Supplier Performance Development Process (SPDP) Tasks Overview

SPDP is Aptiv's internal process that is used to develop, monitor and improve direct external suppliers from APQP throughout Current Production. It contains Tasks that are descriptions of the processes and Appendices that are generally the worksheets or templates to assist in performing the process. The SPDP Tasks Overview contains a brief description of the associated SPDP tools/worksheets that the supplier is involved with and that are located on the Supplier Portal. The Aptiv responsible buyer or Supplier Quality representative will communicate any changes or waivers from these processes.

Manufacturing Capability Assessment (MCA)

Manufacturing Capability Assessments are used by Aptiv to verify the management and manufacturing capability of a supplier to produce a part that meets print and other customer requirements. Used in pre-sourcing to evaluate/recommend potential new suppliers and in current production for continuous improvement and for quality issue resolution.

The questions in the MCA are meant to be aids to assist the assessment and are flexible enough so applicable questions can be selected. The MCA is intended to guide the team (normally the Advanced Quality Engineer or Supplier Quality Engineer), to perform a more standard and comprehensive assessment. The MCA task ends when the assessment is completed and when gaps have been identified and results/recommendations have been provided to the key stakeholders and when appropriate action items related to risk or gaps in the process are addressed.

Suppliers may be asked to submit pre-work prior to the assessment being completed by Aptiv. The Aptiv team will utilize the information in making the sourcing decision and evaluating the capability of the supplier's manufacturing process.

In addition, the MCA is an optional problem solving and continuous improvement tool for suppliers to use to periodically assess their processes.

- Appendix 58_1 - Manufacturing Capability Assessment
- Customer Specific Requirements

Technical Reviews

The Technical Review is a pre-sourcing meeting held with potential suppliers to review items related to the manufacturability of the part, including timing, design, manufacturing capability, packaging, etc.

The meetings are generally scheduled and held individually with each potential supplier. The invited suppliers have been selected to move to the next step of the sourcing process. A Manufacturing Capability Assessment (MCA) may be conducted before or after the Technical Reviews with potential supplier(s). The supplier should be prepared to discuss how they would meet the quality requirements stated in the Customer Specific Requirements (CSR) and that were documented in the Request for Quote.
Team Feasibility Commitment Letters
The Team Feasibility Commitment Letter is used during the sourcing process to provide a communication tool that documents the supplier's response concerning the feasibility of their process to manufacture the part. Suppliers also use the letter to formally address and communicate issues related to their capability and Aptiv's requirements. The document is attached to the electronic Request for Quote Form. A review of the design, DFMEA, DFM, error-proofing features in the design and historical performance of similar designs should be conducted by the supplier to determine the manufacturability of the design, prior to submission of the letter. The supplier's manufacturing plant manager and other appropriate personnel sign the electronic letter.

Program Reviews
The purpose of the Program Review is to analyze and track part/program requirements to ensure timely completion of required items by the supplier and resolve any issues. Suppliers participate as requested by Aptiv. The supplier generally utilizes the Timing Chart and Open Issues formats for program tracking and status updates. The Aptiv Advanced Supplier Quality Engineer (AQE) may utilize the Program Review Checklist tool to follow up on items until completion.

The initial Program Review meeting kicks off after sourcing and prior to PPAP submission. Program Review update meetings or calls should be held as needed after the initial kick off as determined by the AQE to revisit open items in all categories for status & gap closure. There is no set number of Program Reviews that may be needed or required methodology. The documentation and tracking tool used by Supplier Quality is the Program Review Meeting Summary.

Timing Charts and Open Issues List
The AIAG Timing Charts and Open Issues List are the documents that the supplier uses to track the part during the APQP process and is what will be reviewed by the Aptiv at program reviews or at other frequencies when needed. Both the Timing Charts and Open Issues List help to ensure program deliverables are executed on schedule. The supplier is responsible for developing, updating and reviewing timing and open issues with the AQE on an on-going basis to ensure that the program remains on track. When issues occur, the supplier should develop action plans to fix the problem and proactively contact their Aptiv AQE.
Design Failure Mode Effects Analysis (DFMEA) - Suppliers that are Design Responsible do not develop DFMEA or hold formal Design Reviews. Aptiv is generally design responsible.

