



## PPAP Submission Review and Approval

Document No.: CW-8-ALL-500

Revision: A

Revision Date: 11<sup>th</sup> April 2019

### 1.0 PURPOSE / SCOPE:

- 1.1 The work instruction defines the review and approval process and the submission evidence required for TI Automotive and suppliers to satisfy the requirements for the Production Part Approval Process (PPAP). This process is aligned directly with APQP milestones and the latest version of the AIAG Production Part Approval Manual. This process will ensure TI Automotive associates and suppliers follow the same guidelines for review and approval for PPAP submissions.
- 1.2 TI Automotive sites includes all manufacturing sites including those that will provide product to other TI Automotive sites. (internal, inter-company suppliers)
- 1.3 This work instruction supports the requirements as defined in CP-8-ALL-05 APQP/PPAP Product Realization Supplemental Process.

### 2.0 RESPONSIBILITIES:

- 2.1 The Process Owner is the Global Director Corporate Quality Systems.
- 2.2 The TI Automotive site is responsible to ensure that all required elements and sub-elements for the Production Part Approval Process (PPAP) are fulfilled for product/assemblies we will be providing to our customers.
- 2.3 External suppliers are responsible to ensure all required elements and sub-elements for the PPAP for the component/product they will supply TI Automotive are fulfilled. For clarification issues, the supplier should contact the TI Automotive site that will be using the product.
- 2.4 External suppliers are responsible that the Production Part Approval Process documentation and samples are at the TI Automotive site as requested on the purchase order. It is the responsibility of the supplier to notify TI Automotive of any delays.

### 3.0 DEFINITIONS:

- 3.1 AIAG - Automotive Industry Action Group
- 3.2 ANOVA- Analysis of Variance
- 3.3 APQP - Advanced Product Quality Planning
- 3.4 CSR- Customer Specific Requirement
- 3.5 FMEA - Failure Mode and Effects Analysis
- 3.6 GQS – Global Quality Management System
- 3.7 MSA - Measurement System Analysis
- 3.8 NDC - Number of Distinct Categories
- 3.9 OEM – Original Equipment Manufacture



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- 3.10 PPAP – Production Part Approval Process
- 3.11 PSW – Part Submission Warrant
- 3.12 PLT - Plant Trial Run
- 3.13 QMS – Quality Management System
- 3.14 SD- Supplier Development
- 3.15 SRCA - Supplier Request for Change Approval
- 3.16 TS – Technical Specification
- 3.17 DFMEA – Design Failure Modes and Effects Analysis
- 3.18 PFMEA – Process Failure Modes and Effects Analysis
- 3.19 RPN – Risk Priority Number
- 3.20 GRR – Gage Repeatability and Reproducibility
- 3.21 IMDS – International Material Data System
- 3.22 REACH – Registration, Evaluation, Authorization, and Restriction of Chemicals

#### **4.0 REFERENCES / ASSOCIATED DOCUMENTS:**

- 4.1 IATF 16949 Automotive Quality Management System Standard
- 4.2 AIAG Production Part Approval Process (PPAP)
- 4.3 CP-8-ALL-41 Global Supplier Requirements Manual (GSRM)
- 4.4 CP-8-ALL-48 Supplier Advanced Product Quality Planning
- 4.5 CP-8-ALL-05 APQP/PPAP Product Launch Scorecard Tracking Procedure (Internal)
- 4.6 CF-8-ALL-0500 PPAP Submission Review and Approval Tracking Spreadsheet
- 4.7 CF-8-ALL-0510 TI Automotive PPAP Warrant
- 4.8 CF-8-ALL-0515 APQP Process Steps RASI Chart (Internal)
- 4.9 CW-8-ALL-501 PPAP Engineering Change/ Tool and Equipment Maintenance (Internal)

#### **5.0 PROCESS / INSTRUCTIONS:**

- 5.1. Requests for PPAP submissions will be identified in the Purchase order, and will include instructions for PPAP shipment/delivery. The default level for submission is Level 3.
- 5.2. Approval of the submission will be authorized by the customer. For supplier PPAP submissions, the authorization will be from the responsible TI Automotive representative.
- 5.3. English is the required language for PPAP submissions. TI Automotive must approve any exception. If a customer requires the information in a native language other than English; then the information will be in both languages.



