Guideline for Production Process and Product Release / PPAP

PRODUCTION PART APPROVAL PROCESS [PPAP]

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1 INTRODUCTION

The "Production Process and Product Release" or "PPAP" guideline is aimed at suppliers of the sonnen GmbH who develop and manufacture series parts for sonnen, as well as suppliers who manufacture series parts for Sonnen according to specifications.

The basis for requirements are product specifications, drawings, referenced and generally accepted standards, procedures, and norms.

This guideline aims to ensure that the supplier demonstrates the necessary capabilities to produce a series part for sonnen GmbH in a process-secure and error-free manner as per their requirements.

The necessary documents and procedures for production process and product release are outlined in this document and must be submitted prior to the start of series production according to the part's risk classification.

This process concludes with the final production process and product release by sonnen, which remains in effect until changes occur in the production process and/or the product – changes are thus bilateral!

Once the case arises, the PPAP must be partially revised or newly created due to altered conditions.

2 WHEN IS A PPAP TO BE CONDUCTED?

PPAPs are to be conducted under the following conditions:

- New or modified parts/materials
- Changed subcontractor
- Changed specifications
- Changed manufacturing conditions / process changes
- Changed production sites
- Longer suspension of production (t > 1 year)

3 DOCUMENTATION REQUIREMENTS

The issuance of PPAP documentation must occur under series conditions with production tools and fixtures, and it serves as the basis for production process and product release.

4 PPAP SUBMISSION LEVELS

PPAPs are to be conducted according to the specifications of sonnen GmbH. They are generally classified into two types:

(1) Series parts that are developed and manufactured by the supplier for sonnen

(2) Series parts that are developed by sonnen and manufactured by the supplier

➔ Refer to Appendix Submission Levels

5 PPAP ELEMENTS

5.1 TEAM FEASIBILITY COMMITMENT [TFC]

The Feasibility Commitment (TFC) team aims to provide a team statement that assesses and confirms the feasibility of a product or process.

The TFC is typically based on a multidisciplinary team decision made by representatives from various departments such as design, engineering, manufacturing, quality assurance, and supply chain management.

The team collectively discusses whether all aspects of the product in terms of quality, cost, availability, and customer satisfaction can be met in the form demanded by customers.

5.2 DESIGN FAILURE MODE & EFFECT ANALYSIS [DFMEA]

The Design Failure Mode and Effects Analysis (Design-FMEA) is an effective tool used to identify, assess, and mitigate potential failures in the design process.

By systematically examining and evaluating design features and their potential impacts, the Design-FMEA allows for early detection and rectification of potential weaknesses, enhancing the quality, reliability, and safety of a product.

It encourages a proactive mindset and contributes to minimizing costs, rework, and recalls during the later stages of product development and production.

The Design-FMEA is thus a crucial step to ensure that a product's design aligns with customer requirements and expectations, guaranteeing a high level of quality and customer satisfaction.

5.3 PART HISTORY

The Part History provides an overview of the revision history of a component over time. It includes information about all relevant changes made during the component's lifecycle.

The Part History typically includes details such as:

- Date and description of changes made to the component
- Reasons for the changes, e.g., error corrections, enhancements, design adjustments, etc.
- Approval and authorization of changes by responsible individuals or committees
- Updated technical drawings, specifications, or other documents reflecting the changes
- Information about the impacts of the changes on other aspects of the product or the manufacturing process

The Part History allows all involved parties to trace and understand the change history of a component. This is particularly crucial to ensure that all changes are properly documented, approved, and implemented.

Documenting change revisions in the Part History provides transparency and traceability. It's of significant importance for effective communication and collaboration among the involved parties in the PPAP process.

5.4 CUSTOMER ENGINEERING APPROVAL [CEA]

Customer Engineering Approval (CEA) is the consent obtained from the customer for specific engineering aspects of a product. It ensures that the product aligns with customer requirements and expectations. The CEA confirms the customer's approval for design, technical specifications, and other engineering parameters.

5.5 PROCESS FLOW CHART

A Process Flow Chart is a graphical representation that illustrates the sequence of steps in a process or a series of activities.

