Supplier Quality Manual

First Edition

Issued: January 1, 2014










Fiberdome Inc. will meet our customer's requirements for quality and delivery by using the latest technology, having trained personnel, and through continual improvement of our Quality Management Systems.

Fiberdome Inc. is pleased to present the Supplier Quality Manual to the Supply Chain as evidence of continuous improvement and commitment to customer satisfaction. All Suppliers must read, understand and comply with all requirements within this Supplier Quality Manual (SQM). In the event that you need further explanation of requirements, please contact your respective Buyer and/or Quality Manager.

Supplier Quality Assurance Manual On-boarding Strategy

All Suppliers are required to become compliant/certified to the requirements in this Manual and strongly encouraged to strive to become compliant/certified to the ISO/TS 16949 standard, with ISO 9001:2008 being the minimum requirement.

Manual Owner(s):

Rick Wollin, President

Rick Wollin January 1, 2014

Scott Schultz, Quality Manager

Scott Schultz January 1, 2014

Supplier Quality Manual

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1. Preface

The implementation and sustainment of a Quality Management system is a strategic decision of any organization. The design and implementation of an organization's quality management system is influenced by varying needs, objectives, products, and processes as well as the size of the organization and targeted markets. It is understood that each Supplier has their own approach to continuous improvement, however, there are certain requirements in this Manual that require compliance regardless of the state of the Supplier's quality system. It should be noted that all customer specific requirements outlined in this Manual are mandatory. In the event that there is a conflict in requirements between the AIAG Reference Manuals and this Manual, the requirements of this document/Manual shall prevail. Failure to comply could result in a range of activities varying from corrective action(s) to ending the Supplier/customer relationship.

2. Goal

The goal of this Manual is to provide a uniform method to communicate general requirements, expectations, customer specific requirements and guidelines to the Supply Chain.

For questions pertaining to the specific requirements outlined in this Manual, please contact the appropriate Fiberdome, Inc. Purchasing or Quality Representative.

3. Purpose

The Supplier Quality Manual's purpose is to define the fundamental quality system activities that are required from Suppliers and their Supply Chain to ensure on-going Continual Improvement, effective Quality Planning and

customer satisfaction.

Fiberdome's commitment to integrating Suppliers as team members creates a distinctive Supplier/customer relationship that ultimately builds a great business relationship.

4. Quality Management System

Fiberdome realizes that many Suppliers are registered or are currently pursuing registration/compliance to standards audited by third party registrars (such as ISO/TS 16949 or ISO 9001). This Supplier Quality Manual is formatted based on the requirements of ISO/TS 16949. We as a customer strongly encourage the continued efforts of our Supply Chain to become and sustain certification and compliancy to ISO 9001 at a minimum.

As a minimum, the Supplier shall posses all AIAG (Automotive Industry Action Group) Core Quality Tool Manuals – latest editions.

The required reference Manuals are listed below:

APQP – Advanced Product Quality Planning
PPAP – Production Part Approval Process
FMEA – Failure Modes Effects Analysis
SPC – Statistical Process Control
MSA – Measurement Systems Analysis

The above Manuals can be purchased at www.aiag.org

Supplier's Quality Management System documentation shall include the following:

- A documented Quality Policy and Quality Objectives
- A Quality Manual compliant to ISO 9001:2008 or ISO/TS 16949:2002
- Documented procedures as required by this Manual
- Documents needed by the organization to ensure the effective planning, operation and control of its processes, and records required by this Manual.

5. Record and Documentation Retention Requirements

Records and documents providing objective evidence of conformance to drawings, standards, and other applicable specifications considered essential to the effective operation of the requirements/specifications shall be maintained. They shall be legible, dated, clean, and readily identifiable and maintained in an orderly manner. They shall provide traceability to the associated product and use actual data, as required by applicable specifications, to indicate acceptability of the product. Records and documents may be either hard copy or electronic format.

While in storage, records and documents shall be protected from damage, loss and deterioration due to environmental conditions. Records shall be maintained for (5) years. At the end of (5) years, the Supplier shall provide Fiberdome, Inc. with the option of having the records forwarded to Fiberdome, Inc. for further retention, as required by the contract, or authorizing disposal of the records and documents at the Supplier's location. Disposition shall be done in a timely and appropriate manner. Fiberdome, Inc. shall be notified when disposition has taken place.