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- 5.4. Accepted PPAP's will be communicated with an authorized PSW, signed by the customer or for suppliers; by the TI Automotive representative. When TI Automotive accepts a supplier PPAP, the signature indicates only that TI Automotive has accepted the package from the supplier. The supplier is responsible for the content and the accuracy of the information submitted in the package.
- 5.5. Interim approvals will only be given under special circumstance, and will be valid for defined timescales, batch, or quantity dependent upon the product type. The customer or TI Automotive will provide detail of the requirement for subsequent full approval. Interim approvals will be managed through the TI Automotive SRCA / Deviation Sheet process.
- 5.6. Rejected PPAP's will be notified to the originator along with detail of the rejection.
- 5.7. Providing the PPAP documentation is within the year, all approvals (full and interim) are valid for supply into all TI Automotive facilities providing they contain other TI Automotive specific documentation such as; IMDS, Bar Code Labels, Packaging, and PSW. However, there may be situations where the OEM has additional specific requirement for the PPAP data to be submitted using customer specified format. In those cases, suppliers would be required to support TI Automotive with complying with this mandate. Usage in other TI Automotive facilities 1 year after the initial PPAP shall require current status of all PPAP documentation in the PPAP for the additional facility.
- 5.8. **AIAG Manuals**
  - 5.8.1 Throughout this procedure, reference is made to various "AIAG Manuals" – these are a series of booklets published by "Ford, General Motors, and Chrysler". They are available as reference to all Businesses and can be obtained from Carwin Ltd – [www.carwin.co.uk](http://www.carwin.co.uk), or direct from AIAG - [www.aiag.com](http://www.aiag.com).
  - 5.8.2 Production Part Approval Process (PPAP)
  - 5.8.3 Measurement System Analysis (MSA)
  - 5.8.4 Potential Failure Mode and Effects Analysis (FMEA)
  - 5.8.5 Advanced Product Quality Planning and Control Plan (APQP)
  - 5.8.6 Statistical Process Control (SPC)
  - 5.8.7 It is the responsibility of the TI Automotive site and the supplier to ensure that latest editions are available to them, and that the requirements are implemented accordingly.
  - 5.8.8 Where additional TI Automotive Customer Specific Requirements (CSR) are imposed, the requirements will be identified on the RFQ, and subsequent Purchase Order.



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**5.9 Approval Submission Requirements**

Level	Description
1	Submission of Warrant only (PSW).
2	Submission of Warrant with product samples and limited supporting data.
3	Submission of Warrant and complete supporting data.
4	Warrant and other requirements defined by Customer/TI Automotive.
5	Warrant with Product Samples, and complete Supporting Data reviewed at the Supplier's manufacturing location.
Prototype	Warrant and other requirements defined by Customer/TI Automotive Engineering.

5.9.1 The default for PPAP Submission is "Level 3". Written authorization is required prior to submission for any exceptions.



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### 5.10 PPAP and Review and Approval Submission Checklist

All PPAP submissions will be reviewed and approved using CF-8-ALL-0500 PPAP Review and Approval Submission Checklist.

PPAP Review and Approval Submission Checklist														
Plant Supplier:		Part Number												
Plant Supplier Contact Name:		Part Description												
Tracking Date:		Drawing Number/Revision												
Does this program have directed suppliers?			Y/N	PPAP Reviewed By:										
(Tab) Element			Evidence Information Task No. (OK, NOK, DEV, Interim)											
			1	2	3	4	5	6	7	8	9	10	11	
1) Design Record														
1A) Special Characteristics Defined														
2 & 3) Eng Change or Deviation; and Approval														
4) Design FMEA														
5) Process Flow Diagram														
6) Process FMEA														
7a) Prototype Control Plan														
7b) Pre Launch Control Plan														
7c) Production Control Plan														
8) Measurement System Analysis														
9) Dimensional Results														
9A) Dimensional Report Form														
10) Performance Result														
Design Validation Plan & Report														
Production Validation Plan & Report														
10A) Performance Report DVPR - Signoff														
10B) Performance Report PVPR - Signoff														
10C) Material Results														
10D) Material Report														
11) Initial Process Studies														
11A) Special Characteristic Signoff														
12) Qualified Laboratory														
13) Appearance Report														
14) Sample production Parts														
15) Master Sample														
16) Checking Aids														
17) Customer Specific Requirements														
Confirm CSR list in master file														
Approval 17a - 17j														
17A) IMDS														
17B) REACH														
17C) CAMDS														
17D) Packaging														
17E) Run at Rate														
17F) Tools and Gauges														
17G) CQI Documents														
17H) Tool/PPAP Purchase order														
17J) Sub-Supplier PPAP														
18) Part Submission Warrant Submission														
18A) PSW Approval - OEM / TI														

 <p><b>TI Automotive</b></p>	<p><b>PPAP Submission Review and Approval</b></p>	<p>Document No.: CW-8-ALL-500 Revision: A Revision Date: 11<sup>th</sup> April 2019</p>
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#### 5.14 Documentation / Records

