SUPPLIER QUALITY MANUAL

1st Edition

Issue Date: 01.08.20

www.avtec.in

Revision Details

Revision No	Issue Date	Content/Reason of Revision
Edition 1	01.08.20	Initial Release

Table of Contents

INTRODUCTION 4
- Welcome to AVTEC 4
- Introduction to Manual 4
- Scope 4
- Quality Policy 5

1.0 QUALITY MANAGEMENT SYSTEM REQUIREMENTS 5
- 1.1 Quality Management System 5
- 1.2 Preparation and Maintenance of Quality Manual and reporting of Quality Assurance Certification 5
- 1.3 Control of Sub-tier Suppliers 5

2.0 SUPPLIER QUALIFICATION PROCESS 6
- 2.1 New Supplier Questionnaire 6
- 2.2 New Supplier Self-Assessment 6
- 2.3 On-Site Assessment 7

3.0 PART QUALIFICATION 7
- 3.1 PPAP Requirements Checklist 7
- 3.2 Dimensional Inspection Report 8
- 3.3 Material Certification/Test Report 8
- 3.4 Gage Repeatability & Reproducibility (R&R) Studies 8
- 3.5 Gage Correlation Studies 8
- 3.6 Special Characterstics & Process Capability Studies 9
- 3.7 Failure Modes and Effects Analysis (FMEA) 10
- 3.8 Control Plan 11
- 3.9 Material Safety Data Sheets (MSDS) 11
- 3.10 Agency Approvals and Compatibility Reports 11
- 3.11 Traceability 11

4.0 MANUFACTURING CONTROL 12
- 4.1 Process Control 12
- 4.2 Statistical Process Control 12
- 4.3 Process Performance Requirements 12
- 4.4 Continual Process Improvement 13
- 4.5 Lot Control 13
- 4.6 Legal Compliance, Work Safety & Hazardous Materials 13
- 4.7 Maintenance 14

5.0 DRAWINGS/CHANGES 14
- 5.1 Drawing and Change Control 14
- 5.2 Process Changes, Engineering Changes 14
- 5.3 Supplier Process Change Request (SPCR) 15
- 5.4 Supplier Deviation Request 15

6.0 PACKAGING & LABELING 16
- 6.1 Packaging 16
- 6.2 Labeling 16

7.0 CORRECTIVE ACTION SYSTEM 16
- 7.1 Corrective Action Process Approach 17
- 7.2 Supplier Corrective Action 17

8.0 SHIP-TO-USE (STU) 18
- 8.1 Ship-to-Use Requirements 18
- 8.2 Ship-to-Use Suspension 18

9.0 SUPPLIER MONITORING 19
- 9.1 Supplier Audits 20
- 9.2 Inspection Audits 20
- 9.3 N^{th} Article Inspection (Layout Inspection Report) 20
- 9.4 Supplier-Furnished Lot Documentation 21
- 9.5 Supplier Escalation & Improvement Program 21

Introduction

Welcome to AVTEC

AVTEC specializes in providing a wide range of products to suit diverse applications. With years of experience in manufacturing, AVTEC delivers competency across the entire value chain of design & manufacture of engines; transmissions and high precision components like cylinder heads, cylinder blocks, crank shafts, cam shafts, cam rods and transmission gears for Automotive, Off-Highway, Defense, Agriculture and Railway industry, in areas of both proprietary products and contract manufacturing.

Plant I – AVTEC Limited, Pithampur

Address– AVTEC LIMITED, Power Unit Division, Plot # 1A, Sector 3, Pithampur, Sagore 454774, Dist Dhar, MP, India.

Plant 2: AVTEC Limited, Hosur

Address– AVTEC LIMITED, Power Product Division, Poonapalli, Hosur-635114, Tamilnadu, India.

Plant 3: AVTEC Limited, Chennai

Address– AVTEC, LIMITED, Plot A25 & 28, Phase 1, MEPZ-SEZ, Kadaperi Village, Tambaram, Chennai-600045, Tamilnadu, India

Corporate Office: New Delhi

Address – AVTEC Limited, Birla Tower, 7th Floor, 25, Barakhamba Road, New Delhi-110001, India

Introduction to Manual

In today's manufacturing environment, product that is found to be non-conforming at receiving, or during production, causes serious disruptions in the production and shipping schedules, resulting in high production costs. Even the best receiving inspection program cannot detect all defective material. AVTEC requires suppliers to control the quality and conformance of material as per product specification so as to eliminate any probability of non-conformance filtering to production lines.

This manual is provided to specify and make clear AVTEC quality requirements and support suppliers in meeting such requirements.

