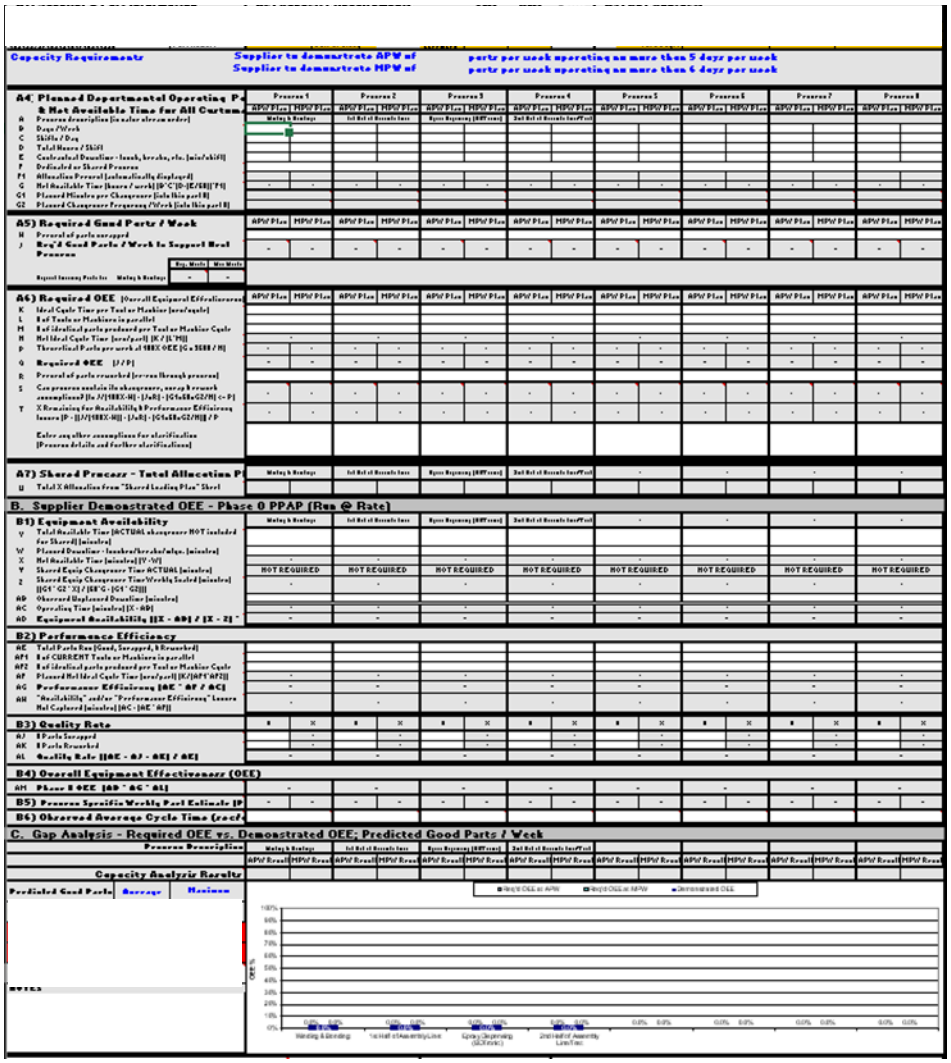


APPENDIX A: ELEMENT EXAMPLES

Element #25

Run at Rate

(SQE should complete the CAR. If the suppliers capacity in near MPW/MCR the SQE should consider other factors that may impact production such as OEE, downtime and scrap)

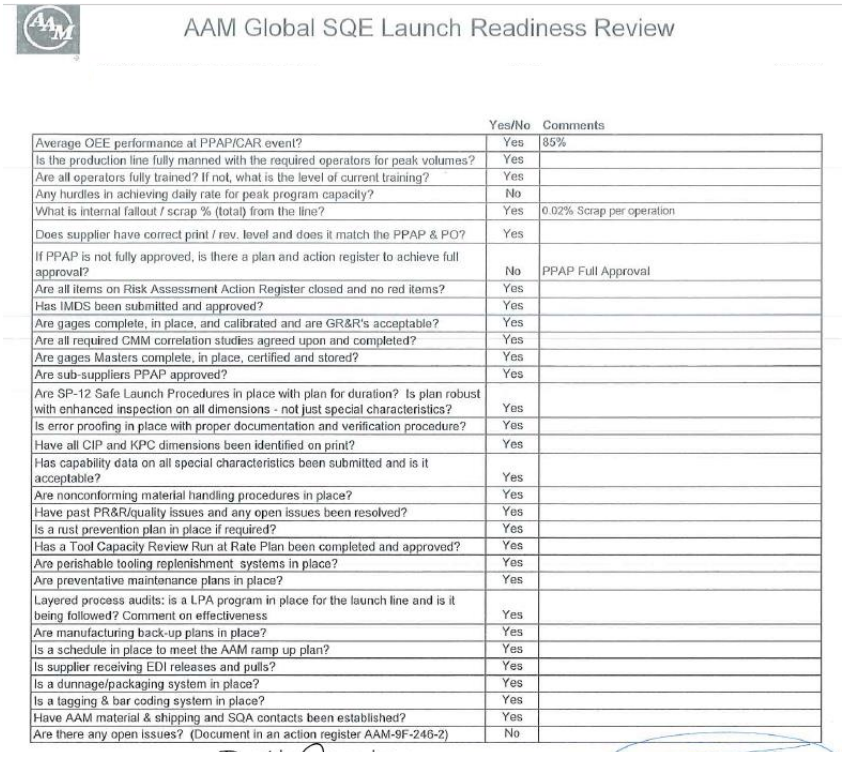


APPENDIX A: ELEMENT EXAMPLES

Element #26

Launch Readiness Review

(The SQE/Cross-Functional Team/Supplier should complete and sign the launch readiness review document verifying that the team agrees the supplier is prepared to provide production parts).