6. Product Traceability

The Supplier must adhere to the ISO 9001 Standard for Product Identification and Traceability and always identify its products from applicable drawings, specifications, or other documents, during all stages of production, delivery, and installation, where appropriate.

The Supplier/Supplier shall always use a unique identification for an individual product or batches, where, and to the extent that, traceability is a specified requirement. This unique identification can be directly on the part or on the part container unless the PO or drawing requirements dictate otherwise. This information must be documented and retained appropriately.

7. Production Part Approval Process – PPAP

The Fiberdome, Inc. Production Part Approval Process (PPAP) defines requirements for production part approval. The purpose of PPAP is to determine if all customer engineering design record and specification requirements are properly understood by the Suppliers and that the manufacturing process has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate.

7.1.1 PPAP Requirements

The Supplier shall meet all specified PPAP requirements as well as those outlined in the AIAG Production Part Approval Process Manual – latest edition. Production parts shall meet all customer engineering design record and specification requirements to include all safety and regulatory requirements.

If any part specifications cannot be met, the Supplier shall document its problem-solving efforts and contact the appropriate Fiberdome, Inc. Buyer to engage support for concurrence in determination of appropriate corrective action.

7.1.2 Design Record

The Supplier shall have the design record for the saleable product/part, including design records for components or details of the saleable product/part. Where the design record is in electronic format, the Supplier shall produce a hard copy. Examples include, but are not limited to pictorial, geometric dimensioning & tolerancing sheets, drawing to identify measurements taken.

7.1.3 Reporting of Part/Product Material Composition

The Supplier shall provide evidence that the material composition conforms to the applicable specification requirements. The Supplier must retain all material and mill test reports and certifications. Submission of these forms is required for PPAP submission level 2 or higher. In addition to submission of the material certifications and mill test reports, the Supplier shall input the necessary data into the Fiberdome, Inc. PPAP workbook for material.

Material Suppliers are only required to submit the original Material Certification (in English) and the completed Material form within the PPAP workbook.

7.1.4 Authorized Engineering Change Documents

The Supplier shall have any authorized engineering change documents for those changes not yet recorded in the design record but incorporated in the product, part or tooling. All marked drawings from Fiberdome, Inc. must be signed and approved. Marked drawings are acceptable for PPAP submission if a released or Advanced Drawing is not available due to timeline constraints in the interim.

7.1.5 **Design Failure Modes and Effects Analysis (Design FMEA)** *if the Supplier is product design-responsible.*

Fiberdome, Inc. requires suppliers to develop a Design FMEA in accordance with, and compliant to, requirements if design-responsible. Fiberdome, Inc. requires that the Suppliers adhere to the requirements outlined in the AIAG FMEA reference Manual – latest edition. The requirement for a DFMEA is communicated to the Supplier via the PPAP Part Submission Checklist (PSC). If the supplier is Design Responsible. When the Supplier is Design Responsible, the Supplier shall conduct this activity and maintain the living FMEA document as the design changes throughout the product lifecycle. The Supplier shall use their own format for the DFMEA.

7.1.6 Process Flow Diagrams (PFD)

The Supplier shall have a process flow diagram in the format outlined in the Fiberdome, Inc. PPAP workbook. Process flow diagrams for “families” of similar parts are acceptable if the new parts have been reviewed for commonality by the Supplier. The PFD must represent the process flow of material from receipt of raw material to finished goods at the dock for shipment.

7.1.6 Process Failure Mode and Effects Analysis (Process FMEA)

Fiberdome, Inc. requires Suppliers to develop and maintain a Process FMEA in accordance with the requirements outlined in the AIAG FMEA reference Manual. The Supplier shall use the FMEA template within the Fiberdome, Inc. PPAP workbook and the FMEA lists for severity, detection and occurrence which are also provided in the PPAP workbook.

