

Revision History Table

ECN No.	Rev.	Date	Originator	Details of change
46691	AA	10-08-85	B. BORKOWSKI	New Release
50301	AB	08-15-86	B. BORKOWSKI	Pages affected: 1-5, 9-19
54386	AC	02-09-89	B. HOOPER	Pages affected: 1, 3, 5,11,13,17,18
50360	AD	02-12-90	A. BOSSERT	Pages affected: ALL
68531	AE	07-08-98	R. HOFFMAN	Pages affected: 1, 4, 5,8
NB117855	AF	06-28-06	M.B. WARNER	Pages affected: All Updated to QS9000 PPAP Fourth Edition, Changed AIEG to GEMS, removed "19" elements since new worksheet has 22, included a worksheets for PSWs and PPAP, removed reference to SCADs
DP119780	AG	08-02-06	R. JONES	Changed Motorola to Continental and removed references to QS9000 certification.

Note: All released revision level changes to this document will also require the Originator to update the Revision level of this document in Continental specification number 87M42999T85 - "Index of Manufacturer's Requirements and Reference Specifications".

Title: **PRODUCTION PART APPROVAL PROCESS (PPAP)**

(FORMERLY TITLED "1ST ARTICLE SAMPLE APPROVALS ON PURCHASED MATERIAL" AND THEN "COMPONENT APPROVAL OF PURCHASED MATERIAL")

I. PURPOSE:

This procedure defines CONTINENTAL requirements on the Production Part Approval Process (PPAP). This procedure states the requirements for determining when a submission is required, the type and amount of data, documentation and/or samples to be submitted, and the approvals that are required before shipment of production quantities is allowed.

II. SCOPE

This policy is applicable to all material purchased by CONTINENTAL intended for use in the manufacture of products. Suppliers are responsible for subcontracted material and services.

III. REFERENCE DOCUMENTS

87M42999T85 Index of Manufacturer's Requirements And Reference Specifications
AIAG PPAP 4th Edition
AIAG FMEA 4th Edition
AIAG SPC 2nd Edition
AIAG MSA 3rd Edition
QS-9000 APQP and Control Plan Reference Manual

IV. DEFINITIONS

AIAG - Automotive Industry Action Group

Cpk - Process Capability Index (Ref. AIAG Statistical Process Control (SPC) Requirements Manual)

FMEA - Failure Mode and Effects Analysis (Ref. AIAG Potential FMEA Requirements Manual)

GR&R - Gage Repeatability and Reproducibility (Ref. AIAG Measurements Systems Analysis Requirements Manual)

MSA - Measurement System Analysis (Ref. AIAG MSA Requirements Manual)

PPAP - Production Part Approval Process - approval is granted for a part number, engineering change level, and manufacturing location.(Ref. AIAG PPAP Requirements Manual)

Ppk - Process Potential Capability Performance Index (Ref. AIAG Statistical Process Control (SPC) Requirements Manual)

PSO - Process Sign-Off. The review and documentation of supplier's production process readiness to assure complete understanding of program requirements. (Similar to AIAG's Quality Systems Requirements QS-9000, Section III, Customer Specific Requirements).

SCC - Supplier Component Change - a process, initiated by the supplier, notifying CONTINENTAL of any changes requested to be made to the design, processing, material or manufacturing location of a component.

Title: **PRODUCTION PART APPROVAL PROCESS (PPAP)**

Special Characteristics (SC) - Characteristics of a part that require special capability evaluation, measurement or ongoing monitoring and are further referenced in the control plan. The following characters may be identified on Continental drawings to designate a SC:

<!> - Continental designated special characteristic. This characteristic replaces the traditional Continental special characteristic symbol (><). This characteristic is used for special form, fit or function attributes. This symbol designates a characteristic that needs ongoing monitoring and process control;

<S/C> - Continental designated characteristic that may affect safety or government regulations compliance. This symbol designates a characteristic that needs ongoing monitoring and process control;

* - Continental designated initial capability study characteristic, also known as tool study characteristic;

@ - Continental or customer designated characteristic that must be measured and submitted to on a periodic basis for re-approval of PPAP. An example would be of a customer dimension that must be re-validated on a yearly basis via a resubmission of PPAP (elements 7 and 13);

- Other customer designated characteristics per AIAG industry standards.

SPC - Statistical Process Control (Ref. AIAG Statistical Process Control (SPC) Requirements Manual)

SREA - Supplier Request for Engineering Approval . This Continental process was replaced by SCC.

SRFD - Supplier Request For Deviation is to be used if a characteristic(s) does not meet CONTINENTAL specification and the supplier requests an evaluation of material for fit, form, or function for short term use until corrections are made. This is for temporary acceptance only.