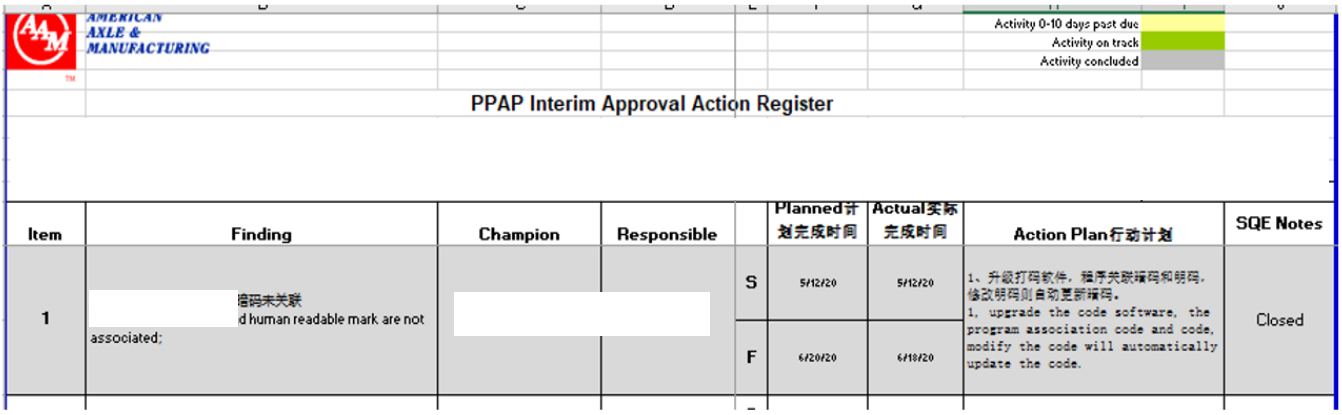
AAM Global SQE Launch Readiness Review

	Yes/No	Comments
Average OEE performance at PPAP/CAR event?	Yes	85%
Is the production line fully manned with the required operators for peak volumes?	Yes	
Are all operators fully trained? If not, what is the level of current training?	Yes	
Any hurdles in achieving daily rate for peak program capacity?	No	
What is internal fallout / scrap % (total) from the line?	Yes	0.02% Scrap per operation
Does supplier have correct print / rev. level and does it match the PPAP & PO?	Yes	
If PPAP is not fully approved, is there a plan and action register to achieve full approval?	No	PPAP Full Approval
Are all items on Risk Assessment Action Register closed and no red items?	Yes	
Has IMDS been submitted and approved?	Yes	
Are gages complete, in place, and calibrated and are GR&R's acceptable?	Yes	
Are all required CMM correlation studies agreed upon and completed?	Yes	
Are gages Masters complete, in place, certified and stored?	Yes	
Are sub-suppliers PPAP approved?	Yes	
Are SP-12 Safe Launch Procedures in place with plan for duration? Is plan robust with enhanced inspection on all dimensions - not just special characteristics?	Yes	
Is error proofing in place with proper documentation and verification procedure?	Yes	
Have all CIP and KPC dimensions been identified on print?	Yes	
Has capability data on all special characteristics been submitted and is it acceptable?	Yes	
Are nonconforming material handling procedures in place?	Yes	
Have past PR&R/quality issues and any open issues been resolved?	Yes	
Is a rust prevention plan in place if required?	Yes	
Has a Tool Capacity Review Run at Rate Plan been completed and approved?	Yes	
Are perishable tooling replenishment systems in place?	Yes	
Are preventative maintenance plans in place?	Yes	
Layered process audits: is a LPA program in place for the launch line and is it being followed? Comment on effectiveness	Yes	
Are manufacturing back-up plans in place?	Yes	
Is a schedule in place to meet the AAM ramp up plan?	Yes	
Is supplier receiving EDI releases and pulls?	Yes	
Is a dunnage/packaging system in place?	Yes	
Is a tagging & bar coding system in place?	Yes	
Have AAM material & shipping and SQA contacts been established?	Yes	
Are there any open issues? (Document in an action register AAM-9F-246-2)	No	

APPENDIX A: ELEMENT EXAMPLES

Element #27

Interim Approval Action Register



AMERICAN AXLE & MANUFACTURING

Activity 0-10 days past due
Activity on track
Activity concluded

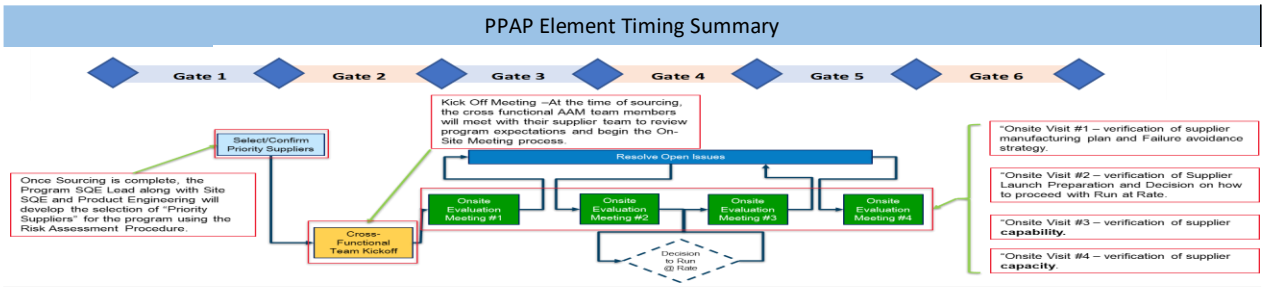
PPAP Interim Approval Action Register

Item	Finding	Champion	Responsible		Planned计划完成时间	Actual实际完成时间	Action Plan行动计划	SQE Notes
1	码未关联 d human readable mark are not associated;			S	5/12/20	5/12/20	1、升级打码软件，程序关联箱码和明码，修改明码则自动更新箱码。 1, upgrade the code software, the program association code and code, modify the code will automatically update the code.	Closed
				F	6/20/20	6/18/20		

APPENDIX B

APQP Element Deliverables by Visit

& Cross-Functional Team



Rasik				APQP Verification Deliverables	Gate 1-2	Gate 3		Gate 4		Gate 5	
P	SQE	PE	Element #	PPAP Element Summary	Pre Source	Kick Off	Visit #1	Visit #2	Visit #3	Visit #4	Full PPAP
R	A	A		Tech Review	F						
S	A	S		SQ4, CQI, and AAM Process Specific Requir	F						
R	A	A		Agred Disagree Matrix	F						
S	A	I	1	Supplier Timing	P	X	F				
S	A	I	3	Supply Chain Map	P	X	F				
I	A	I	4	Tiered Risk Assesment		P	F				
I	S	A	5	Design FMEA	P	X	F				
I	S	A	6	Design Validation Plan		X	F				
I	S	A	7	Design Records	P	X	F				
I	A	I	8	Process Flow		X	X	F			
I	A	I	9	Floor Plan Layout			X	F			
I	A	S	23	SP-12 Early Production Contianment				X	X	F	
I	A	C	10	Process FMEA			X	F			
I	A	I	2	Fixtures / Tooling / Gaging	P	X	X	F			
I	A	I	12	Preventive Maintenance Plan			X	F			
I	A	I	13	Error Proofing			X	F			
I	A	I	14	Vision System			X	F			
I	A	I	15	Operator Instructions					F		
I	A	I	16	Visual Aids					F		
I	A	I	17	Measurement System Analysis					F		
I	A	I	18	Sub-Supplier PPAP				X	F		
I	A	S	19	Dimensional Results					F		
I	A	I	20	Material Certification				X	F		
I	A	I	21	Shipping and Packaging		P	X	X	F		
I	A	S	22	Capability Studies					F		
I	A	C	11	Process Control Plan				X	F		
I	S	A	24	Design Validation Design & Report				X	F		
S	A	I	25	Run at Rate			P	X	X	F	
S	A	A	26	Launch Readiness Review			P	X	X	F	
I	A	S	27	Interim Approval Action Register			P	X	X	F	
I	A	A	PPAP	Interim PPAP Approval			P	X	F		
I	R	I	PPAP	Full PPAP Approval - Plant SQE			P	X	X	X	F

	P= Planning	A= Approve
	F= Finish	C= Consult
	X= Check Point	S= Support
		R= Resp.
		I= Inform

Appendix C

AAM Phased PPAP Checklist

Summary Tab

PPAP Supplier Summary Report

Supplier Name		Supplier Manufacturing Code	
SQE - Name		SQE - Email	

Part Name		Customer Plant	
Part Number		Program	
Type of Change		Engineering Change Level / Concern	
SCR/PCR/CR Number		Permit Number	

Phase x date =>						
PPAP element - Status		Capacity Planning	Kickoff & Visit #1	Visit #2	Visit #3	Visit #4
0	Capacity planning	-/-				
1	Supplier Timing		-/-			
3	Supplier Chain Map		-/-			
4	Tiered Risk Assessment		-/-			
5	Design FMEA		-/-			
6	Design Validation Plan		-/-			
7	Design Records		-/-			
8	Process Flow			-/-		
9	Floor Plan Layout			-/-		
23	SP-12 Early Containment			-/-		
10	PFEMA			-/-		
2	Fixtures / Tooling / Gauging			-/-		
12	Preventative Maintenance Plan			-/-		
13	Error Proofing			-/-		
14	Vision System			-/-		
15	Operator Instructions				-/-	
16	Visual Aids				-/-	
17	Measurement System Analysis				-/-	
18	Sub-Supplier PPAP				-/-	
19	Dimensional Results				-/-	
20	Material Certifications				-/-	
21	Shipping and Packaging				-/-	
22	Capability Studies				-/-	
11	Process Control Plan				-/-	
24	Design Validation Plan & Report (DVP&R)				-/-	
25	Run at Rate					-/-
26	Launch Readiness Review					-/-
27	Interim Approval Action Register					-/-
		Fix open issues	Fix open issues	Fix open issues	Fix open issues	Fix open issues