A DFMEA is a systematic review of a design and a tool to determine:

- What is the local and customer level effect?
- How severe (worst case) is the effect?
- What causes the failure to occur?
- How often will the failure occur?
- What prevents or detects the cause or failure?
- How well can the failure be detected?
- What can be done to eliminate the failure?

A DFMEA:

- Documents methods of design error prevention or containment and should contain lessons learned from other similar designs;
- Is most beneficial when performed early in a design while drawings can be easily/inexpensively changed and tooling has not started;
- Should be reviewed/updated if there are any design changes after completion of Prototype Builds and Validation Tests and also prior to PPAP submission;
- Is performed by gathering together a cross-functional team involved in the design/manufacture of a product. The DFMEA is performed with the use of ideas, sketches, samples, requirements, etc.

The experience of all participants in the DFMEA meeting contributes to the thoroughness of the DFMEA analysis. The DFMEA can help the design team to prioritize where to spend resource dollars and permits the design team to consider implementing low-cost design & quality manufacturability related improvements which do not impact the schedule.

- Appendix 8 - APQP Open Issues List
- Appendix 11 - AIAG Checklists
- Appendix 13_3 - FMEA Form

Design Reviews

The intent of a design review is to have a multi-functional review of the design and process characteristics necessary to manufacture the product. A core team schedules and conducts design work sessions to achieve capability on critical product, control and customer characteristics, (KPC, KCC, QCI's, etc…) The team uses data (drawings, experiments, capability studies, FMEA's, etc.) to identify characteristics that will require controls, establish capable measurement systems, determine gaps between the desired and actual results and create action plans to close.
Gage Reviews
The purpose of the gage review is to ensure the gage is being designed, built and certified to accurately measure part dimensional characteristics, honor datum scheme, measure part variation and meet program timing objectives. Suppliers work with Aptiv to meet gage design requirements and timing.

Process Flow Diagrams
The purpose of the Process Flow Diagrams is to provide a logical pictorial representation of the entire manufacturing process flow (dock to dock), including “hidden factories” such as scrap, rework areas, that is used as the foundation for Process Failure Mode Effects Analysis, Process Control Plans, work station instructions, layouts, etc. The supplier develops the PFD, updates and reviews with the AQE as documented on the Program Review Checklist, APQP Timing Charts and/or as requested by the AQE prior to PPAP.

Process Failure Mode Effects Analysis (PFMEA) Strategy
The purpose of the PFMEA is to assure that potential failure modes of the process have been considered and addressed in order to eliminate future potential defects and protect the customer. It is a primary tool for risk management during the development of the process. Many customer complaints have been linked to the lack of robustness of the controls and/or the lack of consideration of a potential failure mode for each process function/operation. The intent of the PFMEA process is to improve the process by eliminating the failure causes, reduce the probability that a failure will happen, expose weaknesses in the process before production and improve the ability to detect failure modes and/or causes during process development and manufacturing. The Aptiv rating tables for ‘severity’, ‘occurrence’ and ‘detection’ should be used in place of the rating tables referenced in AIAG FMEA 3rd Edition.

A PFMEA:

- Should be reviewed/approved to assure that the supplier has addressed all of the known process potential failure modes for the part/product in order to control the process and protect Aptiv from defects;
- Should reference the Process Flow Diagram which is used as input to the PFMEA;
• Is used to capture known potential failure modes, effects, causes and controls, as well as a risk ranking number for each effect and recommended improvement actions and target dates.

A preliminary PFMEA draft is submitted prior to sourcing if a Technical Review is planned or as requested by the AQE. It should be updated prior to prototype and with PPAP submittal, after lessons learned and throughout the production cycle.