- 5.14.1 The data/documentation shall be submitted using TI Automotive formats provided in the the PPAP Review and Approval Submission Checklist (CF-8-ALL-0500) and must be filled out and submitted with the supporting PPAP documentation.
- 5.14.2 Regardless of the submission level, all documentation / at minimum records shall be maintained for the life of the part, plus service + one calendar year. In addition, PPAP records shall also be retained to satisfy Customer Specific Requirements (CSR) as defined in IATF 16949, It is the responsibility of the TI Automotive site (Internal PPAP) and the Supplier (external PPAP) to ensure that the appropriate records from a superseded PPAP file are included, or referenced in the new part file.
- 5.14.3 TI Automotive and Supplier Retention / Submission Requirements: See requirements defined in CP-8-ALL-50 APQP/PPAP Product Realization Process
- 5.14.4 The following forms are available within GQS and externally to suppliers via the Supplier Resource Site and can be utilized for submission if no other form is available:
- CF-8-ALL-0501 PPAP Deviation Request
  - CF-8-ALL-0502 PPAP Dimensional Result
  - CF-8-ALL-0503 Performance Report DVP
  - CF-8-ALL-0504 Performance Report PVP
  - CF-8-ALL-0505 Logistics Agreement
  - CF-8-ALL-0506 Run @ Rate
  - CF-8-ALL-0507 Run @ Rate Guideline
  - CF-8-ALL-0508 Special Characteristics Results
  - CF-8-ALL-0509 Material Test Report

### 6.0 PPAP Section Guideline Requirements

#### 6.1 **Design Record (PPAP Clause 2.2.1 Checklist Tab 1)**

- 6.1.1 Design Record - Approved drawing (print) in the customer or TI Automotive template, authorized by TI Automotive Engineering, and at the correct level for the part being submitted. Any exceptions must be approved by TI Automotive prior to submission.
- 6.1.2 Note: Copies of the Suppliers own drawing are not acceptable – unless this has been formally approved by TI Automotive prior to the submission.
- 6.1.3 The submitted drawing or design record revision must match the drawing revision on the Purchase Order.



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- 6.1.4 All text shall be in English - it is acceptable for duplicate text to be notated in the originators language.
- 6.1.5 Special Characteristic (SC) items shall be highlighted along with any other special requirement. (CW-4-ALL-411 Supplier Safety, Critical and Functional Mandatory Requirements)
- 6.1.6 The drawing level is verified against the purchase order (PO).
- 6.1.7 Dimensions, Material / Performance tests or specifications shall be sequentially numbered/ballooned for reference purposes. See also Dimensional Results & Material, Performance Test Results. – *Note- for electronically transmitted documents, this may entail printing off in hard copy – reference marking the criteria, and then rescanning for submission back with the PPAP file.*
- 6.1.8 Any questions or concerns regarding the design record or these requirements must be submitted to TI Automotive in writing and resolved before the PPAP package is submitted. Examples can also be provided upon request.

**6.2 Engineering Change Documents (PPAP Clause 2.2.2 Checklist Tab 2)**

- 6.2.1 Engineering Change Documents – Copies of documents approving engineering changes incorporated into the part, but not yet evident within the design record.
- 6.2.2 Where required, customer approval must be included for any changes not incorporated in the design record.
- 6.2.3 A TI Automotive approved Supplier Request for Change Approval (SRCA) must be included for any supplier driven changes not incorporated in the design record. If a TI Automotive driven change is in process, the supplier should include a copy of the request/instruction.

**6.3 Engineering Approval (PPAP Clause 2.2.3 Checklist Tab 3)**

- 6.3.1 Engineering Approval – TI Automotive sites and suppliers must provide evidence that engineering approval has been given for the part for any changes not reflected on the original drawings or purchase order.
- 6.3.2 TI Automotive engineering approval is typically given by issue of an authorized part drawing or an approved engineering change request. Depending on the TI Automotive location, this either could be in written form or electronically approved. For suppliers who are design responsible, approval of the part detail is by the transfer of the supplier drawing onto TI Automotive template and then TI Automotive authorized.