TS2 – TS16949

V. SUBMISSION PROCESS

A. CONTINENTAL Supplier Quality Assurance (SQA) will submit a written or electronic request to the supplier for a PPAP submission. The request will reference specific part number, revision level, PPAP submission level and due date.

❖ Submission Level definitions can be found in the AIAG PPAP manual.

B. The following checklist will be used for documenting specific PPAP submission level requirements:

Title: **PRODUCTION PART APPROVAL PROCESS (PPAP)****Supplier Name**Street Address
City, St, Zip
Country**Subject : PPAP request – Level X – CONTINENTAL P/N (Part Name) - Internal CONTINENTAL
Reference number : T xxxxx**

Dear Supplier Contact Name,

Having achieved third party certification to TS61949, one of our obligations is that our suppliers will comply to the Automotive Industry Action Group (AIAG) Production Part Approval Process (PPAP) requirements.

Based on a review of your product and our application, this product requires a PPAP submission level as referenced above. Please forward to CONTINENTAL a completed PPAP worksheet. The PPAP worksheet template can be found by clicking on the following link.

D:\Profiles\g17583\
My Documents\SpecifThe due dates for submission is no later than: **xx/yy/zzzz**.

Submit all documentation and samples that were measured to the address shown below, and reference the T-number mentioned at the top of this page.

Please also note that our requirements are that you will complete and keep for your own records ALL elements of AIAG's PPAP, even though CONTINENTAL assessment only requires your submission to the above criteria. You are required to present copies of these elements upon request of CONTINENTAL.

YOUR PART OR MATERIAL WILL NOT BE CONSIDERED FOR FINAL APPROVAL UNTIL ALL SUBMISSION REQUIREMENTS HAVE BEEN MET AND APPROVED BY A CONTINENTAL PLANT SUPPLIER QUALITY ASSURANCE PROFESSIONAL. OUR APPROVAL IS SIGNIFIED BY A SIGNED COPY OF THE WARRANT (ELEMENT #13), RETURNED TO YOU BY PLANT SQA REPRESENTATIVE. MATERIAL OR PARTS SHIPPED WITHOUT A SIGNED PSW MAY NOT BE ACCEPTED AND MAY BE RETURNED TO YOU AT YOUR EXPENSE. Please maintain a signed copy of the returned warrant for your records.

For assistance or more information please consult your CONTINENTAL Sourcing Coordinator or Supplier Quality Assurance professional.

Appendix

Production Part Approval Process – PPAP 4th Edition of AIAG Std.

Suppliers are to submit PPAP from a Production run. **Production run** - A minimum quantity of 300 consecutive parts or two hours of production, whichever is more stringent using tooling, gaging, processes, materials, and operators from production environment. **Note:** All control items noted below are to be in place during the Production Run. Supplier data demonstrating compliance to the customer's latest revision of the drawing and or specification, i.e. design record, are to be completed and supplied with the warrant as required by the PPAP level requested.

- 1) Design Records** – All Continental design records (i.e. CAD/CAM math data, etc) tooling and fixturing drawings that are Continental or end customer owned, component drawing, any or customer specification or standard call out in the notes. The latest released revision is to be used and all data/dimensions are to be taken for this revision level.
- 2) Engineering Change Document** – If Continental engineering has authorized changes to the next level drawing and or specification and that drawing and or specification has not been released, the unreleased drawing and or specification may be used.
- 3) Customer Engineering approval** – Pre-production, any supplier requested change to tooling, gaging, processes, materials, and equipment other than what was agreed upon and used during DV/pre-production builds are to be satisfied by a signed Engineering Approval.
- 4) Design FMEA** – For parts where the supplier has design responsibility, i.e. supplier owns/controls the design. The Design FMEA is to be developed in accordance with and compliant to the AIAG FMEA manual. See Appendix F in the 3rd edition AIAG PPAP manual.
- 5) Process Flow** – A Flow diagram that clearly describes the production process and flow of that process.
- 6) Process FMEA** - Rankings are per the “Process FMEA Ranking Tables”. See Appendix F in the 3rd edition AIAG PPAP manual. The supplier may consider the design of their tooling as applicable to help reduce or detect issues in the design FMEA.
- 7) Control Plan** – Supplier shall have a Control Plan that defines all controls used for process control and be in compliance to the APQP and Control Plan Reference Manual.
- 8) Measurement System Analysis Studies** – The supplier shall have applicable Measurement System Analysis studies, e.g. gage R&R, bias, linearity, and stability studies, for all equipment used for new or modified gages, measurement, or test equipment. Address R&R's >10%.
- 9) Dimensional Results** – The supplier shall provide evidence that dimensional verification required by the Continental drawing and or specification, and the Control Plan have been completed and results indicate compliance with the specified requirements. The supplier shall have dimensional results for each unique manufacturing process, e.g. cells or production lines and all cavities, molds, patterns or dies. Include 100% First Article Inspection (FAI) with a >80% tolerance summary sheet. Retain 1 part as master sample.
- 10) Material, Performance Test Results** – The supplier shall complete and may be required to supply test results as specified in Continental's and or end customer's drawing/s and specification/s. Test results are to include, but not limited to, such items as: reliability data, electrical data, and Material Certificate of Analysis (salt spray results, plating, thickness results, color requirements, surface finish results, etc.). Test results are

Title: **PRODUCTION PART APPROVAL PROCESS (PPAP)**

to be noted with the requirement and the measured results. Test results may be required to meet ESA specs, SAE specifications, and end customer material specifications.