• Appendix 13_3 - FMEA Form
• PFMEA Rankings
• APQP Forms

**Process Control Plan**
A Process Control Plan (PCP) is a written summary of the methods and systems used to control production parts and processes. It addresses product and process characteristics and requirements for control and aims at minimizing variation. The purpose of the Process Control Plan is for the supplier to define the methods used to control all product special, critical characteristics (e.g. KPC's, KCC's, QCI's) and any other Aptiv design and print requirements in order to meet Aptiv's specifications.

The supplier develops the Process Control Plan to meet timing documented on the Program Review Checklist, APQP Program Timing Charts and/or as requested by the AQE. Supplier use the control plan format in the AIAG APQP Manual as a reference; other specific requirements may be communicated by Aptiv.

• Appendix 6_1 - Program Review Summary
• Appendix 9 - APQP Timing Chart
• Appendix 11 - AIAG Checklists

**Proactive Containment**
Proactive Containment is a process used to proactively protect the customer by preventing non-conforming product or material from being shipped to Aptiv or subsequently passed to Aptiv's customers.

The Proactive Containment process includes Early Production Containment (EPC) and Provisional Containment. For EPC, a containment plan is established and used during production start-up and acceleration to quickly identify and contain quality issues at the supplier's facility. The containment plan also includes a Pre-Launch Control Plan and is developed in the control plan format referenced in the AIAG APQP Manual.

For Provisional Containment, a containment plan is established to proactively address special conditions that create a heightened risk of producing or shipping non-conforming product or material to Aptiv. Conditions such as production start-up after extended shutdown periods, significant tool or equipment repair, abnormal shifts in product quality, out-of-control or incapable processes, new or significant change in workforce or other applicable circumstances that may occur within a manufacturing facility. This
process is to be self-imposed by the supplier based on the conditions stated above and must have the necessary rigor and discipline to eliminate the risk of non-conforming shipments to Aptiv.

- **Supplier Containment Procedure**
- **Early Production Containment Training**
- **Extended Downtime Checklist**
- **Appendix 60 - Containment Checklist**

**Reactive Containment**

The purpose of the Reactive Containment process is to prevent further non-conforming product or material from reaching Aptiv. Reactive containment includes both the Controlled shipping level 1 and level 2 containment processes. These processes will be instituted based on the nature and severity of a reported problem. Controlled shipping is an additional inspection process to sort the supplier's product or material for non-conformances. Controlled Shipping Level 1 is performed by the supplier at the supplier's facility and is away from the normal production process. Controlled Shipping Level 2 is conducted by a third party at the supplier's expense.

- **Supplier Containment Procedure**
- **Extended Downtime Checklist**
- **Appendix 11 - AIAG Checklists**
- **Appendix 60 - Containment Checklist**

**Production Part Approval Process (PPAP)**

The purpose of PPAP is to demonstrate whether a supplier is capable of producing parts that meet all design records and specification requirements during an actual production run at the quoted production rate. The supplier should follow latest *AIAG PPAP Edition manual* submission requirements and work with their AQE to obtain a full PPAP approval on time.

- **Appendix 20_1 - Supplier PPAP Submission Requirements** (To be used prior to PPAP)
- **Appendix 20_2 - PPAP Checklist** (To be used after PPAP)
- **Appendix 20_3 - Aptiv SQ Interim PPAP Worksheet**

**Run @ Rate**

The purpose of the Run @ Rate is to verify that the supplier's process is capable of producing parts as defined by Aptiv's on-going product requirements and as evaluated using PPAP. It also verifies that the manufacturing process conforms to the manufacturing and quality plan documented by PPAP and the supplier can meet Aptiv's volume requirements on a daily basis. Timing of Run @ Rate is after PPAP and according to the program timing required date - approximately 8 weeks before start of production.

