

PPAP

Production Part Approval Process

Submission Requirements

Quick Reference

(For Internal Cooper use Only)

Note: This document is meant to be a desk reference for Cooper Industries PPAP submissions. Complete guidelines and definition are provided in the Cooper Industries PPAP manual. Application and defined requirements are at the discretion of your Cooper Divisional Quality Representative. Contact them with any additional questions.

Item Order	PPAP Requirements As of PPAP Fourth Edition	Level 1	Level 2	Level 3	Level 4	Level 5	Required Documents	Additional Comments and Clarity
1	Part Submission Warrant (PSW)				AR		Cooper PSW only	Cooper PSW is required for all submissions and required on all Cooper designed parts.
2	Design Records & Bubbleed part prints(s).				AR		Cooper Divisional Part Print	Include one clean copy of the current approved revision print with all dimensions, applicable specifications, and notes, bubbleed (circle with corresponding number) on the print for reference to dimensional report.
3	Approved Engineering Change Documentation				AR	AR	Various engineering documentation	Any formal documentation that is not reflected in the current released print such as un-released marked up prints, formal engineering changes and any pertinent engineering correspondence.
4	Customer Engineering Approvals						Not Required for Cooper Submissions	Not used with Cooper Industries submissions.
5	Design FMEA,				AR	AR	Can be Cooper FMEA Form or an AIAG compliant DFMEA.	Required only if supplier is responsible for part design.
6	Process Flow Diagrams				AR		Any standard flowchart format.	Identifies all process steps from receiving to shipping/warehouse operations. Must include all offline and in process inspections and testing including ongoing routine performance checks such as annual dimensional layouts. Process steps must match PFMEA and Control Plan steps.
7	Process FMEA				AR		Can be Cooper PFMEA Form or an AIAG compliant PFMEA.	PFMEA must be AIAG or comparable format that contains the same information as the AIAG form. Process steps must match Process Flow Chart, Control Plan and address all characteristics associated with each operation. RPN numbers must be in accordance with AIAG guidelines with critical processes and inspections identified. Recommended Actions for high RPN items are required.
8	Control Plan				AR		Can be Cooper Control Plan or AIAG compliant format.	Control Plan must be AIAG or comparable format that contains the same information. Must match the Flow Chart/FMEA, process steps and describe the actions of each phase of the manufacturing process from receiving to shipping/warehouse. All CTQ's and SPC items must be addressed within the corresponding process step. Any dedicated check/testing features that are used will be identified along with the numbered characteristics if measures/verifies/tests on the print. All CTQ's must be identified in the control plan.
9	Measurement System Analysis Studies		AR		AR		Cooper GRR format or any statistical package format for gage RMR.	Require an analysis of the capability of all measuring tools identified in the Control Plan (in process or offline) used in the decision making process of normal production. As a minimum gauge RMRs, using percent of total tolerance must be included for all process tools used in determining acceptability of equipment measurement capability.
10	Dimensional Results				AR		Must be on Cooper Dimensional report format	Cooper Dimensional Data Sheet is only acceptable format.
11	Material, Performance Test Results		AR		AR		Industry Standard reports or test result formats designated by Cooper Industries.	Certificates of Analysis for all primary raw materials such as chemicals, plastic resins and rubber. Chemical composition lab reports for all metals and controlled substances. Performance life testing results such as salt spray, impact testing, heat, humidity, electrical performance, etc. when required either by print, specification or specific request by Cooper representative to be submitted on AIAG forms (CPG-1004, CPG-1005, or equivalent). For Catalog Parts Generic or family data maybe substituted with prior approval. AEC Qualification testing or equivalent is required for semiconductor devices. Any gaps between supplier qualification testing and AEC qualification testing requirements should be documented and approved by Cooper Prior to submission.
12	Initial Process Study (Cpk) Capability Studies		AR		AR		Process Capability Study using any statistical package or Cooper Capability Data Forms.	A short term study of process control capability (Cpk), must come from one continuous significant production run. At least 100 individual samples must be used for Cpk calculations. Multi-cavity tools would require a separate study per cavity. Supplier must have minimum Cpk value of 1.33 on all CTQ's. No attribute data will be accepted for any PPAP submissions for Initial Process Study. If CTQ's are NOT identified on the print, the supplier will identify a minimum of two characteristics that have a direct effect on fit, form, or function and perform Initial Process Studies on them.
13	Qualified Laboratory Documentation				AR		Lab Scope and outside lab proof of accreditation.	A Quality Record that contains the specific test/evaluations/calibrations that your facility performs, a list of your personnel's competency to perform these tests/evaluations/calibrations, a list of all measuring equipment used during production, and a list of methods and standards used to calibrate those tools. NOTE: All outside calibration or testing labs are required to show proof of certification.
14	Appearance Approval Report	AR	AR	AR	AR	AR	AIAG format AAR	Needed only if part has color, grain, or some other cosmetic appearance requirement specified on the part print, or if specifically requested by Cooper to clarify a cosmetic requirement not clearly identified on a print. Format is AIAG form CPG-1002.
15	Sample Product Parts				AR		Parts tagged in accordance with Cooper PPAP reference manual	The organization shall provide 3 sample parts WITH EVERY submission unless otherwise requested. Multi-cavity tools require 1 part per cavity.
16	Master Samples						Required only for level 5.	Not required for submission but must be maintained by the supplier.
17	Checking aids				AR		Checking and design prints and GRR for checking fixtures.	Any part specific fixture, gauge, model or template. Tooling/gauges/fixtures must include design prints and a 3rd party layout confirming conformity to print.
18	Customer Specific Requirements						Documents as specified by Cooper Industries	
a	Tooling Information Form				AR		Specific Cooper Document	Applies to all Cooper owned tooling. Typical application includes information and pictures on production tools such size, maximum cycles, ownership etc.
b	Packaging Form				AR		Specific Cooper Document	Used to outline and verify both external and internal packaging requirements including any related testing.
c	Inspection Plan (AIAG Inspection card)		AR	AR	AR	AR	Specific AIAG Format	Specific format used by many AEC suppliers to document quality inspections
d	Specification Deviation Form		AR	AR	AR	AR	Specific Cooper Document	Used for any requirement that is non-conforming and requires review by Cooper to provide for approval of the PPAP submission. The supplier must provide a recommended action plan for any issue identified on the Specification Deviation Form.
e	Supplier PPAP Checklist				AR		Specific Cooper Document	To be submitted with every submission level except level 1 and must be signed by supplier representative. Used as both a reference/checklist tool as well as a verification that the right documentation is provided at the time of submission.