**6.4 DESIGN FMEA (PPAP Clause 2.2.4 Checklist Tab 4)**



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- 6.4.1 Design FMEA – Evidence of a properly completed Design Failure Mode and Effects is required in all PPAP submissions. This evidence can either be a copy of the DFMEA or written confirmation the DFMEA and key design parameters were reviewed by the customer and the supplier. Analysis is normally only applicable if the supplier is design responsible for the submission part. It is the policy of TI Automotive not to release copies (electronic or hard).
- 6.4.2 The format of the DFMEA document and the scoring evaluation shall be consistent with the current edition AIAG - FMEA Manual. The document itself shall be revision controlled, authorised, dated, and formulated by a core “functional” team of appropriately trained personnel. The FMEA must include a record of all changes or modifications made since the original approved document. The DFMEA should be considered as a live document, and be continually updated as changes occur or additional information is obtained throughout the product development stages.
- 6.4.3 Design characteristics that affect high-risk priority failure modes (S/R/F) are identified.
- 6.4.4 Critical/Significant Characteristics are identified and captured in the DFMEA per CW-4-ALL-410 (internal) and CW-4-ALL-411 (external).
- 6.4.5 Appropriate corrective actions have been taken/planned for high RPN’s, and the risk numbers were revised when the design change is completed. TI Automotive sites and suppliers should constantly monitor and reduce risk by reviewing the RPN levels and updated plans for improving the five highest values.
- 6.4.6 The default-rating format for assessing RPN is the AIAG guidelines. Suppliers that utilize a different format must receive approval from TI before submission.
- 6.4.7 Updates to the DFMEA shall evidence periodic reviews and take into account applicable warranty, historical campaign, lessons learned; similar DFMEA’s or concern data. The revision box shall also evidence instances where the document has been reviewed but no actual amendment to the detail has been made.
- 6.4.8 In some cases, a supplier may have a policy relating to “Company Confidential” information and distribution of DFMEA and PFMEA documentation. To satisfy the requirements for PPAP, a statement as to the revision level / date of the document must be included in the appropriate section of the PPAP package. In addition, and on request, the Supplier should be prepared to review this information with TI Automotive representatives.

### 6.5 PROCESS FLOW DIAGRAM (PPAP Clause 2.2.5 Checklist Tab 5)

- 6.5.1 Process Flow Diagram - is a diagram that clearly identifies all process steps utilised through the entire manufacturing process of the part.



- 6.5.2 There is no prescribed format for the Process Flow, except that it should identify the part or family of parts to which it applies and is revision controlled including a record of all changes made to the document. The document should also include the proper approvals and authorizations.
- 6.5.3 In addition to this the reader should be able to correlate the process steps to the content of the PFMEA and Control Plan with keyed or numbered process steps, and also differentiate as a minimum:
- Receiving
  - Manufacturing stages
  - Movement of parts between processes
  - Storage
  - Inspection stages
  - Shipping
- 6.5.4 The Process Flow Diagram will identify critical processes that affect significant part features/dimensions at each appropriate station. (CW-4-ALL-410 Safety, Regulatory and Functional Mandatory Requirements) (CW-4-ALL-411 Supplier Safety, Regulatory and Functional Mandatory Requirements)  
Note: It is acceptable to submit a “Quality Plan”, which typically shows an integrated Process Flow and Control Plan as one document.

## **6.6 PROCESS FMEA (PPAP Clause 2.2.6 Checklist Tab 6)**

- 6.6.1 Process FMEA - Process Failure Mode and Effects Analysis is a methodology used to determine in advance of start of production, any potential failures / harmful effects that could occur to the process or the product during manufacture, as well as consideration for Special Characteristics associated with the part per CW-4-ALL-410 and CW-4-ALL-411).
- 6.6.2 The format of the PFMEA document and the scoring evaluation shall be consistent with the current edition AIAG - FMEA Manual. The document itself shall be revision controlled, authorised, dated, and formulated by a core “functional” team of appropriately trained personnel. The PFMEA must include a record of all changes or modifications made since the original approved document. The PFMEA should be considered as a live document, and be continually updated as changes occur or additional information is obtained throughout the product development stages.
- 6.6.3 All operations affecting fit, form and function, durability, governmental regulations and safety are identified on the PFMEA.
- 6.6.4 Stations where safety is affected are properly identified on the PFMEA.
- 6.6.5 The PFMEA is keyed to the Process Flow Diagram and matches the sequence number key.
- 6.6.6 Process parameters are considered for potential failure modes.



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- 6.6.7 Note: Requirement is that Current controls are split into two categories:
- 6.6.8 Prevention – Controls such as Poka–yoke that prevent an occurrence happening.
- 6.6.9 Detection - Controls which rely on inspection to detect defects.
- 6.6.10 Any ranking evaluation methods other than those defined within the AIAG manual must be approved by the customer and/or TI Automotive prior to submission of the PFMEA
- 6.6.11 Updates to the PFMEA shall evidence periodic reviews and take into account applicable historical campaigns, lessons learned, similar PFMEA's warranty or concern data. The revision box shall also evidence instances where the document has been reviewed but no actual amendment to the detail has been made.
- 6.6.12 If the process FMEA is considered proprietary, a statement as to the revision level / date of the document should be made. In addition, and on request, the Supplier should be prepared for TI Automotive representatives to review the document at any time.