- **Appendix 15 - Run @ Rate Workbook**
- **APQP Forms**
Problem Tracking

The problem tracking tools can be used to systematically track and monitor a supplier's quality improvement action plans and effectiveness. Such problem tracking tools include the following:

- **Gate Charts** - This problem tracking tool can be used to systematically track and monitor a supplier's quality improvement action plans. The Gate chart is a good visual to show performance before and after a corrective action was implemented to determine effectiveness of action taken. Can be used at any time during APQP or Current Production. Updated monthly or as required for specific problem resolution.

- **Look Across** - The purpose of “looking across” is to ensure that corrective actions/lessons learned are incorporated into all applicable products, processes, manufacturing sites/cells to protect the customer by preventing future defects and Repeats. A Look Across document facilitates the tracking, implementation of changes and corrective actions in all applicable areas. To be utilized when issues occur. An issue could be found during internal audits or when Aptiv receives a defect. Supplier should include a Look Across document with Problem Case responses.

- **Lessons Learned** - Lessons Learned refers to any applicable knowledge gained from previous programs or issue corrective actions that will help to prevent the same quality or design issues from reoccurring on a new program part or a new or current process. By capturing and applying Lessons Learned, performance on a new part should improve due to addressing known issues. Repeat issues during current production should be prevented. Can be used at any time during APQP or Current Production.

- **Step Down Chart** - The tool is used with the Quality Focus Supplier process but can be used outside of that process. Monthly goals along with actual monthly performance are monitored. Colors are used to help the document be more visually helpful. Green indicates that the target value was met, while Red indicates that the target was not met. Yellow color may also be used. Can be used monthly or as required for specific problem resolution.

- **Supplier Quality Action Plan (SQAP)** - A less frequently used tool than the Step Down Chart but is a problem tracking tool option to systematically track and monitor a supplier's quality improvement action plans and effectiveness. Can be used monthly or as required for specific problem resolution.

**Supplementary Resources**
- **Appendix 18 - Lessons Learned Criteria Checklist**
- **Appendix 31_1 - Supplier Quality Action Plans**
- **Appendix 31_2 - Gate Chart**
- **Appendix 57_3 - Step Down Chart**

Supplier Change Request Process (SCRP)
The purpose of the Change Management Process is to commonize Aptiv change methodology process with Suppliers. The Supplier Change Request Review (SCRR) form must be used by suppliers to submit proposed changes. Aptiv analyzes the full
impact of a supplier change prior to being implemented at the Supplier location. Aptiv should be involved in the Supplier's change methodology process to ensure FMEA, Control Plans, PPAP submissions and other requirements are properly completed. Approval of a SCRP does not give approval to start shipping parts that have incorporated the change. Aptiv will communicate to the supplier the start of shipment date of the “changed” part.

- Appendix 32 - Change Request Program (Supplier must have a User ID and Password to access)

**Problem Reporting & Resolution (PR&R)**
The internal Aptiv Problem Reporting and Resolution process defines how issues, concerns or problems are documented and communicated to the responsible supplier. It defines the high level requirements for Problem Solver Problem Case issuance by Aptiv and responses from suppliers.

Issues are communicated to supplier via Aptiv Problem Solver. The supplier needs to respond to this problem report within 24 hours providing a plan on how they will immediately contain the problem. The supplier should then determine the root cause, put the fixes in place to correct and verify that the problem is corrected within 15 days. The supplier should complete a 5-why analysis to determine the root cause.

- Appendix 41 - 5 Why Chart
- Appendix 42_1 - 5 Why Analysis Problem Solving Process Instructions
- Appendix 42_2 - 5 Why Critique Sheet

**Layered Audit**
Layered audits are used to verify on-going compliance to the current documented manufacturing/assembly process to assure the production process is working as it should be (work instructions, controls, error proofing, etc...). Various levels of management perform the audits at specified time intervals and ensure gaps are addressed. Layered Audits are established prior to launch of the part and continues throughout the life of the part.

- Layered Audit