Capacity Planning Tab

Assessment on elements for Capacity Planning		Status
0	**Capacity Planning**	-/-
1	**Committed Capacity**	-/-
1.1-CP	Supplier obtained the LCR/MCR yearly volume from commercial agrement as Tool Order, Contract, Blanket PO.	-/-
1.2-CP	Supplier understands the number of weeks committed to achieve LCR/MCR. (If PPAP is initatied reference volume section of PPAP)	-/-
1.3-CP	Supplier has a value stream map of their manufacturing process and include the subsuppliers and their Dunns numbers. Identify potential bottlenecks.	-/-
2	**Operating Pattern**	-/-
2.1-CP	Supplier operating pattern insures that LCR is met in 5 days/week and MCR is met in 6 days/week.	-/-
2.2-CP	Calculate required time to meet contractual volume and compare to original supplier assumption. Is the result of the comparison satisfactory?	-/-
2.3-CP	For non dedicated process/equipment, has the supplier/sub-supplier identified the allocation percent entered for each manufacturing process for AAM product and other customers? Reference AAM-9F-010 Shared Loading.	-/-
2.4-CP	For non dedicated process, is there a share loading plan that includes other AAM Product and other Customers? If so, is the open capacity sufficient to cover AAM volume and other Customer's volume? Reference AAM-9F-010 Shared Loading.	-/-
2.5-CP	Calculate available time and compare to SQE assumption. Is the result of the comparison satisfactory?	-/-
2.6-CP	Is there a potential risk when comparing time required to meet LCR/MCR against available time to produce parts? If so communicate to the Buyer, Launch SQE and Submit action plan.	-/-
3	**Timing Requirements**	-/-
3.1-CP	Does the supplier require to develop a new process? If so, is there a timing available and support Program Milestones?	-/-
3.2-CP	Is the new equipment / tool unique to design? If so, define if the complexity may represent a risk for the development of the program in terms of timing.	-/-
4	**Ideal Cycle Time**	-/-
4.1-CP	Confirm planned ideal cycle time is calculated to meet contractual volume. Insure ideal cycle time includes number of cavities and number of machines. Reference AAM-9F-010 Shared Loading.	-/-
5	**Target OEE**	-/-
5.1-CP	In case of a new process development at supplier to produce this product, verify supplier's OEE of similar process. Request the supplier to provide historical data to support their OEE calculation.	-/-
5.2-CP	If the process to be used is currently in production of other components (AAM or other customer), verify historical performance and request data to support the OEE calculation. Does the data support AAM requirements?	-/-
5.3-CP	Has the supplier identified change over and frequency? Consumables and frequency? Any other down time? Inspection and frequency? Any of these losses represent a risk? Reference AAM-9F-010 Shared Loading.	-/-
5.4-CP	Confirm projected scrap rate and document in the note section how is this obtained and calculated.	-/-
5.5-CP	Is there any variation between hour/hour Jobs Per Hour (JPH) during CAR PPAP Run?	-/-
5.6-CP	Provide Historical Unplanned Downtime (surrogate lines). Top Parato/Paynter (root cause for downtime)	-/-
5.7-CP	Compare time required to meet LCR/MCR to available time to produce parts. Identify any potential risk, communicate to the Buyer, Launch SQE and submit an action plan if required.	-/-
5.8-CP	Verify Equipment Mean Time Before Failure (MTBF) and Equipment Mean Time To Repair (MTTR) are monitored. Are the average times supporting supplier OEE calculation? Or represent a risk?	-/-
5.9-CP	Supplier has considered all necessary tooling required to support their PM schedule, change overs, etc. in capacity calculations.	-/-

Capacity Planning Tab

6	**Value Chain Constraints**	**-/-**
6.1-CP	Is the sub-supplier(s) capable to meet the contractual volume per year at 47 weeks per year under an operating patern of 5 days to meet LCR and 6 days to meet MCR? Sub-supplier run at rate.	-/-
6.2-CP	Does the sub-supplier require to develop a new process? If so, is there a timing available and support Program Milestones?	-/-
6.3-CP	Is the new equipment OF sub-supplier / tool unique to design? If so, define if the complexity may represent a risk for the development of the program in terms of timing.	-/-
6.4-CP	Has the supplier has identified raw material lead time? Does the lead time represent a risk for the launch?	-/-
6.5-CP	Is there a plan is in place for procuring required materials to support the ramp-up curve.	-/-
6.6-CP	Were the long lead components identified and orders are on schedule, especially for shared capacity components and/or components in Allocation?	-/-
6.7-CP	Provide Critical Spare List, Supply Available for Launch/Ongoing.	-/-
6.8-CP	Compare with Downtime Root Cause(s) – do critical spares exist for major downtime issues.	-/-
7	**Ramp up plan**	**-/-**
7.1-CP	Verify that supplier hiring plan and training plan support program launch curve.	-/-
7.2-CP	Is a safety Buffer (Bank) required to sustain ramp up or acceleration risks? (Assess subpplier and sub-suppliers)	-/-
7.3-CP	Verify sub-supplier ramp up plan supports launch curve.	-/-
8	**Customer specific requirements**	**-/-**
8.1-CP	Verify with New Launch Team if OEM has requested to use their specific format for R@R (CAR) as per CSR.	-/-
8.2-CP	Verify CSR for Capacity Planning and Execution of the R@R and insure the supplier is aware of the requirements. https://www.iatfglobaloversight.org/oem-requirements/customer-specific-requirements/	-/-
8.3-CP	Supplier had cascaded all Customer Specific Requirement to their sub-suppliers.	-/-

