

PPAP Process Checklist \ Sign Off Sheet instructions

In addition to these requirements you must meet all Nexteer Automotive Supplier Requirements noted in the Nexteer Automotive Supplier Website. Nexteer Automotive has moved to electronic PPAP documentation submission and storage for global collaboration and access. In order to facilitate multi regional sharing of information, all PPAP documentation shall be in English, or include an accurate English translation. See the Nexteer Supplier Website for electronic submission Instructions: Nexteer.com, Suppliers, Processes, Quality. The first page of the package should be the approved PPAP checklist from the Nexteer Advanced Quality Engineer (AQE) or Supplier Quality Engineer (SQE). The Nexteer AQE/SQE must refer to the electronic version of this checklist for specific requirement notes and comments by section (See the appropriate version of the Nexteer Automotive Form F1020 – PPAP Checklist, located in the Nexteer Supplier Portal). Consult your AQE/SQE for more information.

These instructions have been revised to conform to the latest update of the PPAP Process Checklist, and are specific to Nexteer Automotive. These revisions are intended to correspond to AIAG PPAP 4th Edition manual, including OEM Customer Specific Requirements for Nexteer Automotive. Reference the latest version of the PPAP Manual: www.aiag.org

NOTE: Nexteer's OEM Customer requirements may supersede the PPAP Checklist requirements. In this instance, the OEM Customer requirements will be discussed during the MAPP (Manufacturability Assessment and Process Plan) Review.

- 1) **a) Design Record - Drawing** – Send in a legible copy of the Print with the submission. Each and every feature (including Print Notes, Standard Tolerance Notes and Specifications) must be “ballooned” or “road mapped” to correspond with the inspection results. Notes on the print must also be included on the ballooned print, and on the inspection data. The print must be at a minimum; a Nexteer Product Engineering signed print.

b) Design Record – Functional / Material / Test Specifications/Purchase Specifications – Send in a legible copy of all customer design records and specifications. **NOTE:** For Specifications that are copyright protected, Supplier is to provide Nexteer with a document stating the revision level of specification used.
- 2) **Engineering Change Documents** – Any marked and signed drawings, specifications etc., authorizing a Supplier to deviate from the design record. For Nexteer, a deviation must normally be authorized by way of an Engineering Permit. Applicable Engineering Permit(s) should be included in this section of PPAP. If the Supplier PPAP submission includes changes referenced on a submitted Supplier Change Request (SCR), then a copy of the approved SCR must be included in this section of PPAP.
- 3) **Customer Engineering Approval** – This is a section which is included in latest AIAG PPAP manual, but which has little to no application for Nexteer Automotive components. Nexteer's engineering department will not typically provide an approval regarding PPAP prior to the submission itself. As such, this section will typically be left blank. This section may be used in the case of OEM engineering approval, if required for a Directed Buy component.
- 4) **Design FMEA (DFMEA), if Supplier is Design Responsible** - The Design FMEA is required if the Supplier is responsible for the design of the part (For example: Black Box design). Otherwise, the Design FMEA is the responsibility of Nexteer Automotive. If the Supplier feels that the Design FMEA is proprietary, they should insert a sheet in the PPAP package stating their position. Reference the latest version of the FMEA Manual: www.aiag.org

- 5) **Process Flow Diagram (PFD)** – The Process Flow Diagram must follow the process from receipt of raw material and receiving inspection, through any warehousing and shipping steps. It should also include any "Dock Audits" and Final Inspections. The PFD shall comprehend all potential paths that a part can take in the process, including inspection, containment, rework, and scrap. The PFD must include material shipped to sub-contractors and the returning of the material back to the Supplier's plant. The Nexteer preferred format (Appendix 13.2) is available on the Nexteer Automotive Supplier Website.

Location: Nexteer.com, Suppliers, Processes, Quality

Important: There must be a one-to-one match of the Operation numbers between the PFD, FMEA and Control Plans, to allow for easy cross-referencing of the documents (unless for "family" of parts). Nexteer Special Characteristics must be noted on PFD's.