Cooper Industries PPAP Submission Levels (in compliance with AIAG Fourth Edition PPAP March 2008 release)

Level 1: Warrant only and Appearance Approval Report as requested submitted to the customer. **Applied to:** "non-critical" parts, "non critical" rework, material or catalog commodity parts for electrical applications, and re-certification of existing parts previously approved by Cooper at levels 3, 4 or 5. Also used for Self Certification.

Level 2: Warrant with product samples and limited supporting data submitted to the customer. **Applied to:** Critical Bulk products such as Plastic/Powder/Chemicals, critical fasteners, simple material changes, simple revision level only changes or simple print updates not affecting form-fit-function. This level can also be applied to low and medium risk parts within a product family.

Level 3: Warrant with product samples and complete supporting data submitted to customer. **Default Cooper Industries Submission Level** **Applied to:** All new parts on Cooper programs. All changes affecting form-fit-function, reliability, or performance. All product resources to new suppliers, initial production parts, existing high risk parts undergoing a part number change.

Level 4: Warrant and other requirements as defined by the customer. This level is reserved for special applications only. **Applied to:** This level can only be applied with prior approval from the designated divisional Cooper Quality PPAP representative.

Level 5: Warrant with product samples and complete supporting data reviewed at the supplier's manufacturing location. **Applied to:** On site review as requested by each Cooper Division

Required for PPAP submission

Not required

Documents on a call by case basis are marked AR for "As Requested"

AR

If Applicable

AR

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Fouad Sabry



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Automotive Process Audits D. H. Stamatis, 2021-04-29 With a detailed discussion on the preparation and tools needed for an automotive process audit this book addresses the fundamental issues and concerns by focusing on two objectives explaining the methods and tools used in the process for the organization and provide a reference or manual for dealing with documenting quality issues This book addresses the fundamental issues and concerns for a successful automotive process audit and details specifically how to prepare for it It presents a complete assessment of what an organization must do to earn certification in ISO standards industry standards and customer specific requirements It also focuses on the efficiency of resources within an organization so that an audit can be successful and describes the methodologies to optimize the process by knowing what to do what to say and how to prove it A road map is offered for the process audit and the layered audit and defines a clear distinction between the preparation details for each This book is intended for those that conduct audits those who are interested in auditing and those who are being audited It specifically addresses how to prepare for an automotive process audit for readers who are involved in quality manufacturing and operations management and those who work with suppliers