Pre-Sourcing Tab

Pre-Sourcing Activities		Status
	Pre-Sourcing	-/-
1	**Tech Review**	-/-
1.1-PS	Was the SQ4 assessment performed at the supplier? What was the assessment score?	-/-
1.2-PS	Was the Generic Commodity Control plan audit performed at the supplier? What was the score?	-/-
1.3-PS	Was the appropriate CQI series audit performed at the supplier? What was the score?	-/-
1.4-PS	Was the Process Flow Diagram (PFD) shared during the tech review?	-/-
1.5-PS	Was the Manufacturing concept (Draft-Blocks) discussed during the tech review?	-/-
1.6-PS	Was the Proposed Packaging (PAF) discussed during the tech review?	-/-
1.7-PS	Has the supplier received and understands supplier confirmation of awareness of SOP, Supplier Launch Manual, SPs, Supplier Quality Manual & Supplier Requirements Manual?	-/-
1.8-PS	Were the Validation Requirements (DV/PV) discussed in the tech review?	-/-
1.9-PS	Was the DFEMA discussed during the tech review?	-/-
1.10-PS	Were the Design Requirements (PR, MS, etc.) discussed in the tech review?	-/-
1.11-PS	Was the Agree/Disagree Matrix and Drawing discussed in the tech review?	-/-
1.12-PS	Were SC/CC/CIP/PTCs, etc. & Gaging Plan discussed during tech review?	-/-
1.13-PS	Were the Key Program Milestones (AAM / Customer) discussed and understood during the tech review?	-/-
1.14-PS	Does the supplier have timing and is it aligned with the program milestones?	-/-
1.15-PS	Were the Tracability requirements discussed in the tech review? -Is the proper shipping label with traceability lot number being used per the GPTL Labeling and Requirements Standard, found on AAM.com – Doing business with suppliers? -If identified on the print, is part traceability bar code being used? -Has the tracebility plan been reviewed and approved by AAM SQE? Is supplier aware of the GPTL Labeling and Requirements Standard? Does supplier have a procedure that reflects the requirements of the GPTL Labeling and Requirements Standard? Is supplier assigning an individual Lot Number for every shift or production run? Verify labels reflect the date and shift or traceable to date and shift. Verify that all quality check sheets and electronic data are being stored for 7 years. Verify that the 7-year storage is captured in the supplier procedure. Verify that the records have date and time/shift and are complete.	-/-
2	**SQ4, CQI, and AAM Process Specific Requirements (Commodity Control Plan), Risk Assessment**	-/-
2.1-PS	Was AAM-9F-236-1 Risk Assessment, used and completed for each component?	-/-
2.2-PS	Is the PPAP updated with correct priority level?	-/-
2.3-PS	Are all Priority Level-1 suppliers scheduled for (4) on-site evaluations?	-/-
2.4-PS	Are all Priority Level-1 suppliers scheduled for on-site Launch Readiness Reviews with enhanced reporting?	-/-
3	**Agree/Disagree**	-/-
3.1-PS	Was Agree / Disagree completed?	-/-
3.2-PS	Are all action items closed?	-/-
3.3-PS	Are all items agreed upon? If not, what was the outcome? Either the PE changed the specification, provided a properly approved deviation, or sourcing is not complete.	-/-
3.4-PS	Was the ballooned drawing used and every dimension and note covered on the Agree / Disagree evaluation?	-/-

Visit 1 Tab

Assessment of Elements for Kickoff and Visit #1		Status
1	**Supplier Timing**	-/-
1.1-1	Does the supplier have a timing plan that will deliver parts from Production / Hard Tool(s) to support the interim PPAP timing dates?	-/-
1.2-1	Has the supplier provided tooling purchase orders to sub-suppliers in time to support off tool parts in time for the process validation timing?	-/-
1.3-1	Has the supplier received the proper AAM purchase orders to support program timing?	-/-
3	**Supplier Chain Map**	-/-
3.1-1	Has the supplier identified and mapped the entire supply chain? Are sub-supplier Dunns numbers provided? If not, please provide them.	-/-
4	**Tiered Risk Assessment**	-/-
4.1-1	Has the supplier used the AAM Risk Assessment (or equivalent) format to identify high risk sub-suppliers? Are all sub-suppliers action registers closed on Risk Assessment?	-/-
5	**Design FMEA**	-/-
5.1-1	Is the supplier design responsible? If yes, is the DFMEA been submitted and agreed upon by AAM?	-/-
5.2-1	If AAM has provided the DFMEA, has the supplier recognized all failure severity modes and planned appropriately for production planning? Design FMEA severities and effects should read-across to the PFMEA; meaning, the severity rating from the PFMEA should carry the same severity rating as the DFMEA for failures having the same effect. For example, if the DFMEA identifies an effect that carries a severity of 10, the PFMEA should also carry a severity of 10 when process failures result in the same effect.	-/-
6	**Design Validation Plan**	-/-
6.1-1	Is there a plan in place to complete design testing within program timing?	-/-
6.2-1	Is the test plan agreed upon by the supplier and AAM product engineering	-/-
6.3-1	Is a third party being used to complete the testing? If yes, do they have the proper certification?	-/-
7	**Design Records**	-/-
7.1-1	Does the PPAP contain the latest drawing? Verify through the AAM PE that the drawing is correct.	-/-
7.2-1	Are the drawings/prints released?	-/-
7.3-1	Were all quality, cleanliness, materials specifications, critical characteristics, customer interface points clearly identified and understood? If not, what was not defined and what is being done to mitigate risk?	-/-
7.4-1	Has all supplemental information been reviewed and agreed upon (AAM Supplier Quality Manual, Purchasing T&C's, AAM Supplier Quality SOR, AAM Materials requirements, lab report formats, etc.)? If not, what is the action plan to close the issue?	-/-
7.5-1	For design responsible suppliers, has the supplier received sufficient engineering information from the product engineer to start and initiate the APQP/PPAP process?	-/-

Visit 2 Tab

Assessment of Elements for Visit #2		Status
8	**Process Flow**	**-/-**
8.1-2	Does the process flow format follow the AIAG Process Flow requirements?	-/-
8.2-2	Is there evidence of a linkage across all quality documents and Characteristics?	-/-
8.3-2	Does the process flow cover all elements of manufacturing from receiving through shipping operations?	-/-
9	**Floor Plan Layout**	**-/-**
9.1-2	Can the layout be viewed from a CAD model or another representation showing process start, end and flow through the stations?	-/-
9.2-2	Are any future equipment moves or line layouts being considered before or after PPAP?	-/-
23	**SP-12 Early Containment**	**-/-**
23.1-2	Are all requirements outlined in SP-12 understood and agreed? Is there a display and easel displayed, or visual display to identify? No. of findings, from each shift, AAM SP-12 Checksheet to be filled out, Training matrix including photos? Has the SP-12 tag (orange) been placed on the part / box after the inspection took place?	-/-
23.2-2	Are all SP-12 characteristics previously agreed to captured. Has the SP-12 for each shift been reviewed and signed by the supervisor? Does the SP-12 Checksheet contain signature fields to make sure signatures are present. Are operator instructions firmly attached and visible to operator? Verify instructions are to the latest engineering change level.	-/-
23.3-2	Is the initial containment activity for new parts (to ensure the system is functioning as intended) separate from the "normal" process? Is the station off-line, separate and independent from the normal manufacturing process? If not, is there an approval from the BU Director/Manager? Are the SP-12 daily results being reviewed by the Plant Manager and staff with a Fast Response opened for each item found?	-/-
23.4-2	Results from SP-12 should be loaded weekly until SP-12 is released or PPAP is fully approved.	-/-
23.5-2	Has the supplier defined the measurement plan (quality, frequency and traceability requirements) in the pre-production build control plan including sub-supplier(s) significant characteristics? Are all gages calibrated? Do gages have operator instructions? Is a reaction plan available? Does the SP-12 checklist contain customer interface points, Areas of prior customer concerns, KPC's, Special areas where surface finish or handling can create a N/C?	-/-
23.6-2	Suppliers are required to upload the AAM SP-12 Check sheet on a weekly basis to the PPAP Element #23 "SP-12" in the PPAP Level Checklist located in AAM Oracle Portal until the end of SP-12 period as agreed with AAM SQE/procurement	-/-
23.7-2	The Element #23 “SP-12” will stay open and available to the supplier to upload documents into Oracle even after the full PPAP approval has been granted. This allows suppliers to access and upload documents for extended Safe Launch periods.	-/-
10	**PFEMA**	**-/-**
10.1-2	Is the PFMEA created in the correct AIAG format?	-/-
10.2-2	Are all Customer Interface Points and Special Product Characteristics (AC, CC, SC and CIP) identified and are ratings and RPN’s appropriate?	-/-
10.3-2	Has a PFMEA been completed for every operation of the manufacturing process?	-/-
10.4-2	Design FMEA severities and effects should read-across to the PFMEA; meaning, the severity rating from the PFMEA should carry the same severity rating as the DFMEA for failures having the same effect. For example, if the DFMEA identifies an effect that carries a severity of 10, the PFMEA should also carry a severity of 10 when process failures result in the same effect. Are all high severity ratings addressed with the appropriate detection methods?	-/-