- 6) **Process FMEA (PFMEA)** – The PFMEA is a living document and should:

- Be initiated before or at the MAPP stage,
- Be initiated prior to tooling for production,
- Take into account all manufacturing operations from individual components to assemblies, and,
- Include all processes within the plant that can impact the manufacturing and assembly operations, such as shipping, receiving, transporting of material, storage, conveyors or labeling.

The PFMEA needs to be reviewed by Nexteer prior to the PPAP submission. Ensure that the PFMEA meets AIAG's requirements for Severity, Detection and Occurrence ratings. For Nexteer Special Characteristics, see section 4.5 of the Nexteer Supplier Requirements manual located on the Nexteer Automotive Supplier Website. **Important:** The Supplier PFMEA should be reviewed with the Nexteer PE to ensure that the PFMEA severity rankings are equal to or higher than the Nexteer DFMEA rankings. There must be a one-to-one match of the Operation numbers between PFD, FMEA and the Control Plan to allow for cross-referencing of the documents. Reference the latest version of the FMEA Manual: www.aiag.org

- 7) **a) Pre-Launch Control Plan (including EPC plan)** – Make sure that the Pre-Launch Control Plan is clearly marked as such and is signed. The Pre-Launch Control Plan must meet all of the requirements of the Production Control Plan with the following additions: 'Early Production Containment' must be documented in the Pre-Launch Control Plan, as a separate step. EPC is above and beyond what is done in the rest of the Pre-Launch Control Plan. EPC must be performed as a step segregated from the production process, just prior to packaging/shipping. When feasible, all Special Characteristics are to be 100% inspected during EPC. The Pre-launch Control Plan must document increased sample sizes and/or sample frequencies for quality checks performed during the pre-launch period. (Each Process Operation in the Pre-Launch Control Plan must have a higher sample size and/or sample frequency than what is noted in the Production Control Plan). The Pre-Launch Control Plan must follow the process from receipt of raw material through shipping steps. **Important:** There must be a one-to-one match of the Operation numbers between PFD, FMEA and the Control Plan to allow for cross-referencing of the documents.

b) Production Control Plan – Make sure that the Production Control Plan is clearly marked as such and is signed. It must follow the manufacturing process from receipt of raw material through shipping steps; including Receiving Inspection, Dock Audits and Final Inspections. Control methods for both product and process characteristics should be listed. A procedure number is not acceptable in the control method column unless a brief description of the

procedure or a copy of the procedure is included. If work instructions are referred to in the Control Plan, they should be included in the PPAP package. The Control Plan must include the print revision number and letter and be comprehensive (i.e. it must include all part dimensional characteristics and notes provided on the blueprint. These characteristics must be listed on the Control Plan with the process characteristics that link to them in a cause and effect relationship). The Control Plan must be part, or part family, specific. Sub-Supplier Control Plans should be available for Nexteer review (if requested). Anything required to make a defect-free part needs to be addressed in the Control Plan. Sample sizes must be defined in number of parts. Sample frequencies must be defined as a specific quantity of parts, or as a specific time interval. General terms such as: "Per Box", "Each Lot", "Each Production Run", "Each load", etc, are not acceptable. **Important:** There must be a one-to-one match of the Operation numbers between PFD, FMEA and the Control Plan to allow for cross-referencing of the documents.

c) Process Expert Sign Off – Required only if the part is safety critical (Severity 9 or 10 or CL1 or CL2). Where a Process Expert has been identified for a specific commodity, that individual must sign the front page of the completed Production Control Plan. If no Process Expert has been identified, then the SQ Supervisor/Manager must sign the front page of the completed Production Control Plan. The AQE/SQE must verify that an appropriate signature is present during the completion of the PPAP checklist review.

8) Measurement System Analysis (Gage R&R) – All gages in the Control Plan must have a Gage R&R study completed. For the PPAP Submission; only Gage R&R's for Special Characteristics are to be submitted.