Scope

This quality manual applies to all manufacturers and suppliers providing manufacturing industry related products and services and have interest in doing business with AVTEC. It also applies to AVTEC's outsourced partners or subsidiaries.

Quality Policy

In AVTEC Ltd, We are committed to create value for all our customers and Key stakeholders by continually standardizing, improving and innovating our offering, system and process through involvement of all our employees.

1.0 Quality Management System Requirements

1.1 Quality Management System

Each AVTEC's supplier is required to maintain an effective quality management system, preferably one that conforms to ISO 9001:2015 Quality Management System or IATF 16949:2016 Requirements (Automotive). In addition, the supplier must meet all other requirements of this manual.

Within the Supply chain, Customers and Suppliers (free sourced or mandated) are interdependent upon each other's performance. Our target is to ensure customer satisfaction for consistent Quality, Cost and Delivery (QCD).

1.2 Preparation and Maintenance of Quality Manual and reporting of Quality Assurance Certification

The supplier shall prepare and maintain a Quality Manual to ensure consistent quality of products and shall submit the Quality Manual to AVTEC if necessary.
Submitted supplier manual will be applicable if it is consistent with AVTEC requirement. However, if inadequate contents are found then revision is mandatory.

The supplier shall furnish AVTEC with a copy of current quality assurance certification as certified by official organizations such as ISO/TS 16949, ISO 9001.

Suppliers shall notify AVTEC of any change in their IATF 16949 or ISO 9001 registration status through an email to AVTEC. Such changes include, but are not limited to:

- Initial certification.
- Recertification.
- Transfer of certification to a new Certification Body
- Certificate withdrawal.
- Certificate cancellation without replacement.

1.3 Control of Sub-tier Suppliers

Suppliers are responsible for the quality of materials and components provided by their sub-tier suppliers and sub-contractors. AVTEC suppliers must impose controls on their sub-tier suppliers that provide quality results and documentation comparable to the controls applied to suppliers by AVTEC.

The extent of the controls may vary, depending on the nature and complexity of the product and processes, but should normally include:

- Evaluation and qualification of sub-tier supplier facilities
- Control to ensure that raw materials used meet AVTEC's requirements
- Controls to ensure that the sub-tier suppliers of components used are those approved by AVTEC, where applicable.
- Part qualification, including first article inspection and process capability studies of as applicable.
- Control of drawings/revisions
- Control of nonconforming material
- Corrective action and preventive action programs
- A continuous quality improvement program

Where appropriate, AVTEC may specify the sub-tier suppliers that may be used, evaluate and qualify the sub-tier supplier's facilities, and assist the supplier in controlling the sub-tier supplier. Typically, this occurs when the sub-tier supplier is an essential component of the supply-chain process. AVTEC *reserves the prerogative to evaluate the quality system and records of such sub-tier suppliers as necessary. In the event of AVTEC's involvement, it does not absolve suppliers of the ultimate responsibility for the quality performance of their sub-tier suppliers.*

2.0 Supplier Qualification Process

All suppliers of production materials to AVTEC must be qualified suppliers. The extent of the qualification process is dependent upon the criticality of product purchased and other factors determined by AVTEC. The qualification process in its most complete form consists of three parts:

- A questionnaire completed by the supplier.
- A quality management system self-assessment completed by the supplier, using the AVTEC supplier assessment survey form. This is returned, along with the supplier's quality manual and documentation for review by AVTEC.
- An on-site assessment by AVTEC personnel or their authorized agents.

AVTEC periodically reevaluates suppliers through the use of quality performance data and/or on-site assessments.

2.1 New Supplier Questionnaire

In the early stages of the supplier selection process, Potential suppliers are sent a questionnaire. This questionnaire solicits general information about the company such as location(s), size, capabilities, and financial stability as well as detailed questions regarding the Company's quality management system and quality history.

2.2 New Supplier Self-Assessment

When a new supplier is being considered, they are sent a quality management system self-assessment survey form. The supplier completes the self-assessment and returns it along with a copy of supporting

documents. AVTEC will review the survey form to determine if the documented quality system meets AVTEC's requirements.

2.3 On-Site Assessment

For suppliers of critical components, an on-site assessment of the supplier's facility is performed. The on-site assessment includes three components:

- A quality assessment to determine whether the supplier's quality management system is in place and functioning effectively.
- A business assessment to determine whether the supplier has financial resources, production capacity, and other business resources needed to fulfill AVTEC's production needs.
- A technology assessment to determine whether the supplier has the needed technical resources, including production and inspection equipment, facilities, engineering resources, etc.

If the assessment team determines that the supplier meets AVTEC's requirements, AVTEC qualifies the supplier to bid on new business and supply production materials.