Visit 2 Tab

2	**Fixtures / Tooling / Gauging**	**-/-**
2.1-2	Was the American Society of Mechanical Engineers / Geometric Dimensioning & Tolerancing (ASME / GD&T) appropriately used when creating the part drawing? Check for evidence and identify the 3-2-1 master datum points.	-/-
2.2-2	Are all Special Product Characteristics identified on the drawing?	-/-
2.3-2	Has the supplier created a master tooling list?	-/-
2.4-2	Has the supplier defined the calibration frequency for each gage?	-/-
2.5-2	Does the supplier have the correct tooling identification requirements?	-/-
2.6-2	Are all Special Product Characteristics, control points and datum surfaces, tolerances, part specifications and other special material characteristics considered?	-/-
12	**Preventative Maintenance Plan**	**-/-**
12.1-2	PM plan should include spare parts list and PM checks with frequency and verification the checks are being completed. If this is an online system a representative sample may be provided.	-/-
12.2-2	Does the preventive maintenance plan have recovery plans for missed activities?	-/-
13	**Error Proofing**	**-/-**
13.1-2	Are all error proofing stations captured in a matrix? Are all stations that can or cannot be bypassed identified? Do stations that can be bypassed have Control Plans, PFMEA, and Work Instructions for the bypass procedure?	-/-
13.2-2	Suppliers are required to error proof all customer interface points. Is there evidence of this or is there a 100% inspection plan in place?	-/-
13.3-2	Are rabbit tests in place and procedures to run available?	-/-
13.4-2	Is verification frequency documented with a log that shows compliance and a reaction plan specific to the failure of these devices? Does each rabbit test occur at the beginning of each shift and the results documented on a log sheet that is stored indefineatly.	-/-
14	**Vision System**	**-/-**
14.1-2	Suppliers are required to error proof all customer interface points. Is there evidence of this and a 100% inspection plan in place?	-/-
14.2-2	Are rabbit tests in place and procedures to run available?	-/-
14.3-2	Is verification frequency documented with a log that shows compliance and a reaction plan specific to the failure of these devices?	-/-

Visit 3 Tab

Assessment of Elements for Visit #3		Status
15	**Operator Instructions**	**-/-**
15.1-3	Are Operator Instructions available at each station and do they follow standardized work principles?	-/-
15.2-3	Is there a procedure in place for control of non-conforming material?	-/-
15.3-3	Are lock boxes in place and are they being used properly?	-/-
15.4-3	Are the Operator Instructions available to the operators at their workstation?	-/-
15.5-3	Review Operator instructions, Set-up sheets, Inspection instructions, Visual displays, Control charts, Rework/Repair procedures, etc. for appropriateness.	-/-
16	**Visual Aids**	**-/-**
16.1-3	Are all visual aids noted on the control plan and available for operators at the workstation?	-/-
16.2-3	Are the visual standards appropriate for the characteristic being evaluated?	-/-
16.3-3	Is the product engineer and the receiving AAM plant in agreement with the visual aids being used?	-/-
17	**Measurement System Analysis**	**-/-**
17.1-3	Are there gage certifications, Gage R&R, bias, linearity and stability for all new or modified gages?	-/-
17.2-3	This should also include studies for gages where tolerances have been tightened to ensure they are still acceptable.	-/-
17.3-3	Are all gages calibrated by an A2LA certified laboratory?	-/-
17.4-3	Does the supplier have a tracking system to manage the gage calibrations?	-/-
17.5-3	Were all gages and test equipment calibrated and have an acceptable Gage Repeatability and Reproducibility (GR&R) study performed in accordance to the Automotive Industry Action Group (AIAG) Measurement Systems Analysis (MSA) Manual?	-/-
18	**Sub-Supplier PPAP**	**-/-**
18.1-3	Has the supplier approved the PSW for each of the sub-supplied components?	-/-
18.2-3	Have any of the sub-suppliers had capability issues that need to be addressed? Fill in the informantion in the Notes section regarding the required capability verses the actual results. Do all sub-suppliers meet the capacity requirements to meet contractual obligations.	-/-
18.3-3	For tiered sources, does the revision level at the time of submission and PPAP parts meet all customer engineering design records and specification requirements?	-/-
18.4-3	Do any of the sub-suppliers require CQI audits and have they passed?	-/-

Visit 3 Tab

19	**Dimensional Results**	**-/-**
19.1-3	Did supplier recieve the ballooned Drawing and provide a six piece dimensional report for each feature on the drawing. These balloons should match the features from the drawing that was used in the Technical Review with the Agree/Disagree matrix. If required, an Appearance Approval Report is to be submitted.	-/-
19.2-3	Do the PPAP parts meet all customer engineering design records and specification requirements and production parts are manufactured at the production site using production tooling, gauging, process, materials, operators, environment and process settings?	-/-
19.3-3	Were the parts used for the 6-piece dimensional results must come from a significant production run, which can run from 1 hour to 8 hours with the specific production quantity to total a minimum of 300 pieces, unless otherwise specified by AAM.	-/-
20	**Material Certifications**	**-/-**
20.1-3	Are all material performance results documented and meet the requirements?	-/-
20.2-3	Do all raw materials have certifications and meet the material requirements? Will material certifications be provided for each lot per requirements?	-/-
20.3-3	Are laboratory certifications provided?	-/-
21	**Shipping and Packaging**	**-/-**
21.1-3	Verify the AAM packaging form is attached and signed by the appropriate supplier and AAM plant associates.	-/-
21.2-3	Verify there are provisions for expendable packaging if returnable containers are unavailable?	-/-
21.3-3	A sample label should be uploaded.	-/-
22	**Capability Studies**	**-/-**
22.1-3	Do the capability studies have information on how each study was conducted?	-/-
22.2-3	Were capability studies completed for each Customer Interface Point, Special Product Characteristic and any other characteristics requested by AAM and/or deemed a key feature by the supplier as they are critical to their internal processing?	-/-
22.3-3	Does supplier demonstrate the required level of capability for each study completed?	-/-