- **Variable Gage R&R's** – Must be done and included in the PPAP submission even if the gage is a hand tool, such as micrometers or calipers. This also includes CMM. Variable gage studies shall be completed with all operators who will be using the gage as part of normal production process. Studies are to be of the format: 3 operators 3 trials, using 10 parts. The 10 parts need to be representative of the process. All variable gage R&R studies should have a minimum of 5 distinct categories. The preferred method for calculating the gage R&R is by using the ANOVA method. Gages not meeting the acceptance criteria per the AIAG MSA manual shall have a containment plan (such as 100% inspection, gage improvement, or other means). Gage study records shall be maintained. The preferred tool for reporting this data is Minitab (version 15 or newer). Additional information may be found in section 4.10 of the Nexteer Supplier Requirements.
- **Attribute Gage R&R** – Shall be completed with 3 operators, 3 trials, using 50 parts and evaluated with Kappa calculations as outlined in the AIAG manual. The AQE/SQE can provide an electronic template for this attribute study, which will streamline the gage study method and eliminate confusion and inconsistencies with Nexteer's expectations.
Important: If a CMM is used to complete the initial process capability study on a feature that is checked with an attribute gage in the Control Plan, then a variable gage study must be completed on the CMM and an attribute study on the attribute gage.

The latest version of the MSA Manual: www.aiag.org

9) Dimensional Results – Dimensional results must correspond to the "Road Mapped" or "Ballooned" Print / Design Record Details (including any and all drawing notes). Each data point must indicate "In Spec/Out of Spec", and/or "Pass/Fail". An Interim Recovery Worksheet must be filled out by the Supplier, for any requirements not met, and signed by the Nexteer AQE/SQE and Product Engineer. A total of 5 pieces per Value Stream are to be checked for Dimensional Results. When reporting on the dimensional results of a True Position, and/or Profile, GD&T

requirement, also report the dimensional results for the Basic Dimensions that are associated with the GD&T requirement. AQE/SQE is to request that the Supplier identify any bonus tolerance resulting from MMC or LMC.

10) a) Material Certifications – Include any material certifications / material test results relating to the part and the base materials from the Supplier's internal lab or outside contracted lab. Identification of the Specification and Lot of material must be identified on the Control Plan. If there are material specifications and or purchase specifications noted on the print, you must provide data that shows conformance to those specifications in the PPAP package; speak to your Nexteer AQE/SQE for details.

b) Test Results (Performance, Durability) – Include any performance or durability tests as prescribed in the design record; including drawings and functional and validation specifications. The required level of detail (i.e. summaries vs. charts vs. raw data) shall be as directed by Nexteer Product Engineering and/or Nexteer AQE/SQE.

11) Initial Process Capability Studies (CpK/PpK) – 125 piece capability studies are required at time of PPAP for all special characteristics unless otherwise agreed upon in the MAPP Supplier Capability and Selection Review. The 125 piece data points should come from the 300 piece PPAP production run, in time-ordered subgroups of 3 to 5 pieces. The sampling plan is to be documented and pre-approved by Nexteer. Unless otherwise directed by the Nexteer AQE/SQE, each cavity of a multiple cavity mold, or multiple tool process, must have its own capability study. If the Nexteer Product Engineer or AQE/SQE has not identified special characteristics to measure, the Supplier should select not less than one dimension to demonstrate process capability.

On the initial process studies for special characteristics, the Supplier needs to demonstrate that the process is stable and in control through the use of a control chart. Normality and capability must also be demonstrated. The required statistical software package is Minitab and the above can be shown using the "Capability Six Pack, within Minitab."

The acceptance criteria for the process indices is per the Nexteer Supplier Requirements section 4.5.

12) Qualified Laboratory Documentation – If testing is performed in a Supplier's internal lab, they must provide a copy of their quality certification. The Supplier should also provide documentation of the appropriate laboratory scope. If an external lab is used, send a copy of outside lab certification and the scope of accreditation (must be ISO 17025/A2LA certified or regional equivalent). As a best practice, the Supplier should indicate specifically which labs were used for the applicable part number (i.e. by test log or other indication of laboratory usage). Laboratories which were not used expressly or indirectly in the testing of the applicable part number should not be referenced.

13) Appearance Approval Report – Any part that is color matched, needs graining, or other appearance approval must have an appearance approval report attached to the PPAP. Verify the OEM Customer Specific Requirements for specific use of forms.