The Supplier shall conduct the MFMEA – Machinery Failure Modes & Effects Analysis at the discretion of the Purchasing Agent listed on the Purchase Order (PO). Information on Machinery Failure Modes & Effects Analysis can be found within the AIAG APQP & Control Plan and FMEA Manuals.

7.1.8 Control Plan

The Supplier shall have a Control Plan defining all methods used for process control and complies with all Fiberdome, Inc. requirements. Fiberdome, Inc. requires that all Suppliers use the Control Plan template within the PPAP workbook. The Supplier shall use the Process Flow Diagram and FMEA to verify line of sight to the control plan. The control plan must include all Critical Product Characteristics and process controls driven by the FMEA process. In verifying effectiveness of the Control Plan, the Supplier shall account for all operations in the Process Flow Diagram and FMEA. Failure to comply will result in a rejected PPAP and/or request for re-submission of the Control Plan or other applicable documents.

7.1.9 Measurement System Analysis (MSA)

The Supplier shall have applicable Measurement System Analysis studies, e.g., gage R&R, bias, linearity, stability, etc. for all new or modified gages, measurement, and test equipment. The Supplier shall refer to the AIAG MSA reference Manual for additional information.

7.2.0 Dimensional Results

The Supplier shall provide evidence of dimensional verification as required by the design record and the Control Plan proving compliance with 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. The Supplier shall record actual results for all dimensions, characteristics, and specifications as noted on the design record and Control Plan.

The Supplier shall indicate the date of the design record, change level, and any authorized engineering change document not yet incorporated in the design record to which the part was made, e.g., advanced drawings or marked

drawings. The Supplier shall record the change level, drawing date, organization name and part number on all auxiliary documents (e.g., supplementary layout results sheets, sketches, tracings, cross Sections, CMM inspection point results, geometric dimensioning and tolerancing sheets, or other auxiliary drawings used in conjunction with the part drawing). Copies of these auxiliary materials shall accompany the dimensional results when submitting PPAP packages. A tracing shall be included when an optical comparator is necessary for inspection.

The Supplier shall identify one of the parts measured as the master sample.

The Supplier shall use the dimension worksheet in the PPAP workbook when documenting and submitting dimensional results as part of a PPAP submission.

7.2.1 Records of Material / Performance Test Results

The Supplier shall have records of material and/or performance test results for tests specified on the design record or control plan and adhere to the retention requirements outlined in Section 5 for Record / Document Retention.

7.2.2 Material Test Results

The Supplier shall perform all chemical, physical, metallurgical, or mechanical property tests for all parts and product materials when chemical, physical, metallurgical or mechanical property requirements are specified by the design record or Control Plan.

Material Test Results shall indicate and include the following:

- The design record change level of the parts tested,
- Any authorized engineering change documents that have not yet been incorporated in the design record,
- The number, date, and change level of the specifications to which the part was tested,
- The date on which the testing took place,
- The quantity tested,
- The actual results, and

- The material Supplier's name and vendor code.

The Supplier shall use the PPAP workbook material template to use in reporting the above information.

7.2.3 Component First Article Testing (CFAT)

The Supplier shall conduct the appropriate CFAT testing as outlined on the design record (only applies if design record notes indicate requirement). Fiberdome, Inc. may be required to notify the government or prime contractor within a preset number of days prior to the start of the CFAT testing. The government reserves the right to be present at any such testing. The Supplier shall work with the designated Fiberdome, Inc. person in reporting out and planning of these test activities. The Supplier shall conduct the testing at the Supplier's facility or via third party accredited laboratory unless a waiver is signed and approved from Fiberdome, Inc. in the event that the Supplier; within reason, can not perform the CFAT requirements. The waiver can be in email format or via a formal document. The Supplier shall include a copy of the waiver with the PPAP submission to be exempt from this requirement. The Supplier shall submit a test report with the PPAP package to Fiberdome, Inc.

7.2.4 Performance Test Results

The Supplier shall perform tests for all part(s) or product material(s) when performance or functional requirements are specified by the design record or Control Plan.

Performance test results shall indicate and include the following:

- The design record change level of the parts tested,
- Any authorized engineering change documents that have not yet been incorporated in the design record,
- The number, date, and change level of the specifications to which the part was tested,
- The date on which the testing took place,
- The quantity tested, and
- The actual results.