Visit 3 Tab

11	**Process Control Plan**	**-/-**
11.1-3	Is the control plan created in the correct AIAG format?	-/-
11.2-3	Are all Customer Interface Points and Special Product Characteristics identified and are the related controls appropriate?	-/-
11.3-3	Does the control plan describe every operation of the manufacturing process including but not limited to the following: material receiving, material handling and storage, in-process operations, testing, inspections, rework / repair, and shipping?	-/-
11.4-3	Are all process and product control parameters documented (sample sizes, frequency of inspection, acceptance criteria, etc.)? Are all inspection check sheets and special process documents identified on the control plan per their document control ID number?	-/-
11.5-3	Are all reaction plans identified?	-/-
11.6-3	Are all related actions from applicable material specifications captured appropriately?	-/-
24	**Design Validation Plan & Report (DVP&R)**	**-/-**
24.1-3	The Plan (element #6) and Results (element #24) should be loaded separately.	-/-
24.2-3	For supplier-initiated changes or any other changes to fit, form, or function, verify there is an approved AAM change document with all related and required approvals.	-/-
24.3-3	Have any planned tests, methods and/or quantities deviated from the Plan (element #6)?	-/-
24.4-3	Was testing successfully completed on all planned test samples? Were tests approved in writing by the cross-functional AAM team lead by the PE?	-/-
24.5-3	Were test samples taken from PPAP run?	-/-
ST 1	**Special Topic: APQP People Readiness (Required for Greenfield / Brownfield Suppliers, Optional for other suppliers as required)**	**-/-**
ST 1.1-3	Has the Supplier's HR Manager completed the hiring launch curve?	-/-
ST 1.2-3	Have items rated green been randomly selected to review completion evidence to support the Green ratings?	-/-
ST 1.3-3	Have the next steps for any Yellow or Red items been reviewed?	-/-
ST 1.3-4	If the Overall Rating or High Impact Rating is rated red, have the items been escalated to the appropriate teams?	-/-
ST 2	**Special Topic: Run at Rate Planning**	**-/-**
ST 2.1-3	Is Supplier able to see forecast in R12 and receiving pulls for material?	-/-
ST 2.2-3	Review Run-at-Rate input requirements to be in place for the production stream, including operation instructions and personnel training to support Full PPAP on time?	-/-
ST 2.3-3	Ensure all gages (including sub-assembly gages) are tagged / labeled, calibrated and identified on the Control Plan. Verify gage calibration records and condition of gages.	-/-
ST 2.4-3	Ensure the Pre-Launch Control Plan is planned to be used during the Full PPAP run?	-/-
ST 2.5-3	What is the expected number of parts produced in a defined period of time?	-/-
ST 2.6-3	Are "Bottle Neck" operations identified?	-/-
ST 2.7-3	Will the run at rate parts be used to qualify for Full PPAP, including Gage Repeatability & Reproducibility (R&R)?	-/-
ST 2.8-3	Are capability requirements determined for Special Product Characteristics (AC, CC, SC and CIP) and were these met during this run?	-/-

Visit 4 Tab

Assessment of Elements for Visit #4		Status
	Visit #4	-/-
25	**Run at Rate**	-/-
25.1-4	Has the supplier correctly filled in sections 1 & 2 with correct AAM volume information?	-/-
25.2-4	Are shared/allocated equipment properly quantified on the Run at Rate form? AAM-9F-010 Shared Loading.	-/-
25.3-4	Was the original plan for the actual run at rate to be completed after the PPAP run and PPAP submission or during? Delete	-/-
25.4-4	Is any surrogate data being used for any operations? Reference AAM-9F-010 Shared Loading.	-/-
25.5-4	Verify supplier's evidence that all sub-suppliers are capable to achieve AAM capacity.	-/-
25.6-4	Are all personnel (Salary, Direct and Indirect Labor) hired and trained to support Phased PPAP, including Run-at-Rate event(s)?	-/-
25.7-4	Has the supplier demonstrated capability using mass production parts from all production streams and from a production process that is stable, normal (or expected distribution) and in control and meeting the standard operating pattern (5 days for LCR and 6 days for MCR)?	-/-
26	**Launch Readiness Review**	-/-
26.1-4	Have all issues/concerns been addressed in the FMEA and Control Plan? Have all action plans implemented and proven to be effective?	-/-
26.2-4	Has the launch readiness checklist been completed and confirmed to have no open items?	-/-
27	**Interim Approval Action Register**	-/-
27.1-4	Have all Full PPAP exceptions been closed out prior to the planned full PPAP date?	-/-

CCAR Tab

Concern and Corrective Action Report				Author
				Distribution
Reason for Report		**PPAP/ PSW**		
No.	**Program Stage**	**PPAP no + element**	**Issue**	**Problem & Root Cause**
1				
2				
3				
4				

Author				Initial Date:	DD.MM.YYYY		
Distribution				Last update:	DD.MM.YYYY		
				Progress %			
Problem & Root Cause	**Corrective Action and Recommendation**	**Resp.**	**Target Date**	10 20 30 40 50 60 70 80 90 100	**Actual Completion Date**	**Remarks**	

Note: Document Retention for all AAM Suppliers is for the life of the Program plus one-year or according to customer specific Requirements.

END of Supplier Launch Manual

Global Supplier Quality Manual

All Printed copies of this manual are not controlled. The only controlled copy of this manual is available online at AAM's iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab, on aam.com, and in the Policies and Procedures section of AAM Powerhouse.

Revision: 27 2-Oct-2025

GSQM Table of Contents

PREFACE

All Direct Material Suppliers and Processors:

The purpose of this Supplier Quality Reference Manual is to provide an overview of American Axle and Manufacturing Inc.'s (AAM) requirements and expectations for quality. Suppliers are required to read and understand the contents of this manual in its entirety. Any questions regarding this document should be directed to your Supplier Quality Engineer or Buyer.

In order to meet or exceed customer expectations and be successful in today's global marketplace, AAM must supply products of the highest quality to our customers at the right price, the right time, every time. This cannot be accomplished without a robust supply base that understands AAM's expectations and is committed to the same high standards demanded by our customers. By selecting only those suppliers which can fulfill the quality requirements set forth in this manual, AAM can remain confident that the materials and services supplied will be world class in quality.

AAM welcomes your supplier team and looks forward to a prosperous relationship together. By accepting a purchase order from AAM, you are accepting the requirements identified in this manual, which is incorporated by reference into the purchase order.

Wayne Uhrick
Director, Global SQE

Note: AAM reserves the right to change or eliminate this manual with or without notice to suppliers.

1. DOCUMENTATION REQUIREMENT

1.1. DOCUMENTATION EXPECTATIONS

- This document is referenced in AAM Supplier Requirements Manual and must be used to meet all AAM Supplier Quality Engineering Requirements.

  All documentation for PPAP, PRR, SP11 and IATF16949 certification is expected to be loaded in the appropriate online system. All suppliers are to maintain their data in the online systems, including personnel and certificates for Quality, Minority status etc.

- All suppliers are to include directed-buy suppliers, sub-tiered suppliers and AAM sister plants that supply product to any AAM facility.

1.2. EXCEPTIONS TO REQUIREMENTS

- The requirements identified in this manual apply to all AAM suppliers, globally, unless otherwise specified by your AAM Global Supplier Quality Engineer in writing.

2. PROCUREMENT SUPPORT REQUIREMENTS

2.1. SUPPLIER SITE ASSESSMENT

- All new Supplier Sites should have an SQ^4 Assessment performed prior to being sourced.
- AAM sister plants with completed Q^4 assessments shall waive the SQ^4 assessment.

2.2. APQP AND ISO/IATF

- Advanced Product Quality Planning (APQP) is required when replying to a Request for Quote. Appendix B (AAM APQP Procurement Implementation Plan) outlines the detailed requirements and milestones by when those requirements must be met.

- The Prospective Supplier must provide proof of a process-oriented, Quality Management System that at least fulfills the requirements of ISO 9001 though IATF 16949.

2.3. Scope

- All Products, Processes and Services which are a part of, or impact material sold by AAM to a customer are required to adhere to this manual. This includes physical parts and outside processing.

3. PROTOTYPE REQUIREMENTS

3.1. AAM SP-11 – SUPPLIER REQUIREMENTS FOR PROTOTYPE

- Suppliers must comply with AAM's Supplier Procedure 11 (SP-11) when quoting and submitting prototype components to AAM (located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab).
- AAM may also require additional Prototype documentation on an "as-needed" basis. SP-11 is an online system. For access contact your SSC.

4. APQP REQUIREMENTS

4.1. AIAG APQP MANUAL

- All AAM Suppliers must provide APQP documentation according to the quality requirements outlined in the AIAG Manual.

4.2. AAM ADVANCED PRODUCT QUALITY PLANNING AND CONTROL PLAN CYCLE

- AAM has online systems that contain the APQP requirements for each element of a PPAP.
- AAM may require additional APQP documentation on an "as needed" basis.
- Reference Appendix B (AAM APQP Procurement Implementation Plan).