14) Sample Product to Plant – Send the sample product to the using plant as instructed by the PPAP purchase order or by the Nexteer AQE/SQE. The Supplier will provide the shipping information (i.e. the carrier name, and shipment tracking number) to the Nexteer AQE/SQE, and to the person receiving the PPAP at the Nexteer Plant. As a best practice, this shipping information may be included in this section in the PPAP submission. Samples need to be properly identified with the Nexteer PPAP Orange Label (Form X3483). The Label and

corresponding instructions can be obtained at:

<http://www.nexteer.com/supplier-portal/processes/quality/>. The label must be printed on bright orange paper by supplier and firmly affixed to all four sides of the container or box. See label instructions for further details.

15) Master Sample – Per AIAG PPAP Manual 4th edition: “The organization shall retain a master sample for the same period as the production part approval records, or (A) until a new master sample is produced for the same customer part number for customer approval, or (B) where a master sample is required by the design record, Control Plan or inspection criteria, as a reference or standard. The master sample shall be identified as such, and shall show the customer approval date on the sample. The organization shall retain a master sample for each position of a multiple cavity die, mold, tool or pattern, or production process unless otherwise specified by the customer.” Note that the current PPAP edition includes some guidelines which detail conditions upon which this requirement can be waived. The waiving of this requirement shall ultimately be determined by the Nexteer AQE/SQE, and can be indicated on the checklist (as “NO” to being required). **NOTE:** The Nexteer AQE/SQE will direct the Supplier on the number of Master Samples to be retained.

16) Checking Fixtures / Aids / Gages – If needed to verify, the Supplier will provide a list, or drawing, and/or duplicate fixture / aids / gages to the Nexteer Plant with the PPAP parts.

17) Nexteer Specific Requirements – These are PPAP submission requirements that are specific to Nexteer Supplier components. While several of these items are typically mandated, at least under certain conditions, the final applicability of any of these requirements pertaining to a certain component PPAP submission shall be indicated on the PPAP Process Checklist by the Nexteer AQE/SQE. (**Important:** The latest revision of the Nexteer Supplier Requirements should be obtained from the Nexteer Supplier Website and referenced as the formal requirement documentation. Points below are identified as helpful lessons learned from past PPAP experiences.)

- a) **Interim Recovery Worksheet (F1042)** – If for any reason the Supplier anticipates less than full approval (for example: print changes being made by engineering but not yet released, etc.) a Nexteer Interim Recovery Worksheet must be filled out and included in the package. The Interim worksheet needs to be signed by the Nexteer Product Engineer and the Nexteer AQE/SQE prior to the submission of the PPAP package to the Nexteer Manufacturing Plant. The AQE/SQE is responsible to obtain the signatures.
- b) **SoC Confirmation Letter** - A copy of the Substance of Concern Confirmation Approval must be included in the PPAP package. Suppliers must submit into IMDS. If any materials prohibited by the GADSL List are contained in the product, the Prohibited Substance Reporting Form (23000000) approved by the Chief Chemist (or SoC Team) must be included in the package and the appropriate box be noted on the Part Submission Warrant.

NOTE: IMDS Recipient for Nexteer Automotive is # 75801. Any other recipient code submitted will be rejected. The specific information for suppliers on how to fill out an IMDS request for Nexteer, as well as the prohibited substance reporting form, can be found on the Nexteer Supplier Website.

See Also – Nexteer Supplier Requirements, Section 1.5 for further information.

- c) **Supplier Characteristic Summary (SCS) Form** – This is a summary of technology and quality strategy for the critical and notable product features and process controls of the component. It must include a summary of certain process and capability information concerning all Special and other characteristics as directed on the form. This electronic form is to be initiated by the Supplier for initial program review, updated throughout process development phase, and ultimately submitted with the PPAP package. Instructions are included in the comments for each column heading within the electronic form.