**6.7 CONTROL PLAN (PPAP Clause 2.2.7 Checklist Tab 7)**

- 6.7.1 Control Plan - Defines all of the controls employed to assure the quality of the part through the entire manufacturing route, taking particular consideration for Special Characteristics.
- 6.7.2 The format of the Control Plan should be consistent with the current edition AIAG - Advanced Quality Planning and Control Plan Manual with revision control and authorised by an appropriate person. Where TI Automotive Customer Specific Requirements (CSR) are given, the TI Automotive representative will communicate the requirements through Purchasing.
- 6.7.3 The Control Plan should evidence:
- Review and update as appropriate, to any changes that affect product, manufacturing processes, measurement, logistics, supply sources or FMEA.
  - Process numbering should cross-reference to those detailed within the Process Flow and PFMEA (incoming receiving through shipping).
  - Clearly and easily identifiable S/R/F controls, safety, government compliance and regulatory items.

- All special product/process characteristics – for special characteristics SPC is the typical production control method. (CW-4-ALL-410 *Safety, Regulatory and Functional Mandatory Requirements*, CW-4-ALL-411- *Supplier Safety, Regulatory and Functional Mandatory Requirements* and CW-4-ALL-440- *Special Characteristics*)
- Review and update as appropriate for any/all changes due to non-conformance, warranty or changes in risk.
- Drawing specifications requiring inspection.
- Engineering performance test requirements
- Preventative controls such as maintenance, tool checks, etc.
- Storage, cleanliness and handling controls and protective measures.
- Include lot control and traceability controls as required in CW-4-ALL-410 and CW-4-ALL-411
- First Off Piece (FOP) and Last Off Piece (LOF) inspection
- Revision block for history

6.7.4 Evaluation methods should detail precise types of measuring equipment (gauge), i.e., it is not acceptable to just enter “Micrometer”; the correct definition would be “1 – 25mm Digital Micrometer”. *This is important, as each type of equipment will require MSA study evaluation – refer Section 8 Measurement System Analysis.*

6.7.5 All quoted gages and test equipment are to be available, as required.

6.7.6 Control Plans shall be identified by type, i.e. Prototype, Pre-Launch, or Production.

6.7.7 Prototype – define the dimensional measurements, material and functional tests that occur during prototype build.

6.7.8 Pre-Launch - define the dimensional measurements, material and functional tests that occur after Prototype but before Production. The requirements should be more stringent than for Production to protect TI Automotive from potential non-conformance during initial production runs.

6.7.9 Production – is a living document that reflects the experiences gained by actually producing parts, and as such should be less demanding than the Pre-Launch control plan.

## 6.8 MEASUREMENT SYSTEM ANALYSIS STUDIES (PPAP Clause 2.2.8 Checklist Tab 8)

6.8.1 Measurement System Analysis Studies (MSA) - Determines the acceptability of inspection equipment for the attribute they are measuring. This acceptance considers both the ability of the instrument to measure consistently to the required accuracy (Repeatability), and the ability of a number of operators to use the equipment in the working environment and achieve similar result (Reproducibility).

6.8.2 Variable MSA studies should be conducted using:

- i) 10 samples (selected from normal process variation)
- ii) 3 operators
- iii) 3 trials
- iv) ANOVA method
- v) Acceptance criteria levels: 0-20% and, NDC's  $\geq 5$
- vi) Data must demonstrate stability and control.

6.8.3 It is expected that test data will be re-calculated in response to significant process or operator changes, and that a schedule for routine re-evaluation will be defined.

6.8.4 It is up to the individual TI Automotive site or the supplier to determine which software package is utilised for calculating MSA data, and TI Automotive may request/perform correlations studies with Minitab. Beyond the parameters defined within the AIAG manual - Equipment Variation, Appraiser Evaluation, R&R, Part Variation, and Total Variation – TI Automotive may request % Study GRR.

6.8.5 Attribute MSA studies should be conducted using:

- i) 50 samples
  - a. 25% near lower gage boundary
  - b. 25% near upper gage boundary
  - c. 30% normal process variation
  - d. 10% just outside lower gage boundary
  - e. 10% just outside upper gage boundary
- ii) 3 operators
- iii) 3 trials
- iv) Reference values for all parts are included (i.e., actual part measurements)
- v) Kappa Coefficient  $> 0.70$

6.8.6 All gages are tracked and evidence will support a proper calibration system. Additionally, all gage calibrations are traceable to the appropriate regional standard.

6.8.7 All inspection and test equipment/gages identified within the Control Plan should have studies conducted, to determine their suitability for purpose. It is acceptable



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to conduct one study for each type of equipment as long as the equipment is being used for measuring similar attribute in similar working environment with similar part tolerances and dimensions.