11) Initial Process Study – The level of initial process capability or performance must be determined to be acceptable prior to submission for all Special Characteristics designated by the customer and or supplier.

Note: The supplier shall perform measurement system analysis to understand how measurement error is affecting the study measurements. Address all Cpk & Ppk < 1.67.

12) Qualified Laboratory Documentation – The supplier shall have a laboratory scope and documentation showing that laboratories used, e.g. dimensional, materials testing, etc. are compliant to QS 9000.

13) Appearance Approval Report – As applicable, a separate Appearance Approval Report shall be completed for each part that a submission is required. See Appendix B in the 4th edition AIAG PPAP manual.

14) Sample Product – The supplier shall provide sample product as specified in this specification.

15) Master Sample – The supplier shall retain a master sample from the same period of time as the production part approval records, or until a new master sample is produced. The supplier shall also supply Continental with samples for correlation measurement and retention. All samples are to be identified and cross-referenced to dimensional and test data. The number of samples needed by Continental should be obtained from Continental Plant Supplier Quality.

16) Checking Aids – Can include fixtures, gages, models, templates, mylars specific to the product being submitted. The supplier shall certify that all aspects of the checking aid agree with part dimensional requirements. There is documented released engineering design changes that have been incorporated in the checking aid at the time of submission. There is documented preventive maintenance and calibration. Checking aids are to be in compliance with **Measurement System Analysis** requirements.

17) Record of Compliance With Customer-Specific Requirements – The supplier shall have evidence of compliance to all applicable and end customer requirements. These include 's Quality specifications as listed in 87M42999T85, and tooling or process specifications as noted in the drawing or component specification.

- a. CONTINENTAL will indicate sample quantity submission requirements under element 16.
- b. CONTINENTAL SQA will review the submission, and signify approval of the submission via a signed copy of the PSW/Warrant.
- c. CONTINENTAL SQA may require a PSO to be completed prior to approval of the PPAP submission.
- d. For printed circuit boards, bulk chemicals/materials, contact SQA for direction and guidance on all submissions.
- e. All submissions must include the Certificate of Analysis under element 8.
- f. Submissions made to CONTINENTAL Component Engineering or Sourcing following 87M44799F66 may be substituted in lieu of elements 8 and 16 for electrical components only.

18) Part Submission Warrant (PSW) – Upon satisfactory completion of all measurements and test, the supplier shall record the required information on the Part Submission Warrant. **Note: Submission Results** section, if the results **do not** meet **all** drawing and specification requirement, **no box checked**, the supplier is to provide a list of non-conformances, corrective action to be taken, and a time line to complete corrective action and to resubmit a clean PPAP.

For Ford, DaimlerChrysler and GM:



D:\Profiles\g17583\
My Documents\Specif

Title: **PRODUCTION PART APPROVAL PROCESS (PPAP)**

For all other customers:

D:\Profiles\g17583\
My Documents\Specif

19) Bulk Material Requirements Checklist – Suppliers of chemicals, inks, pastes, adhesives, etc. are to complete each item as noted in this checklist, validation test data to be taken from three production lots of material.

20) Quality Certifications - The submission will contain a copy of the Supplier ISO9000 or TS16949 certificate within each PPAP package. If the Supplier is not certified in any of the two above standards, their plans for obtaining certification should be included within each package.

21) Specification # 87M44162U01, "PROCESS AVERAGE_TESTING (PAT), STATISTICAL YIELD ANALYSIS(SYA) AND JUNCTION VERIFICATION TEST (JVT)" Conformance Data - This requirement is key to Continental 's quality initiative and must be provided for PPAP approval.

22) Custom IC Run at Rate - Special Requirement

Demonstration of production volume: Minimum number of wafer lots as required in specification # 87M44162U01 (21) above shall be processed through supplier's final test. Both capacity and yield targets must be complied with. This production demonstration must be completed 3 months prior to receipt of 1st production purchase order deliveries. Yield and/or thru put deficiencies must be addressed with appropriate corrective actions and necessary plans such that no impact to delivery will exist at point of Continental production launch. Demonstration of production volume / run at rate shall be attached to PPAP package as a separate summary report.