- d) **New Tool Information: Photos, Description & Drawing** – For new tools and fixtures for which any payment is expected to be made by Nexteer, some minimal information shall be required to be included in this section of the PPAP submission in order to help substantiate Supplier claims of tooling expense. This information should include – at a minimum – recent photo(s), drawings, and brief written description. Information should describe applicability of this tool regarding any other usage by the Supplier beyond the express purpose of creating or ensuring quality of the submitted component.
- e) **Supplier Packaging Information (SPI) Form** – Include the approved SPI form (minimum requirement – sign-off should be completed at the preliminary stage of the SPI Form). For further information regarding this form, Supplier should consult with the Nexteer Buyer. The SPI form is available on the Nexteer Supplier Website. Applicability of this section to a particular PPAP submission shall be prescribed on the checklist by the AQE/SQE.
- f) **Contact List** – If requested by the AQE/SQE per the checklist, the Supplier shall include a list of key Supplier contacts in the PPAP submission. This will increase the visibility of key contacts which may be required for Nexteer business purposes.
- g) **Factory Floor Layout** – As requested by the AQE/SQE per the checklist.
- h) **Nexteer Intelex Application Access Confirmation** – Nexteer Intelex access is MANDATORY for all production component Suppliers to Nexteer. The Nexteer AQE/SQE will indicate “YES” as a requirement for PPAP submission if there is any doubt concerning the Supplier’s access and/or usage capability for Nexteer Intelex Applications. If checked “yes”, the Supplier must include in the PPAP submission, evidence of having registered and accessed the Intelex application. (Example: Screenshot from Nexteer Balanced Scorecard). If the Nexteer AQE/SQE has confidence of the Supplier’s access and usage of the Nexteer Intelex application, then he/she may indicate “NO” – not required – on the checklist.
- i) **Assessments** – Nexteer AQE/SQE should indicate whether special surveys, worksheets, or questionnaires are to be submitted with PPAP. These assessments shall pertain to the location of applicable processes, whether at Supplier or sub-tier Supplier. For example, if the Tier-1 Supplier purchases the heat treat process from their Tier-2 Supplier, then the heat treat system at the Tier-2 Supplier shall be assessed using the CQI-9 worksheet, and shall be included in the Tier-1 PPAP to Nexteer. These assessments may include but are not limited to:
- CQI-9 (Heat Treat System Assessment)
 - CQI-11 (Plating System Assessment)
 - CQI-12 (Coating System Assessment)
 - CQI-15 (Welding System Assessment)
 - CQI-17 (Soldering System Assessment)
 - CQI-23 (Molding System Assessment)
 - CQI-27 (Casting System Assessment)
 - Other (The word “other” would be circled in the following cases, as well as any other Special Assessment not listed above)
 - Ford W-HTX supplement (Add a note at bottom of PPAP checklist to indicate the assessment type)
 - Toyota Weld Survey (Add a note at bottom of PPAP checklist to indicate the assessment type)
- j) **Production Label** - Include an example of the Barcode Label that will identify the parts prepared for shipping to Nexteer.

k) Manufacturing Capability Assessment (Green) – Manufacturing Capability Assessment is completed, uploaded in Intelex and has a green score (≥ 90). If an MCA score is not green at sourcing, development and successful execution of an action plan to achieve a green MCA score (≥ 90) is required for PPAP submission for New Parts or New Volume for existing Parts. Revised MCA and/or Completed Action Plan must be uploaded in Intelex by the Nexteer AQE/SQE and should be reflected in an updated MCA score. If a Completed Action Plan does not result in a revised MCA score of green, then the AQE/SQE should recommend the supplier for New Business Hold using the Intelex Supplier 360 Application.

l) Other Nexteer Specific Requirements - In addition to the requirements noted above, the Supplier must meet all Nexteer Specific Requirements noted in the Nexteer Supplier Website, and/or Best Practices as noted by your Nexteer AQE/SQE.

Some examples of these include:

- Order the PPAP Package in an electronic submission format, as required in the Nexteer Supplier Requirements, Section 4.3 for further instructions, as well as the Nexteer Electronic PPAP Submission Instructions that are located in the Nexteer Supplier Website.
- If applicable, include approved PPAP warrants, for all sub-tier Supplier components that have a Nexteer part number noted on the print.

18) Part Submission Warrant (refer to the latest AIAG PPAP manual for the template) – A Part Submission Warrant MUST be properly filled out. Any information that is not filled out must have an explanation. Electronic signatures are acceptable.