- 6.8.8 *Additionally, the measurement device should have sensitivity ten times the part feature dimension: e.g., a x.xx dimension should be measured with an x.xxx gage.*
- 6.8.9 The PPAP submission should include “acceptable” test data for all control plan inspection equipment.

**6.9 DIMENSIONAL RESULTS (PPAP Clause 2.2.9 Checklist Tab 9)**

- 6.9.1 Dimensional Results – Confirms that all dimensional requirements of the design (as shown on the drawing or print) and Control Plan have been met.
- 6.9.2 The report should include:
  - i) TI Automotive part number
  - ii) TI Automotive part description
  - iii) Design change level (revision level)
  - iv) Date when tests were carried out
  - v) Item sequential references/balloons as depicted on the drawing – see Section 1 Design Record.
  - vi) Dimension / specification /notes against each reference
  - vii) Specification limits for dimensions
  - viii) Measurement equipment used
  - ix) Minimum of 5 samples per cavity reported, unless otherwise agreed upon with TI. The submitted samples should be numbered (1 - 5).
  - x) Qualification of results – OK / NOK
  - xi) Authorisation Signature / Name / Job Title / Date.

**6.10 MATERIAL, PERFORMANCE TEST RESULTS (PPAP Clause 2.2.10 Checklist Tab 10)**

- 6.10.1 Material, Performance Test Results – Confirms that all material and performance test requirements of the Design (drawing or print), and Control Plan have been met.
- 6.10.2 The format of the Material and Test results should be consistent with the current edition AIAG form – PPAP Manual. Where TI Automotive Customer Specific requirements are given, the TI Automotive representative will communicate the requirements through Purchasing. (EG, JOEM specifics)

Material Test Results	Performance Test Results
Design change level (revision level) for the parts being tested. (See Section 1)	
Any authorized engineering change documents that have not yet been incorporated into the design. <i>(Not normally applicable to TI Automotive -see Section 4.2)</i>	
The number, date, and change level of the specifications to which the parts are being tested.	



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The date when testing was carried out.

Quantity of parts actually tested

Actual results of tests – and qualification of "Pass or Fail".

- 6.10.3 It is acceptable to include a Design Validation Performance Report (DVPR) as the submission for this section of the PPAP. Where TI Automotive Customer Specific requirements are given, the TI Automotive representative will communicate the requirements through Purchasing. (EG, JOEM specifics)
- 6.10.4 If any of the data is from sub-supplier processes, e.g. external coating, then the Company Name & Address of the Supplier, contact name/information is also to be recorded

**6.11 INITIAL PROCESS STUDIES (PPAP Clause 2.2.11 Checklist Tab 11)**

- 6.11.1 Initial Process Studies – Determine if the production process is likely to produce product, which meets the TI Automotive design specification.
- 6.11.2 Process studies are to be carried out on processes where attributes designated as Special Characteristics are determined, and focuses on variable data - and not attribute (Go/No Go) data. Initial studies are by their nature short term, and will not predict the effects of time and variation in people, materials, methods, equipment, measurement systems and the environment. The data collected should be used for the creation of usable control charts.
- 6.11.3 Data collected using X-Bar & R-Charts should be based upon a minimum of 25 subgroups containing at least 125 readings from consecutive parts of a significant production run. The samples should be collected in a pattern of collect 5, skip 5, collect 5 skip 5 (and so on) until 125 samples are collected.
- 6.11.4 The default capability for NEW or REVISED processes is  $C_p / C_{pk} > 1.33$  or  $P_p / P_{pk} > 1.67$ . This default may be amended at the discretion of TI Automotive.
- 6.11.5 The data must demonstrate normality, control and stability.
- 6.11.6 For existing processes minimum  $C_p / C_{pk}$  is  $> 1.33$ .  
Note: The purpose of the study is not to just achieve a specific capability index, but to understand the variation within the process.
- 6.11.7 Where there are no designated special characteristics, at the discretion of TI Automotive – Commodity Quality representative, other process capability studies may be requested.

6.11.8 All SPC protocols shall be as defined within the AIAG Manual – Statistical Process Control, or other with prior agreement of TI Automotive Commodity Quality representative.

6.11.9 The PPAP submission should include calculated Cp/Cpk or Pp/Ppk indices for defined characteristics or processes as well as any support data used for the calculation.

## **6.12 QUALIFIED LABORATORY DOCUMENTATION (PPAP Clause 2.2.12 Checklist Tab 12)**

6.12.1 Qualified Laboratory Documentation – This is the certificate evidencing that a laboratory or test house is qualified (Accreditation certificates/marks of accreditation per IATF 16949) to perform the inspections or test that it has been asked to carry out, and the Calibration certificates issued against calibration equipment (gauges).