The Supplier shall use the performance testing template within the PPAP workbook to document and submit the performance test results.

7.2.5 Initial Process Studies and On-Going Statistical Monitoring of Processes

The level of initial process capability or performance shall be a minimum Cpk value of 1.33 for all variable Major or Critical characteristics. The Supplier shall perform measurement system analysis to understand how measurement error affects the study measurements.

Where no Major or Critical characteristics are identified, Fiberdome, Inc. reserves the right to require demonstration of initial process capability on other characteristics.

The purpose of this requirement is to determine if the production process is likely to produce product that will meet Fiberdome, Inc.'s requirements. The initial process study is focused on variables not attribute data. Assembly errors, test failures, surface defects are examples of attribute data, which is important to understand, but is not covered in the initial study. To understand the performance of characteristics monitored by attribute data will require more data collected over time. Unless approved by Fiberdome, Inc., attribute data is not acceptable for PPAP submissions.

7.2.6 Laboratory Documentation

The inspection and applicable testing for Production Part Approval Process (PPAP) shall be performed by a "qualified laboratory" (internal or external to the Supplier organization). The laboratory must have a legitimate business license, scope of business, and all documentation proving that the laboratory is qualified for the specific type of inspection and testing performed on any sample part/component. When required per Discretion, the Laboratory shall be A2LA Accredited.

7.2.7 Checking Aids

All instruments, templates, attribute and variable gages, fixtures, or jigs that are used to determine acceptance/rejection of a product characteristic shall be on a calibration program.

The Supplier shall also certify that all checking aid characteristics align with the part/component dimensional requirements. In the event that the checking aid is used to verify a “Major” characteristic or Critical Product Characteristic the Supplier shall conduct the appropriate Measurement Systems Analysis (MSA) activities including Gage R&R. Unless the Supplier is ISO/TS 16949 certified, the Supplier shall ensure that all “custom” checking aids have the customer part number and revision level.

7.2.8 Weld Fixtures

All weld fixtures must be certified either by the fixture manufacturer or the Supplier. Certification requires that the weld fixture be validated by verifying the part dimensions to the design record requirements. For characteristics that may result in distortion or warpage concerns, the Supplier shall verify the weld process capability. The Supplier shall bring any concerns to the attention of the appropriate Fiberdome Inc. Purchasing Agent for agreement on corrective action.

7.2.9 PPAP Workbook and Part Submission Requirements

All Suppliers are required to submit the PPAP package (documentation and part/component samples) as requested per the requirements selected on the Part Submission Requirements. In the event the Supplier has questions as to the submission requirements, the Supplier should contact the appropriate Purchasing Agent. A copy of the PPAP Submission Requirements must be included in the PPAP document package. Suppliers are required to complete the required PPAP documents using the provided PPAP Workbook in MS Excel. Suppliers shall submit the PPAP documents in .pdf format only to the FTP Server – see Section 7.3.5 for more detail on PPAP submission.

7.3.0 Submission Samples

In the event that samples are requested for PPAP submission, the Supplier must ensure that the "PPAP Parts Label" from the PPAP Workbook is filled out and attached appropriately to the outside of the sample container. The PPAP Parts Label is also accessible in the PPAP Workbook.

The Supplier is required to use the PPAP Parts Label – not any other format and it must be printed in color ensuring that the yellow area is clearly visible on the sample containers.

For production parts that are produced from more than one die, mold, tooling, pattern, cavity or production process, the Supplier shall complete a full layout to all characteristics. The Supplier's Process Flow Diagram must reflect production process redundancy if applicable.

7.3.1 Fiberdome, Inc. – Customer Specific Requirements

Suppliers shall maintain records of compliance to all customer specific requirements.

7.3.2 Part Submission Warrant (PSW)

The Supplier shall complete the Part Submission Warrant after all PPAP elements have been verified and conform to all requirements. Fiberdome, Inc. requires that Suppliers only submit one part number on a Part Submission Warrant (PSW). This PSW is part of the PPAP Workbook.

7.3.3 Appearance Approval Report

If the part/component has appearance requirements specified, the Supplier shall provide an Appearance Approval Report for each part or family of parts.