It offers a visual overview of the chronological order of activities, decisions, and connections within the process.

The purpose of a Process Flow Chart is to vividly and comprehensively visualize the process, ensuring that all involved parties share a common understanding of the steps and their sequence.

It helps identify potential bottlenecks, sources of errors, or inefficient areas. Additionally, it serves as a means of communication to share processes with other teams or stakeholders, facilitating discussions.

5.6 Factory Floor Plan

The Factory Floor Plan is a crucial LEAN activity within the scope of PPAP. Through its visualization, the production flow can be optimized, and bottlenecks can be identified. It contributes to waste elimination and efficiency enhancement within the production process.

It enables efficient utilization of factory space, aligning with the principles of LEAN management.

The plan also considers safety and environmental aspects, ensuring that LEAN principles such as safety and sustainability are integrated.

Through clear communication across departments, the Factory Floor Plan supports collaboration and fosters the continuous improvement process, which is an essential component of LEAN.

Therefore, within the context of PPAP, the Factory Floor Plan contributes to the implementation of LEAN practices, aiming to enhance efficiency, quality, and productivity.

5.7 Process Failure Mode & Effect Analysis [PFMEA]

Therefore, within the context of PPAP, the Factory Floor Plan contributes to the implementation of LEAN practices, aiming to enhance efficiency, quality, and productivity.

The Process Failure Mode and Effects Analysis (Process-FMEA) is a powerful tool used to identify, assess, and mitigate potential errors and their impacts within a process.

It enables the development of preventive measures to enhance process quality, increase efficiency, and reduce costs.

The Process-FMEA is a crucial component of a robust quality management system and supports the continuous improvement of processes.

5.8 Control Plan

A Control Plan is an essential tool for ensuring product quality within a comprehensive quality management system.

It serves to establish the necessary control measures to ensure that a product or process meets the specified requirements.

The Control Plan provides detailed descriptions of the measurement and testing methods to be used, the frequency of checks, responsibilities, and acceptable tolerance limits.

By implementing an effective Control Plan, deviations can be identified and corrected early, leading to consistent product quality and customer satisfaction.

The Control Plan supports process control, traceability, and contributes to continuous improvement by ensuring the required quality standards are adhered to.

5.9 Performance Test Report

A Performance Test Report is a document that summarizes the results and insights from performance tests conducted on a product or a system component. The report provides detailed information about the tests performed, the testing methods, the test results, and the resulting performance data.

The Performance Test Report is of significant importance to assess the capability of a product and ensure that it meets the required performance criteria. The report provides objective data and enables an evaluation of performance against established specifications.

Furthermore, the Performance Test Report aids in identifying potential weaknesses, bottlenecks, or areas for improvement concerning the product's performance. It assists in deriving targeted measures for performance enhancement or issue resolution.

5.10 Material Test Report

A Material Test Report is a document that summarizes the results of material tests and examinations. The report provides detailed information about the tests conducted, the testing methods applied, the test results, and the specific properties and quality of the material.

The Material Test Report is important to ensure that the used material meets the required quality standards. It provides objective data about the material's chemical composition, physical properties, mechanical strength, and other crucial characteristics.

The Material Test Report enables the early detection of potential material defects, deviations, or quality issues. It allows for a comprehensive assessment of material quality and supports decision-making regarding the material's use in a product or process.

5.11 Dimension Test Report

A Dimension Test Report is a document that summarizes the results of dimension tests and examinations. The report provides detailed information about the tests conducted, the measurement methods used, the measurement results, and the specific dimensions of the tested object.

The Dimension Test Report is important to ensure that the dimensions of a product align with the drawing requirements and specifications. It provides objective data about the actual measurements of the product and allows for the verification of conformity with the requirements.

5.12 Appearance Approval Report

An Appearance Approval Report is a document that describes the visual acceptance of a product or component. The report provides detailed information about the appearance, surface quality, and other visual characteristics of the tested object.

The Appearance Approval Report is important to ensure that the appearance of a product meets aesthetic requirements and customer expectations. It includes the assessment of surface texture, colors, finishes, or other external features.