6.12.2 The requirement for PPAP submission is that all inspection and test equipment used to validate PPAP data has a current certificate issued by a qualified laboratory/auditor, with coverage under IATF-16949 (Accreditation certificates/marks of accreditation per IATF 16949).

6.12.3 For instruments that are calibrated or qualified internally by the supplier, certificates are required for the original equipment used for the self-calibration as well as the internal data sheet for the instrument itself.

6.12.4 Therefore each submission should include:

- i) Copy of the calibration certificates for all inspection and test equipment used.
- ii) Copy of the Laboratory scope for all calibration bodies issuing the certificates (Accreditation certificate).
- iii) Copy internal calibration data (self-calibration items only).

Note 1: Laboratory certificates can normally be downloaded from the appropriate website, but if this service is not available, copies will be available direct from the calibration body.

Note 2: External testing for material & performance results, should also only be carried out by qualified laboratories, therefore copy certificates will also be required for these suppliers.

## **6.13 APPEARANCE APPROVAL REPORT (PPAP Clause 2.2.13 Checklist Tab 13)**

*TI Automotive parts do not currently carry appearance related criteria as part of the design record therefore this section does not apply.*

## **6.14 SAMPLE PRODUCTION PARTS (PPAP Clause 2.2.14 Checklist Tab 14)**

6.14.1 Sample Production Parts – These parts are representative of the condition of the manufacturing processes and tooling at the time of submission.





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- 6.14.2 The parts used for qualifying the dimensional report, are to be forwarded to TI Automotive along with the PPAP submission.
- 6.14.3 Under no circumstance should these parts be reworked, altered or changed in any way prior to submission.
- 6.14.4 The samples should be identified by part number, batch reference and sample number and, packed such that they will not incur any damage or detrimental effect during transit, and should be addressed to the TI Automotive Commodity Quality representative.
- 6.14.5 Note: The supplier should retain further samples (minimum 5) from the same batch / production run to those submitted to TI Automotive. It is possible that further qualification may be required either at TI Automotive or at the Supplier, and if this is the case, then these parts should be used for the evaluation.
- 6.14.6 In addition to the above, additional sample quantities (Dependent upon the commodity group) will be required by TI Automotive. These should all be from one batch and be representative of the process under normal manufacturing conditions.
- 6.14.7 Supplier to ship PPAP samples per requirements defined on the PO.

### 6.15 MASTER SAMPLE (PPAP Clause 2.2.15 Checklist Tab 15)

- 6.15.1 Master Sample – Is a qualified part showing the condition of manufacture at the time of PPAP approval, and should be from the same production batch as those submitted for PPAP approval.
- 6.15.2 The supplier shall retain a master sample for the same period as the PPAP approval records, or until
- i) A new master sample is produced for the same revision part number for approval.
  - ii) A master sample is required by the design record, control plan, or inspection criteria as a reference or standard.
- 6.15.3 The master sample shall be identified for its status, i.e. “Master”, as well as the date approved by TI Automotive.
- 6.15.4 Unless specified otherwise by TI Automotive, the supplier shall retain a master for each position of a multiple spindle tool, or manufacturing process.

Note: Only the finished stage part will be approved by TI Automotive, the earlier stages are to be self-qualified by the Supplier.

### 6.16 CHECKING AIDS (PPAP Clause 2.2.16 Checklist Tab 16)





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- 6.16.1 Checking Aids – These are part (or family of parts) specific and used within the manufacturing process to assist in the qualification of the product. Typically, these may be in the form of visual aids, care points, mounted reference samples, models, templates, or variable and attribute gauges.
- 6.16.2 A record of all pertinent checking aids is required for the PPAP submission - these should be either copy documents or a photograph of the aid at the work place. Additionally, the qualification details are to be included. The gage is certified to include all aspects of the gage agree with the part dimension requirements and the gages are listed on the control plan.
- 6.16.3 Where specific design record detail is quoted on the checking aid, it is required that the revision level for the part at the time of issue is also quoted.

Note: Inspection and test equipment mounted or used at the manufacturing process should be calibrated and qualified as Section **6.12** Qualified Laboratory Documentation, and a photograph showing the environment in which they are applied submitted for this section – **6.16** Checking Aids.