VI. Reasons why CONTINENTAL may require a supplier PPAP submission

- A. For initial component approval of a part number by CONTINENTAL from each supplier and location
- B. Whenever a supplier to CONTINENTAL proposes a change to design, specification, process or method of manufacture as follows (a thorough description of the change should be included and how these changes will affect quality metrics such as capability, linearity, etc...)
 - 1. Any items listed in Table I.3.1. of the AIAG PPAP manual, revision 3.
 - 2. Tool refurbishment, new tool or modified tool
 - 3. Production from tooling and equipment transferred to a different plant location or from an additional plant location
 - 4. Use of another optional construction or material than was used in the previously approved part
 - 5. Change of source for a subcontracted part, material or service (e.g. heat treating, plating, etc.)
- C. When corrections are needed from a previous submission when parts are found to be unacceptable
- D. When product is manufactured after the tooling has been inactive for 12 months or more
- E. Following a customer request to suspend shipment due to a supplier quality concern
- F. Annual re-qualification - upon request of CONTINENTAL . The specific parameters to be submitted for revalidation will be identified on the part specification by an @ symbol.

VII. SPECIAL CHARACTERISTICS REQUIREMENTS

- A. Submission requirements for each characteristic:
 - 1. <!> or <S/C> - Supplier must submit data in element 9 or 11, indicating capability to meet this dimension. The supplier must also identify this item on the product control plan and negotiate an acceptable submission requirement and frequency with CONTINENTAL SQA.

Title: **PRODUCTION PART APPROVAL PROCESS (PPAP)**

2. * - Supplier must submit data in element 11 for this initial capability study parameter, indicating capability to meet this dimension. The supplier must also resubmit these data when making changes identified in section VI.
 3. @ - Supplier must submit data in element 11 for these periodic capability study parameters, and must negotiate a resubmission schedule with CONTINENTAL SQA.
 4. Other customer-assigned characteristics - Supplier must submit data in element 9 in accordance with CONTINENTAL SQA or Design Engineering requirements, as specified by CONTINENTAL customer. The supplier must also negotiate an acceptable submission requirement and frequency with CONTINENTAL SQA prior to production shipment.
- B. All measuring equipment used to monitor special characteristics will be assessed for repeatability, reproducibility, stability, linearity and accuracy (bias). The supplier shall submit evidence of these analyses under element 8 if required.
- C. Where a measurable characteristic is defined, a preliminary capability (Ppk) of > 1.67 , or an ongoing capability (Cpk) of > 1.33 is required, per AIAG PPAP section I.2.2.9.3, AND GR&R studies meeting MSA requirements for measurement systems.
- D. Where an attribute characteristic is defined, all parts from the significant production run (minimum 300 pieces) must be checked with zero defects, to determine a preliminary capability.
- E. The supplier is responsible for meeting all special characteristics ongoing reporting and capability requirements.
- F. Special characteristic controls must be based on AIAG SPC, Control Plan, MSA and QS-9000 methods for all quantifiable parameters identified as SC's. Special characteristic controls may include the following:
1. Continuous process monitoring (SPC, control charts, etc.)
 2. Ongoing capability performance monitoring (Cpk)
 3. Additional measurement system analysis requirements, such as linearity, stability, bias or accuracy
 4. 100% inspection, sorting or testing.
- G. The control plan, with all SC's identified, must be submitted under element 7 if required.
- H. Regardless of capability requirement or the demonstrated process capability, continuous improvement is required, with the highest priority on customer special characteristics.

VIII. OTHER SPECIFIC SUPPLIER REQUIREMENTS

- A. The supplier is responsible for submitting a PPAP package with accurate representation of capability against the CONTINENTAL specification.
- B. Any results that are not compliant to the special characteristics criteria in section VII, or pass/fail criteria for all other parameters are cause for CONTINENTAL to reject the submission. In these cases, the supplier shall submit interim PPAP, and clearly identify which parameters are not compliant on the warrant (element 18). The interim submission must include a plan to gain compliance, including resubmission of PPAP.
- C. Production shipments cannot be made to CONTINENTAL until a signed warrant (element 18) has been returned to the supplier. Material or parts shipped without a signed PSW may not be accepted and may be returned to the supplier at their own cost. The supplier should also review the production purchase order, in order to assure that the P/O received from CONTINENTAL Purchasing matches the signed warrant prior to acknowledging the purchase order.
- D. If CONTINENTAL SQA grants interim approval of the supplier PPAP submission, the supplier must contact CONTINENTAL SQA and negotiate an acceptable action plan to correct deficiencies. This plan must include a plan to resubmit PPAP.
- E. The supplier should retain all elements of the PPAP, regardless of submission requirements of CONTINENTAL .