In order to ensure compatibility of the measurements and test results between the supplier and AAM, unambiguous agreements concerning the test procedures/methods, the test device and the test sequence must be reached and documented.

4.3. LAUNCH READINESS REVIEW

- Launch Readiness Reviews are performed by the AAM Supplier Quality Engineer prior to the Run-at-Rate at the supplier's location.
- The number of Launch Readiness Reviews is determined by the Risk Assessment.
- The supplier should consolidate all the required documentation ahead of time.
- Supplier should contact their Supplier Quality Engineer with any questions.

The Supplier Readiness Review Form is part of the Supplier Quality Manual located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab.

4.4. SUB TIER SUPPLIER MANAGEMENT

- All suppliers to AAM are required to implement a similar approach to APQP, PPAP and supplier management with their suppliers.

4.5. STATUTORY AND REGULATORY REQUIREMENTS

- Supplier must comply with any and all statutory and regulatory requirements. The supplier shall document their process to ensure that purchased products, processes, and services conform to the current applicable statutory and regulatory requirements in the country of receipt and the country of shipment.

5. CHANGE MANAGEMENT REQUIREMENTS

5.1. PROCESS CHANGE REQUEST

- Any change proposed by Suppliers to the product, prior process, raw material, sub-supplier, location, equipment, tooling, or gauging requires notification to and approval from AAM.
- All changes are submitted to the appropriate AAM Buyer with the "Supplier Change Request Process in R12.
- A part of the Supplier Change Request Process is the Technical Risk Assessment located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab. Suppliers must complete this risk assessment for each change proposed.
- Where applicable the Supplier Change Request must be submitted in R12.

5.2. REQUEST FOR PROCESS CHANGE REQUESTS

- Process changes (not requiring a change to the drawing or specification) are captured through Oracle "Supplier Change Request.
- The change request must be approved before the PPAP is initiated.
- AAM timing must be adhered to for changes.

5.3. REQUEST FOR PRODUCT DRAWING OR SPECIFICATION CHANGE

- Product changes that require a change to the drawing or specification are captured through the "Request for Product Drawing or Specification Change" Form (AAM-2F-115) located in the AAM Portal.
- The AAM Buyer routes the form through all impacted parties for review and concurrence.
- After AAM's evaluation of the proposed change, the AAM Buyer notifies the supplier whether or not their proposed change was approved.

The Request for Product Drawing or Specification Change Form is located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab.
The Process / Product Change Implementation Form is located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab.
Suppliers are not allowed to implement the proposed process/product changes until documents are submitted and approved by AAM Procurement, Engineering, and Supplier Quality. **Parts with approved changes cannot be shipped without PPAP approval from AAM.**

6. SQE/PPAP/PRR REQUIREMENTS

6.1. SCOPE

- All production materials, parts and processes are required to be PPAP approved, if it is in or on the product shipped it is included.
- Embedded software that was not developed by AAM is also included and proof of a process for software quality assurance is required.

6.2. AAM SP-12 EARLY PRODUCTION REQUIREMENTS

- AAM requires its Suppliers to provide PPAP documentation according to the quality requirements outlined in the latest edition of the AIAG PPAP Manual.
- AAM requires that Suppliers develop Early Production Containment plans as part of their PPAP.
- AAM Supplier Procedure 12 (SP-12) requires Suppliers to properly document their manufacturing processes using the Process Failure Mode Effects Analysis (PFMEA) and Pre-Launch Control Plan. This serves as an outline to procedure the Pre-Launch Control Plan referred to in Customer Specific Requirements of AAM's customers.
    - AAM plants must use Customer Specific Requirement processes when referring to "Early Production Containment Procedure".
    - AAM refers to the "Early Production Containment Procedure" used by its suppliers as SP-12. AAM plants refer to the same procedure internally as GP-12.

SP-12 is part of the Supplier Quality Manual located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab.

6.3.AAM SP-9 TOOLED CAPACITY REVIEW (RUN@RATE)

- AAM also requires Suppliers to perform a capacity review in order to verify their ability support AAM's on-going quality requirements at quoted tooling capacity for a period of time (Run-at-Rate).
- AAM Supplier Procedure 9 (SP-9) details the Tooled Capacity Review.

SP-9 is part of the Supplier Quality Manual located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab.

6.4.RECYCLING DIRECTIVES

- AAM also requires an IMDS submission for each PPAP to comply with all applicable end-of-life vehicle recycling directives.
- Questions regarding IMDS requirements may be directed to IMDS@aam.com.

6.5.AAM PRODUCTION TRIAL RUN

- As part of the PPAP process, AAM may require a Production Trial Run (PTR), whereby the supplier submits parts to the AAM using plant for trial runs prior to start of production.
- The PTR documentation shall be uploaded into the AAM-Online system, during PPAP submission.

The procedure for PTR's is located at iSupplier portal under Quality section of the Requirements and Specifications page.
Please use Appendix A as a tutorial for access to the AAM-Online System for PPAP administration.
Finally, AAM may require additional PPAP activity and documentation in its sole discretion.

6.6.GLOBAL SUPPLIER ANNUAL AUDIT

AAM requires that its suppliers complete the Global Supplier Annual Audit each year. The supplier shall complete an audit in the first quarter of each year. The audit requires the supplier to perform a full piece dimensional layout. The results of the layout shall be uploaded to AAM-Online. The supplier is also required to submit a Capacity Analysis Report for each part number in the Annual Audit. The Global Supplier Annual Audit is located at iSupplier portal under Quality section of the Requirements and Specifications page. Internal AAM suppliers and directed-buy suppliers are required to submit the Supplier Annual Audit. Suppliers must condense and submit using Zip files no more than 5 megs.

6.7.SQE AUDITS

AAM reserves the right to perform audits at supplier locations for reasons including but not limited to: special processes, poor performance, change to management and what AAM defines as "key suppliers". These could take the form of SQ^4 Assessments, Control Plan Audits, CQI audits or derivations of those audits. All suppliers and sub-tiered suppliers must maintain applicable annual CQI audits and must upload to the AAM Supplier Portal.

AAM developed the SQ^4 Assessment internally as a response to the ever-increasing quality expectations of our customers. The SQ^4 Assessment has three areas consisting of problem solving effectiveness, 44 element checklist and action register. New suppliers must pass the 13 core elements of the SQ^4 Assessment. These elements are 1,2,3,4,8,9,10,13,14,22,23,26, and 31, (Reference the audit for element details). New suppliers and current suppliers must perform a self-assessment using the SQ^4 Assessment and AAM Supplier Quality Engineers will perform on-site SQ^4 Assessments.

AAM's SQ[4] Assessment drives improvement at suppliers with high impact on AAM's quality performance and ensures proper qualification of new suppliers.

7. ERROR PROOFING AND CONTINUAL IMPROVEMENT REQUIREMENTS

7.1. AAM SP-13 ERROR PROOFING

AAM expects its Suppliers to develop Error Proofing systems that either prevent and/or detect customer issues during the manufacture of AAM products and services at all supplier manufacturing facilities.

- Supplier Procedure 13 (SP-13) details AAM's requirements for Supplier Error Proofing systems.

SP-13 is part of the Supplier Quality Manual located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab.

7.2. AAM SP-8 CONTINUAL IMPROVEMENT

- AAM also requires Suppliers to have an on-going process for continually improving the product.
- Continual Improvement is achieved by improving manufacturing processes to reduce variation and ensure the process has capability and stability over time.
- Supplier Procedure 8 (SP-8) details AAM's requirements for Supplier Quality Continual Improvement.

SP-8 is part of the Supplier Quality Manual located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab.
AAM may require additional Error Proofing and Continual Improvement activity and documentation in its sole discretion.