5.13 PACKAGING TEST REPORT

The Packaging Test Report is a crucial document that summarizes the results of tests and examinations related to the packaging of a product.

By providing detailed information about the conducted tests, applied testing methods, and results, the report offers valuable insights into the packaging's performance regarding requirements.

The Packaging Test Report assesses important aspects such as protection, safety, handling, storage, and transportation. This ensures that the product is adequately safeguarded and arrives undamaged at the customer's location.

5.14 PRODUCT AND MASTER SAMPLE

A Product and Master Sample is a representative specimen or example of a manufactured product that serves as a reference for product quality, design, and other specific attributes. It is used to ensure that serial production aligns with established standards and specifications.

The Product and Master Sample plays a critical role in the quality management process as it serves as a benchmark for reviewing and assessing serial products. It allows for comparison between manufactured products and the accepted reference sample to ensure they are identical or within defined tolerances.

5.15 PART SUBMISSION WARRANT [PSW]

A Part Submission Warrant (PSW) is a crucial document within the context of the PPAP process.

It serves as the supplier's formal confirmation that the delivered parts or components meet the agreed specifications and requirements.

5.16 PART SUBMISSION WARRANT, DEVIATION SHEET

The Deviation Sheet is a supplementary document to the PSW within the framework of the PPAP process.

It is used to record and document deviations from the established specifications. The purpose is to capture the nature of the deviation, its impacts, and the corrective or compensatory measures taken. This sheet serves as the basis for the customer's decision to approve or reject the deviation and may result in requesting adjustments.

5.17 Safety Data Sheet

Safety Data Sheets (SDS) are important within the context of PPAP for assessing the safety of materials used.

They provide information about potential hazards and necessary protective measures. These data sheets ensure compliance with safety standards and support the protection of employees, customers, and the environment.

5.18 Form, Fit and Function

"Form, Fit, and Function" are crucial in the context of PPAP to ensure that a product meets design requirements, compatibility, and functionality. This ensures that the physical characteristics, dimensional compatibility, and intended purpose of the product are aligned with the specifications and expectations.

- Form refers to the appearance of the component
- Fit refers to the accuracy of fit of the component
  and
- Function refers to the performance of the component

Assessing these aspects ensures product conformity and performance to meet customer requirements.

5.19 Qualified Laboratory Documentation

Qualified Laboratory Documentation is crucial in the PPAP process to ensure that tests are conducted by recognized laboratories.

The documentation confirms the laboratory's competence and provides accurate and reliable test results.

5.20 List of Checking Aids

The "List of Checking Aids" is a compilation of tools, fixtures, or instruments used to perform inspections and tests within the scope of the PPAP process.
This list includes the necessary testing equipment required for verifying product quality, conformity, and performance.

5.21 SUB SUPPLIER SOURCE DETAILS

Sub Supplier Source Details play a crucial role in the PPAP process to ensure transparency and traceability of the supply chain.

In the context of PPAP, Sub Supplier Source Details are crucial to ensure that the materials or components used come from trusted and qualified suppliers. They help identify potential risks, bottlenecks, or quality issues in the supply chain and take appropriate actions.

6 PRODUCTION PROCESS AND PRODUCT APPROVAL

Formal series deliveries may only take place once an explicit production process and product approval of the PPAP has been granted by sonnen GmbH.

Any special releases are to be defined based on quantity or time and must be approved in writing by sonnen.

Under certain circumstances, sonnen reserves the right to conduct a process audit at the supplier's premises for decision-making purposes.

The supplier will provide the best possible support to sonnen in this regard and commits to addressing any discrepancies identified in the audit report in a timely manner.

The approval of samples does not release the supplier from the responsibility for the quality of their products, nor does the approval of samples constitute a purchase order.

7 PARTIAL SAMPLING IN CASE OF CHANGES

Only the characteristics/specifications affected by the change and, if applicable, the inspection and functional dimensions on the drawing need to be submitted for approval. The formal procedures for initial submissions described earlier apply in this case.

8 EXEPTIONS

Deviations from the specifications and requirements mentioned in this document can be granted by mutual agreement between the SUPPLIER and sonnen's Quality Assurance. Exceptions are to be documented in writing as part of the Initial Sample Inspection Report.