**6.17 CUSTOMER SPECIFIC REQUIREMENTS (PPAP Clause 2.2.17 Checklist Tab 17)**

- 6.17.1 Customer Specific Requirements (CSR) – Are records of compliance to IATF 16949 requirements specified by TI Automotive or our customer other than those defined within the AIAG PPAP Manual and should be documented as requested. Examples of some types of CSRs: **(not all inclusive)**

**IMDS:**

Include a copy of the IMDS screenshot submission  
Verify plastic parts are identified with the proper ISO symbol  
As required, evidence that End of Vehicle Life is satisfied  
As required, evidence that RSMS is satisfied

**REACH:**

Suppliers who are categorized as “Downstream User” must submit a written confirmation that the company monitors and controls that the sub suppliers are following the REACH legislation. The confirmation document must also have a definition of a concrete contact person for any issues related to REACH.  
Suppliers who are categorized as “Substance Producer” must submit the above-mentioned written confirmation and the REACH pre- or registration number of the materials supplied to TI Automotive.

**CAMDS:**

All production material substances are reported in the Chinese Materials Data



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System (CAMDS) to the correct user plant and correct part number and approved by TI Automotive. (Product shipped to China only)

**COMPLIANCE TO GOV'T STANDARDS**

Suppliers are also responsible for providing evidence, where required that the product they produce and ship to TI Automotive complies with industry, global and regional laws and standards. These may vary by region or country so the supplier must verify where the product will be used and it is responsible for understanding those regulations. Examples could be: NAFTA, Child Labor Laws, Chinese Compulsory Certification, etc.

**CQI ASSESSMENTS:**

When applicable, include a copy of the latest assessment that is less than a year old.

**LOGISTICS/PACKAGING/LABELS:**

Copy of shipping label

Verification that the packaging was tested and approved

Verification that contingency packaging was tested and approved

**RUN @ RATE:**

The supplier conducted a trial run that demonstrated the ability to meet all quoted capacity and quality requirements. The trial run is/was on a significant production run. The Control Plans, PFMEA and work instructions were updated after the run

**CUSTOMER OWNED TOOLS:**

All customer owned tools are to be tagged and identified as such. Include photos of tagged tools and copies of tool drawings

**TOOL/PPAP PURCHASE ORDER:**

A copy of the latest Tool/PPAP purchase order must be provided in the submission package if requested by TI Automotive.

**SUB SUPPLIER PPAP:**

Suppliers shall provide evidence of sub-supplier PPAP as required and agreed with TI Automotive.

Customer specific requirements are normally initiated by TI Automotive (OEM) customers, who ask for specific detail or inspection reporting methods outside of those stipulated in the AIAG manual. These are normally written into the OEM customer manuals, and if applicable to the Tier 2 supplier will be requested as "Special" at the time of PPAP request.

There shall be a copy of the written agreement for PPAP responsibility for all Customer "Directed" sources.



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*Example: It is a requirement of some OEM's that the supply chain provide evidence that Material suppliers have conducted an assessment of their own on the purchaser to ensure that their product is being applied under the correct conditions.*

*Where this is the case, evidence of such an assessment will be requested as part of the PPAP submission.*

Note: The requirements of this PPAP process also form part of TI Automotive customer specifics and as such all conditions should be applied to the submission.

### 6.18 PART SUBMISSION WARRANT (PSW) (PPAP Clause 2.2.18 Checklist Tab 18)

- 6.18.1 Part Submission Warrant – Is the approval sheet authorised by the Supplier and qualifying the part as acceptable for submission. In effect, it is a summary pass off for all of the other data collated within the PPAP submission.
- 6.18.2 It is a requirement that all fields of the PSW are completed prior to submission; otherwise, the entire PPAP will be rejected automatically. Blank fields are not acceptable – “NA” will suffice in lieu of a blank field.
- 6.18.3 A separate PSW is required for each part number being submitted – unless agreed otherwise by TI Automotive Commodity Quality representative.
- 6.18.4 If production parts are to be produced using more than one set of tools and / or manufacturing process, then a separate dimensional evaluation (see Section 4.9) is required for each, and a separate PSW issued for each – clearly identified for the tooling or process to which it applies.
- 6.18.5 The PSW shall be approved by an “authorised person” at the Supplier prior to submission.
- 6.18.6 Part weight quoted on the PSW must be expressed in Kilogram's and to 4 decimal places (0.0000). To calculate the weight, 10 randomly selected parts are to be weighed (at least 1 from each set of tooling / process) and then the average calculated.
- 6.18.7 The PSW format is TI Automotive specific. **(CF-8-ALL-0510)**

### **7.0 REASON FOR CHANGE TABLE:**



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<b>REVISION LETTER</b>	<b>REVISION DATE</b>	<b>DESCRIPTION OF CHANGE</b>	<b>APPROVAL HISTORY</b>
A	5 <sup>th</sup> April 2019	Initial Release into the Corporate Quality System	Global Director Corporate Quality Systems