8. SUPPLIER QUALITY PROBLEM RESOLUTION REQUIREMENTS

8.1. AAM SP-5 SUPPLIER QUALITY PROCESSES AND MEASUREMENTS

- AAM expects its Suppliers to comply with Supplier Quality Processes and Measurements Procedure when addressing quality Problem Reporting and Resolution (PRR) issues.
- Supplier Procedure 5 (SP-5) details AAM's process for suppliers to address PRR's, controlled shipping, cost recoveries, and new business hold.
- PRR's are issued and addressed in AAM's web-based system (AAM-Online).
- AAM-Online is accessed via iSupplier Portal or www.aam-online.com.

SP-5 is part of the Supplier Quality Manual located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab. Please use Appendix A as a tutorial for access to the AAM-Online.
AAM may require additional quality processes and measurement activity at AAM's sole discretion.

9. MATERIALS SUPPORT REQUIREMENTS

9.1. CRITERIA FOR PROSPECTIVE SUPPLIERS

AAM requires all Suppliers and Sub-Tier suppliers to adhere to the Criteria for Prospective Suppliers checklist. This requirement includes but is not limited to proper packaging requirements, containers free of debris, parts that are free from rust and FIFO practices in-place.
The Criteria for Prospective Suppliers is part of the Supplier Quality Manual located at iSupplier Portal, in the "Supplier Quality" section of the "Requirements & Specifications" tab.

APPENDICES

APPENDIX A

AAM ONLINE SYSTEM INSTRUCTIONS

AAM uses online systems for storing and reviewing all elements of PPAP, as well as PRR, supplier scoring information and ISO/IATF Certifications. It is the responsibility of the Supplier to obtain access to the tool, upload all of the required documentation for PPAP's, and also review any PRR reports as outlined in the work instruction.

Access to Oracle based systems are controlled through Supplier Security Coordinators (SSC), if you do not have one already the request form is on AAM.com under suppliers and access request forms.
For access to Plex based systems, please contact your buyer or SQE.

For Suppliers with issues accessing or viewing Plex, contact your SQE or buyer for more information.

For suppliers having issues with the Oracle based system, please contact your SSC, if you are the SSC contact the AAM Customer Care help desk.

For questions regarding the contents of this manual, please contact your AAM Supplier Quality Engineer.

APPENDIX B

ISO14001 INFORMATION

American Axle and Manufacturing is dedicated to complying with ISO- 14001 and the continual improvement of its Environmental Management System to meet its established targets and objectives. AAM does not require its suppliers to seek or obtain ISO14001, but strongly encourages them to implement an Environmental Management System to be responsible caretakers of the environment.
Suppliers are required to complete an IMDS submission on www.mdsystem.com for each PPAP submission to comply with all applicable end-of-life vehicle recycling directives. Questions pertaining to IMDS submissions can be directed to IMDS@aam.com.

APPENDIX C

REWORK AND/OR REPAIR

April 13, 2022

Attention: All AAM Suppliers

Subject: Rework and/or Repair

In the last several months, AAM has experienced several customer disruptions because of nonconforming supplier parts. These issues have impacted AAM and our extended partnership financially, but more importantly and long lasting, is the impact to our reputation for quality. An investigation into the systemic reason determined among the top issues was nonconforming supplier components from rework, outside of process and process controls.

In today's unique operating environment, we have all experienced changes to operating patterns, availability of trained operators, raw material logistic delays along with high demand for components. This has put pressure on the system to provide product, however, that can **never** be at a risk to the integrity of the parts or products provided.

As a result, it is imperative for AAM to remind our supplier partners of our **POLICY regarding Rework and Repair** and ask you to reinforce discipline within your production value streams.

Definition of Rework:

- Corrective action(s) taken on nonconforming product so that the product will conform to requirements, utilizing all original processes and inspections contained in the control plan.

Definition of Repair:

- Corrective action(s) taken on nonconforming product, in the field, at a customer's facility, at an AAM facility, or at any other location, so that the product will conform to requirements, without utilizing all original processes and inspections contained in the control plan.

It is AAM's policy **NOT** to repair any product under any circumstances.

In general, rework should not be performed. If Rework is taking place, it must have already been reviewed and approved as part of your APQP/PPAP process with AAM's Supplier Quality group. If there is an approved rework process at your facility, please gather your cross functional team members to:

- Verify the process satisfies the definition above for rework.
- All current methods within the control plan are being used to verify all features regardless of nonconformance.
- Contact your Site SQE to make them aware you have verified this process still satisfies what was originally reviewed and approved through your prior PPAP submission(s).

AAM's goal remains **ZERO** quality defects to preserve our reputation as a leader for quality in our industry. To achieve this goal, we need our supply base to strive for the same level of commitment to operational excellence and quality standards. We ask that you review operations and related controls in detail and assure that you comply with our policies.

Your support is greatly appreciated, thank you in advance for your immediate attention to confirm your process and controls.

John Saieg
Executive Director, Global SQE

Fred Solomon
Vice President, Global Procurement & SQE

REVISION HISTORY for GSQM

DATE	REV	REVISION
15-Sep-06	*0*	*Initial Release*
23-Oct-06	*1*	*Added Revision Column*
24-Jan-07	*2*	*Replaced Ravi Pawar with Atul Wankhede.*
		Replaced Michael Dorah with Bob Karban
18-Apr-07	*3*	*Replaced Atul Wankhede with Gajendra Tawale*
		Replaced Sherry Meadows with Jonathan Conger
24-Nov-08	*4*	*Added Plant Trial Run Procedure*
		Replaced Bob Karban with J. Luiz Martin
		Updated Supplier Quality Contact direction
		Replaced all mentions of Plexus with AAM-Online
		Updated Table of Contents
		Removed Hyperlinks
		Numbered sections / requirements
		Added IMDS email address
		Replaced Preface Letter to suppliers
12-Jan-2010	*5*	*Replaced J. Luiz Martin with Norm Weber*
24-Mar-2010	*6*	*Updated to ISO/TS 16949:2009*
31-Aug-2010	*7*	*Replaced Norm Weber with Mike Flynn*
2-Feb-2011	*8*	*Replaced Mike Flynn with Mauro De Donno*
17-Oct-2012	*9*	*Removed reference to Terms and Conditions in Appendix C*
27-Apr-2015	*10*	*Updated multiple sections*
26-Feb-2016	*11*	*Updated 6.5*
28-Jul-2017	*12*	*Updated for SQ4 Assessment and IATF 16949*
22-Feb-2019	*13*	*Renamed Title*
14-Oct-2020	*14*	*Updated – Renamed Footer document title AAM-9-237*

7-Sept-2021	*15*	*Updated ISO-14001 statement & Annual Audit submission size*
27-May-2022	*16*	*Added Appendix D – Supplier Rework and/or Repair Policy*
28-Oct-2022	*17*	*Combined SLM & GSQM*
6-Feb-2023	*18*	*Changed Supplier Visit Information – Format issues*
23-May-2023	*19*	*Updated Risk Assessment notes and responsibility notes*
23-Oct-2023	*20*	*Updated Tech Eval Requirements*
29-Nov-2023	*21*	*Added Safe Launch Notes, Reformatting*
5-Jan-2024	*22*	*Shipping label for traceability notes added*
4-April 2024	*23*	*Updated Launch Readiness Review and miscellaneous notes*
15-April 2024	*24*	*Updated Standard Cpk requirements*
15-Sept 2024	*25*	*Modified Sourcing Rasic. Updated Shipping Form.*
1-June 2025	*26*	*Removed reference to SOR*
2-Oct 2025	*27*	*Blocked out info on Element Samples*