Functional Safety for Road Vehicles Hans-Leo Ross, 2016-07-25 This book highlights the current challenges for engineers involved in product development and the associated changes in procedure they make necessary Methods for systematically analyzing the requirements for safety and security mechanisms are described using examples of how they are implemented in software and hardware and how their effectiveness can be demonstrated in terms of functional and design safety are discussed Given today's new E mobility and automated driving approaches new challenges are arising and further issues concerning Road Vehicle Safety and Road Traffic Safety have to be resolved To address the growing complexity of vehicle functions as well as the increasing need to accommodate interdisciplinary project teams previous development approaches now have to be reconsidered and system engineering approaches and proven management systems need to be supplemented or wholly redefined The book presents a continuous system development process starting with the basic requirements of quality management and continuing until the release of a vehicle and its components for road use Attention is paid to the necessary definition of the respective development item the threat hazard and risk analysis safety concepts and their relation to architecture development while the book also addresses the aspects of product realization in mechanics electronics and software as well as for subsequent testing verification integration and validation phases In November 2011 requirements for the Functional Safety FuSa of road vehicles were first published in ISO 26262 The processes and methods described here are intended to show developers how vehicle systems can be implemented according to ISO 26262 so that their compliance with the relevant standards can be demonstrated as part of a safety case including audits reviews and assessments

Advanced Product Quality Planning D. H. Stamatis, 2018-11-12 This book defines develops and examines the foundations of the APQP Advanced Product Quality Planning methodology It explains in detail the five phases and it relates

its significance to national international and customer specific standards It also includes additional information on the PPAP Production Part Approval Process Risk Warranty GD T Geometric Dimensioning and Tolerancing and the role of leadership as they apply to the continual improvement process of any organization Features Defines and explains the five stages of APQP in detail Identifies and zeroes in on the critical steps of the APQP methodology Covers the issue of risk as it is defined in the ISO 9001 IATF 16949 the pending VDA and the OEM requirements Presents the role of leadership and management in the APQP methodology Summarizes all of the change requirements of the IATF standard *Automotive Engineering* Fouad Sabry, 2025-01-02 The world of automotive engineering is evolving at a rapid pace blending traditional mechanics with cuttingedge robotics technology This book Automotive Engineering in the Robotics Science series explores the crucial intersections between these disciplines providing insights into the latest trends innovations and practices that shape the automotive industry today Whether you re a professional an undergraduate or graduate student or simply an enthusiast this book offers valuable knowledge that connects mechanical engineering robotics and automotive design Automotive engineering An introduction to the fundamental principles that drive vehicle design and innovation focusing on the integration of robotics in modern automotive systems Mechanical engineering Explores the core mechanical concepts necessary for the design and operation of vehicles emphasizing robotics applications Mechatronics Discusses the synergy between mechanical electrical and software systems that enable advanced automotive automation Car platform A detailed look at the chassis and structural foundations of vehicles considering the role of robotics in enhancing vehicle performance and safety Chevrolet Vega A case study on the iconic Chevrolet Vega illustrating how robotics and engineering improvements shaped its design Vehicle bus An explanation of vehicle communication systems showing how robotics enables realtime data exchange and system control Bendix Corporation A focus on Bendix s innovations highlighting their contributions to automotive safety systems with robotic technologies Production part approval process Describes the essential process of manufacturing automotive parts with a focus on how robotics ensures quality and efficiency Active safety An examination of systems designed to prevent accidents highlighting robotics in vehicle safety technology Hardwareintheloop simulation Discusses simulation technologies in automotive development focusing on robotics role in virtual testing Noise vibration and harshness Explores the critical factors affecting vehicle comfort emphasizing how robotics helps reduce noise and vibration Manufacturing engineering A comprehensive overview of the manufacturing processes in automotive production showing how robotics drives innovation in assembly lines Automotive electronics Details the electronics systems powering modern vehicles highlighting the role of robotics in enhancing these systems MAHLE Powertrain Investigates the role of MAHLE Powertrain in advancing automotive powertrain technologies with robotics playing a key role Automotive Research Association of India Focuses on ARAI s work in automotive development particularly how robotics is integrated into research and development efforts Runner Automobiles A look at Runner Automobiles and their use of robotics for improving vehicle

design and performance Acura RLX An exploration of Acura RLX's innovative engineering showing how robotics contributed to its advanced features Ecomechatronics Introduces the emerging field of Ecomechatronics where robotics meets environmental sustainability in automotive design Industrial and production engineering Discusses the application of robotics in streamlining automotive production processes improving efficiency Active sound design Explores the use of robotics in automotive acoustics focusing on innovations in noise control and sound enhancement Predictive engineering analytics Looks at how robotics-driven analytics are used to predict vehicle performance and optimize design

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