7.3.4 Approval Process

Approved - The Supplier will receive a signed and approved PSW via email to the email address provided on the PSW submitted with the PPAP package.

Reject – A rejected PSW is sent to the Supplier in the event that the PPAP submission does not meet Fiberdome, Inc. requirements. In the event of a PPAP

rejection, the Supplier shall take all action necessary to expediently correct the nonconformances.

Minor documentation discrepancies – In the event that SQA discretion (rather than rejection of entire PPAP package) permits the Supplier to correct documentation discrepancies, the Supplier has 24 hours to re-submit the corrected document(s) unless otherwise agreed upon between the Supplier and Fiberdome, Inc. Supplier Quality.

7.3.5 PPAP Submission

The Supplier is required to submit the PPAP paperwork to the FTP server and send an Email to the email address specified on the Purchase Order (PO) notifying him/her of submission. The Supplier is also required to submit a paper copy of the PPAP documents with samples (if samples are requested). Samples must be identified as PPAP samples – see PPAP Workbook for appropriate label and Section 8.3.0.

8. Advanced Product Quality Planning (APQP)

The information provided within all APQP sections outline the specific Fiberdome, Inc. requirements for APQP.

8.1.0 Advanced Product Quality Planning Overview

APQP is a structured approach for defining, establishing and specifying goals for product quality. Quality planning focuses on developing processes with process controls that, when properly managed, will ensure a high degree of quality within the manufacturing/assembly system.

Quality planning begins with a company's management commitment to defect prevention and continual improvement, as opposed to defect detection.

The Fiberdome, Inc. APQP Program is based on the AIAG APQP and Control Plan, latest Edition requirements.

The five Phases of the Fiberdome, Inc. APQP Process are:

1) Plan and Define Program
2) Product Design and Development
3) Process Design and Development
4) Product and Process Validation
5) Feedback Assessment and Corrective Action

The Supplier shall follow the requirements of the AIAG APQP and Control Plan Reference Manual, latest Edition unless otherwise agreed upon by the Fiberdome, Inc. SQA Department.

9. Process/Product Change Notifications

Suppliers are required to follow the Approval Request process prior to implementing Process or Product Changes. PPAP Requirements will be communicated via an approved Process/Product Change Form. Contact the Fiberdome Purchasing Agent to initiate the Process or Product Change process.

9.1.0 Approval Request

Suppliers shall request approval from Fiberdome, Inc. before making changes to a specification or process for supplied products or services for any change that may impact safety, fit, form, function, performance, durability, or appearance per the requirements listed in Table 1.

Fiberdome Purchasing will provide written approval where granted.

Table 1: Changes that require PPAP Approval Prior to Implementation (Shipment of Production Quantity to Fiberdome, Inc.)

Requirement	Examples
1. Use of other construction or material than that used in the previously approved part or product or specified in the most recent design revision level.	This material may be any that has not been formally approved or specified on the design record. An example may be material from an alternative source

	than used for the previously approved part.
2. Parts/components from new or modified tools (except perishable tools), dies, molds, patterns, etc., including redundancy or replacement tooling.	This requirement only applies to tools, which due to their unique form and function can be expected to influence the integrity of the part and/or component.
3. Use of refurbished tooling/equipment or rearrangement of existing tooling or equipment.	Refurbishment means the reconstruction and/or modification of a tool or machine that incorporates; increasing the capacity, performance, or change of its existing functionality. The Supplier shall not confuse this with normal maintenance or repair/replacement of tooling or equipment components that do not impact performance. Rearrangement or floor plan change is defined as changes that affect the sequence of product/process flow from that documented in the product/process flow chart, which shall reflect any equipment or tooling redundancy. Fiberdome, Inc. recognizes that minor adjustments of production equipment may be required to meet safety requirements such as installing safety covers, sensors, or elimination of potential electro static discharges. There is no need to acquire formal approval for these types of changes. Any change requiring critical equipment loss of power shall require a PPAP.

