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Orientation Training Program

What is a "PPAP"?

Production Part Approval Process

The **Production Part Approval Process** (**PPAP**) is used in the automotive supply chain to establish confidence in component suppliers and their production processes, by demonstrating that all customer engineering design record and specification requirements are properly understood by the supplier and that the process has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate.

PPAP Approval
The result of the PPAP process is a series of documents gathered in one specific location (a binder or electronically) called the "PPAP Package". The PPAP package is a series of documents which need a formal approval by the supplier and customer. The form that summarizes this package is called PSW (Part Submission Warrant). The approval of the PSW indicates that the supplier responsible person (usually the Quality Engineer) has reviewed this package and that the customer has not identified any issues that would prevent its approbation.

The documentation on the PPAP package is closely related to the Advanced Product Quality Planning process (APQP) used during the design and development of new vehicles and component systems to reduce the risk of unexpected failure due to errors in design and manufacture. The PPAP manual is published by the Automotive Industry Action Group (AIAG), and specifies generic requirements for obtaining PPAP approvals. Additional customer specific requirements may be imposed by particular clients (vehicle manufacturers) and incorporated in the purchasing contracts. Details of 'customer specific' requirements may be found on the AIAG website http://www.aiag.org or supplier portals provided by the vehicle manufacturers.

Suppliers are required to obtain PPAP approval from the vehicle manufacturers whenever a new or modified component is introduced to production, or the manufacturing process is changed. Obtaining approval requires the supplier to provide sample parts and documentary evidence showing that:
1. The clients requirements have been understood.
2. The product supplied meets those requirements.
3. The process (including sub suppliers) is capable of producing conforming product.
4. The production control plan and quality management system will prevent non-conforming product reaching the client or compromising the safety and reliability of finished vehicles.

Production Part Approval Process (PPAP) may be required for all components and materials incorporated in the finished product, and may also be required if components are processed by external sub-contractors.

PPAP Elements
There are 18 elements to a complete "PPAP", as follows:

1. Design Records: A copy of the drawing. If the customer is design responsible this is a copy of customer drawing that is sent together with the Purchase Order (PO). If supplier is design responsible this is a released drawing in supplier's release system.

2. Authorized Engineering Change Documents: A document that shows the detailed description of the change. Usually this document is called "Engineering Change Notice", but it may be covered by the customer PO or any other engineering authorization.

3. Engineering Approval: This approval is usually the Engineering trial with production parts performed at the customer plant. A "temporary deviation" usually is required to send parts to customer before PPAP. Customer may require other "Engineering Approvals".

4. DFMEA: A copy of the Design Failure Mode and Effect Analysis (DFMEA), reviewed and signed-off by supplier and customer. If customer is design responsible, usually customer may not share this document with the supplier. However, the list of all critical or high impact product characteristics should be shared with the supplier, so they can be addressed on the PFMEA and Control Plan.

5. Process Flow Diagram: A copy of the Process Flow, indicating all steps and sequence in the fabrication process, including incoming components.

6. PFMEA: A copy of the Process Failure Mode and Effect Analysis (PFMEA), reviewed and signed-off by supplier and customer. The PFMEA follows the Process Flow steps, and indicate "what could go wrong" during the fabrication and assembly of each component.

7. Control Plan: A copy of the Control Plan, reviewed and signed-off by supplier and customer. The Control Plan follows the PFMEA steps, and provides more details on how the "potential issues" are checked in the incoming quality, assembly process or during inspections of finished products.

8. Measurement System Analysis Studies (MSA): MSA usually contains the Gage R&R for the critical or high impact characteristics, and a confirmation that gauges used to measure these characteristics are calibrated.

9. Dimensional Results: A list of every dimension noted on the ballooned drawing. This list shows the product characteristic, specification, the measurement results and the assessment showing if this dimension is "ok" or "not ok". Usually a minimum of 6 pieces is reported per product/process combination.

10. Records of Material / Performance Tests: A summary of every test performed on the part. This summary is usually on a form of DVP&R (Design Verification Plan and Report), which lists each individual test, when it was performed, the specification, results and the assessment pass/fail. If there is an Engineering Specification, usually it is noted on the print. The DVP&R shall be reviewed and signed off by both customer and supplier engineering groups. The quality engineer will look for a customer signature on this document. In-addition, this section lists all material certifications (steel, plastics, plating, etc), as specified on the print. The material certification shall show compliance to the specific call on the print.

11. Initial Process Studies: Usually this section shows all Statistical Process Control charts affecting the most critical characteristics. The intent is to demonstrate that critical processes have stable variability and that is running near the intended nominal value.

12. Qualified Laboratory Documentation: Copy of all laboratory certifications (e.g. A2LA, TS) of the laboratories that performed the tests reported on section 10.

13. Appearance Approval Report: A copy of the AAI (Appearance Approval Inspection) form signed by the customer. Applicable for components affecting appearance only.

14. Sample Production Parts: A sample from the same lot of initial production run. The PPAP package usually shows a picture of the sample and where it is kept (customer or supplier).

15. Master Sample: A sample signed off by customer and supplier, which usually are used to train operators on subjective inspections such as visual or for noise.

16. Checking Aids: When there are special tools for checking parts, this section shows a picture of the tool and calibration records, including dimensional report of the tool.

17. Customer Specific Requirements: Each customer may have specific requirements to be included on the PPAP package. It is a good practice to ask the customer for PPAP expectations before even quoting for a job. North America auto makers OEM (Original Equipment Manufacturer) requirements are listed on http://www.iaob.org website.

18. Part Submission Warrant (PSW): This is the form that summarizes the whole PPAP package. This form shows the reason for submission (design change, annual revalidation, etc) and the level of documents submitted to the customer. There is a section that asks for "results meeting all drawing and specification requirements: yes/no" refers to the whole package. If there are any deviations the supplier should note on the warrant or inform that PPAP cannot be submitted.

PPAP Example:
Double Click Electronic Document Below to Open Embedded PDF File:

Z:\My Documents\
PSS Sales - Training -