

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." Version 4 March 1st 2006

Although individual manufacturers have their own particular requirements, the [Automotive Industry Action Group \(AIAG\)](#) has developed a common PPAP standard as part of the [advanced product quality planning process \(APQP\)](#) – and encouraging the use of common terminology and standard forms to document project status.

The PPAP process is designed to demonstrate that the component supplier has developed their design and production process to meet the client's requirements, minimising the risk of failure by effective use of [APQP](#). Requests for part approval must therefore be supported by-

Purpose:

Defines generic requirements for production for production part approval including production and bulk materials, The purpose of PPAP is to Determine if all customer engineering design record & specification requirements are properly understood by the organisation and that the manufacturing processes as potential to produce the product consistently meeting these requirements during an actual production run at the quoted production rate.

Critical elements of the process approach

- Process owner exists
- Process is defined
- Process is documented
- Linkages of process established
- Process monitored, analyzed and improved
- Records maintained

PPAP approval

The result of this 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 \(AIAG\)](#), www.aiag.org 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 [International Automotive Task Force IAT](#) website www.iatfglobaloversight.org. or supplier portals provided by the vehicle manufacturers. A new website, developed by customer-specific requirements, LLC <http://customerspecifics.com> has been created to help solve problems associated with the distribution and accessibility of customer-specific requirements.

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

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.

The term ISIR (initial sample inspection report) is being used by Germany companies like VW and BMW. ISIR form is standardized by VDA. The term is also used by some other companies like Hyundai and Kia. In fact ISIR is like the Warrant and Inspection Report of PPAP document package. PPAP document package includes some other document such as PFMEA, control plan, drawing, MSA, capability data etc. Besides ISIR document, other documents like that of PPAP is normally required by VW and Hyundai for release of a product and process. The PPAP is like the older ISIR plus a lot more, unless your customer has a specific requirement for using their ISIR within their system. ISIR is a summary of the initial sample being presented at what ever state. The PSW is supported and validated by the ISIR. This does not mean the product being presented is under serial conditions but just states with evidence the current status.

PPAP is the confirmation that the product meets the customer requirements for series production. The PPAP will be considered signed when a full PSW is approved by your customer and added to the PPAP folder. The PSW would always be supported with a ISIR but the PPAP is only considered approved when a FULL PSW is endorsed with and ISIR.

In essence the PSW and ISIR are part of PPAP or VDA and can even be outside of PPAP in cases such as first off tool parts which should be submitted in most cases with a PSW and ISIR but will not be approved in PPAP until series conditions are met.

The ISIR is the part of the PPAP which includes the product ballooned drawing, layout and the capability study (Cpk's). It may sometimes be separately requested by the customer annually or in the event of repeating nonconformance.

The Verband der Automobilindustrie e. V., short VDA, is a German interest group of the German automobile industry, both automobile manufactures and automobile component suppliers. The group is located in Frankfurt, Germany. Current president since June 1, 2007 is the former federal minister of transport Matthias Wissmann. The VDA is hosting the world's largest motor show, the biannual Internationale Automobilausstellung (IAA) in Frankfurt. The VDA published a series of standards and recommendations. Among those is the German Quality Management System (QMS) for the automobile industry. The fourth edition was issued in December 1998, and became mandatory for all German car makers on April 1, 1999.

PPAP elements

Below is the list of all 18 elements, and a brief description of them..

- 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 (note) 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, that usually is 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 www.iatfglobaloversight.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 is any deviations the supplier should note on the warrant or inform that PPAP cannot be submitted.