	Any change that affects the Process Flow Diagram must be approved prior to implementation and shipment of product.
4. Changes due to moving tooling and equipment to/from a different plant location or from redundant manufacturing sites.	This change requires PPAP approval prior to shipment of production quantities.
5. Change of Supplier for parts, non-equivalent materials, or services (e.g.: heat-treating, painting, plating).	Suppliers are responsible for approval of subcontracted material and services that affect all characteristics of the part/component.
6. Product produced after the tooling has been inactive for volume production for twelve months or more.	Notification is required when the part has had no active purchase order and the existing tooling has been inactive for volume production of twelve months or more. The only exception is when the part/component has low volume, e.g. service or special order vehicles. Fiberdome, Inc. SQA reserves the right to require PPAP submission for service parts/components.
7. Product and process changes related to components of the production product manufactured internally or manufactured by Suppliers that impact safety fit, form, function, performance, durability, and/or appearance of the saleable product, to include any change to design record specifications. The Supplier shall agree with requests by a subcontractor prior to submission to Fiberdome, Inc. Purchasing.	Any change that affects Fiberdome, Inc. Customer Specific Requirements for safety, fit, form, function, performance, durability, design record specifications and/or appearance requires notification and approval.
8. Changes in test/inspection methods that have an affect on acceptance criteria require notification and PPAP approval. Changes that do not affect	Notification and PPAP approval requirements depend upon the specific circumstances. When in doubt, submit notification.

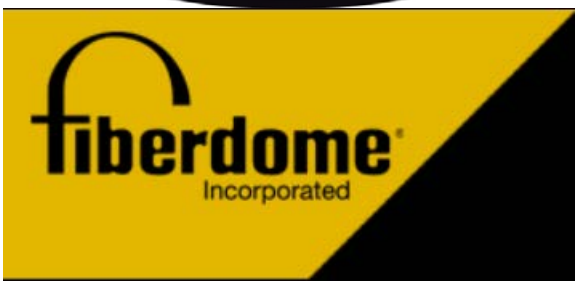
acceptance criteria do not require notification or PPAP approval.	

10. Welding Requirements

Suppliers must comply with the appropriate industry accepted codes and standards, such as AWS, ASME or MIL-specs, as they apply to the components manufactured and supplied to Fiberdome, Inc.. Suppliers MUST certify and maintain a record of any and all personnel that weld on Fiberdome, Inc. components per the accepted codes and standards, along with maintaining that certification to satisfy Fiberdome, Inc.'s customer requirements. Welding is not used as a repair measure for defective parts unless approved by Fiberdome, Inc. Approved weld repair procedures in accordance with the appropriate industry accepted codes and standards as they apply to the components manufactured and supplied to Fiberdome, Inc. are approved

Fiberdome, Inc. welds to the standards of AWS and also MIL where applicable.

Supplier shall comply with all pertinent AWS and MIL Standards as specified on the design record and correlate to the product design record.



Fiberdome, Inc. Product/Process Change Request Form

Fiberdome, Inc. P/N:_____ Engineering Rev. Level:_____ Dated:_____

Supplier P/N:_____ Engineering Rev. Level:_____ Dated:_____

Purchase Order Number:_____ Safety and/or Governmental Regulation:_____

Supplier Information:

Name:_____ Supplier I.D._____

Address:_____

City, State & ZIP_____

Product Change Description:
(Is it relevant to: dimension(s), material, functional and/or appearance?)

_____
_____
_____
_____
_____

Process Change Description:

_____
_____
_____
_____

Planned Date of Implementation: _____

I understand that implementation of changes can not occur until PPAP approval is acquired. Fiberdome, Inc. will provide an approved/rejected copy of this form. The appropriate Supplier Quality Engineer will distribute the PPAP Workbook with the submission requirements outlined in the Part Submission Requirements tab to the Supplier if accepted. All changes require level 3 PPAP submissions unless otherwise communicated.

Name:_____ Phone Number:_____

Title:_____ Email:_____

Upon completion of form, email to Sr. Buyer to be reviewed by the Change Board.

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TO BE COMPLETED BY FIBERDOME, INC.: **Tracking Number**_____

Approved Y/N:_____ Date:_____ PPAP Y/N:_____ PPAP PSC to Supplier by date:_____

Name:_____ Phone:_____ Email:_____