9 NON-COMPLIANCE

In case of non-compliance with the agreed provisions according to the PPAP guideline, the following consequences are possible:

- Delays in Approval: Failure to meet the agreed-upon requirements can result in delays in product approval for mass production. Further actions and corrections will be necessary to ensure product quality and conformity.

- Rework or Recall: If the non-compliance is significant and affects product quality or safety, it may be necessary to perform rework or even recall products to address potential risks or issues.

- Contractual Penalties: In case of serious non-compliance with the agreed provisions, contractual penalties or financial sanctions may be imposed. These serve as incentives to ensure compliance with the agreed conditions.

- Loss of Trust: Non-compliance with the agreements can lead to a loss of trust between the parties involved. This can affect the business relationship and future engagement.

It's important to note that the exact consequences of non-compliance with the agreements can vary from case to case.

Careful review and compliance with the agreed provisions is of utmost importance to avoid possible negative consequences.

10 APPENDIX

		Niedrig		Mittel		Hoch	
El-Nr	Element	Dokumentation	Vorlage	Dokumentation	Vorlage	Dokumentation	Vorlage
2	Team Feasibility Commitment, TFC	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
3	Design Failure Mode & Effect Analysis, DFMEA	Optional	*	Pflicht	*	Pflicht	*
4	Part History	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
5	Customer Engineering Approval	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
6	Process Flow Chart	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
7	Factory Floor Plan	Optional	Vorlage	Optional	Vorlage	Optional	Vorlage
8	Process Failure Mode & Effect Analysis, PFMEA	Optional	*	Pflicht	*	Pflicht	*
9	Control Plan	Optional	*	Pflicht	*	Pflicht	*
11	Performance Test Report	Optional	Vorlage	Optional	Vorlage	Pflicht	Vorlage
12	Material Test Report	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
13	Dimension Test Report	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
14	Appearance Approval Report	Optional	Vorlage	Optional	Vorlage	Optional	Vorlage
16	Packaging Test Report	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
17	Product and Master Sample	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
18	Part Submission Warrant, PSW	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
19	Part Submission Warrant, Deviation Sheet	Optional	Vorlage	Optional	Vorlage	Optional	Vorlage
20	Safety Data Sheet	Optional	Vorlage	Optional	Vorlage	Optional	Vorlage
21	Form, Fit and Function	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
22	Qualified Laboratory Documentation	Optional	Vorlage	Optional	Vorlage	Pflicht	Vorlage
23	List of Checking Aids	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
24	Sub Supplier Source Detail	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage

Figure 1 - Template levels for series parts developed and manufactured by the supplier for sonnen

		Niedrig		Mittel		Hoch	
El-Nr	Element	Dokumentation	Vorlage	Dokumentation	Vorlage	Dokumentation	Vorlage
2	Team Feasibility Commitment, TFC	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
4	Part History	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
6	Process Flow Chart	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
7	Factory Floor Plan	Pflicht	Vorlage	Optional	Vorlage	Optional	Vorlage
8	Process Failure Mode & Effect Analysis, PFMEA	Optional	*	Pflicht	*	Pflicht	*
9	Control Plan	Optional	*	Pflicht	*	Pflicht	*
11	Performance Test Report	Optional	Vorlage	Optional	Vorlage	Pflicht	Vorlage
12	Material Test Report	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
13	Dimension Test Report	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
14	Appearance Approval Report	Optional	Vorlage	Optional	Vorlage	Optional	Vorlage
16	Packaging Test Report	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
17	Product and Master Sample	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
18	Part Submission Warrant, PSW	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
19	Part Submission Warrant, Deviation Sheet	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
20	Safety Data Sheet	Optional	Vorlage	Optional	Vorlage	Optional	Vorlage
21	Form, Fit and Function	Pflicht	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
22	Qualified Laboratory Documentation	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
23	List of Checking Aids	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage
24	Sub Supplier Source Detail	Optional	Vorlage	Pflicht	Vorlage	Pflicht	Vorlage

Figure 2 - Template levels for series parts developed by sonnen and manufactured by the supplier