3.0 Part Qualification

The supplier is responsible for submitting all PPAP documents requested by AVTEC on the PPAP checklist. AVTEC and the supplier will agree on the number of the samples to be checked and submitted with the first article data. Where possible, all First Article documents as per PPAP checklist should be submitted to the supplier quality engineer in electronic format (preferably Adobe Acrobat or Microsoft Office).

In some cases, AVTEC personnel may wish to be present during the initial production run. This will allow AVTEC to validate and verify the process before any product is shipped

3.1 PPAP Requirements Checklist

For each new or revised part, AVTEC sends the supplier a PPAP-document required checklist, listing the steps and information that must be submitted for qualification of the component or assembly for production. The PSW submission level and PPAP document required checklist are selected based on supplier quality recognition status, part criticality, experience with prior part submissions, and the supplier's expertise with the specific commodity. Default submission level is AIAG Level 3, unless otherwise communicated to the supplier by the Supplier development team and Quality assurance team (If Required).

- Level 1 - Part Submission Warrant (PSW) only submitted to the customer.
- Level 2 - PSW with product samples and limited supporting data.
- Level 3 - PSW with product samples and complete supporting data.
- Level 4 - PSW and other requirements as defined by the customer
- Level 5 - PSW with product samples and complete supporting data available for review at the supplier's manufacturing location

PPAP must have fully approved or have interim PPAP approval with approved deviation before starting the serial production

3.2 Dimensional Inspection Report

AVTEC notifies the supplier of the quantity of parts to be inspected, typically five from each tool or cavity. The supplier inspects or tests each sample for all dimensions, drawing notes, and specification requirements listed on the current revision of the AVTEC drawing and/or specification. The supplier records the results on the First Article Report form or equivalent. The supplier numbers a copy of AVTEC's drawing and/or specification to correspond with the supplier's results.

The dimensional inspection report must include the specification number, specified requirements, and the inspection/test results. A simple statement that the material meets the requirements is not acceptable. Each report must be traceable to the supplier's material, through lot/heat/coil/batch numbers or equivalent, and must be signed by the organization that performed the testing. For any requirements that the supplier does not have the equipment to inspect or test, the supplier may obtain reports from their sub-supplier or other test agency.

Parts inspected for the dimensional inspection report are randomly selected from a production run of parts. The minimum quantity for the production run is agreed upon between the supplier and AVTEC. The parts must be produced under volume-production conditions, including material, machines, tooling, processing parameters, cycle times, etc. Any exceptions to the volume-production conditions must be approved in writing by AVTEC, and included in the data package submitted to AVTEC.

3.3 Material Certification/Test Report

When requested, the supplier must provide a material certification/test report. This report must include the specification number, specified material and/or physical requirements, and the inspection/test results. A simple statement that the material meets the requirements is not acceptable. Each report must be traceable to the supplier's material, and must be signed by the organization that performed the testing.

3.4 Gage Repeatability & Reproducibility (R&R) Studies

For those characteristics specified by AVTEC, the supplier must perform gage R&R studies using procedures described in Measurement Systems Analysis published by AIAG. AVTEC must approve R&R report as per the AIAG manual of MSA latest Edition requirement

Normally for variable gages, three different operators measure ten samples three times each. For attribute gages, the Attribute Gage Study (long method) is required. AVTEC must approve any alternative methods.

3.5 Gage Correlation Studies

For characteristics specified by AVTEC, the supplier must perform a gage correlation study. This consists of the supplier identifying, measuring and recording a specified number of production parts. The

supplier then sends the parts to AVTEC for measurement. AVTEC compares their measurements with the supplier's measurements to determine the correlation between the gages.

3.6 Special Characteristics & Process Capability Studies

Special Characteristics are the features or properties of a part, component or assembly described on engineering part drawings, in engineering specifications or in other primary engineering information that are likely to affect safety, compliance with government regulations, product quality, reliability, form, fit, function or customer satisfaction.

Special Characteristics are listed below:

- **Critical Characteristics (⊜)** (Safety /Regulation Characteristics) are those features of product of the product design or manufacture which have an adverse effect on safer operation of vehicle, Operator safety or on Environment regulation compliance.
- **Major Characteristics (⊜)** are those feature of the product design or manufacturing process which affect the performance of the vehicle in a such a way to make it inoperable or reduce the efficiency of operation of the product significantly or to cause severe irritation to the user of the vehicle .
- **Key Characteristics (◯)** (Significant Characteristics) are those features of the product, which are not shown in the final finished print of the product, but may have an extremely significant bearing on controlling the critical or significant characteristics during production of the component .
- **Critical to Product Characteristics (◇):** A characteristic where the reasonably anticipated variation within specification (target or tolerance) is likely to significantly affect fit, function or customer satisfaction. The supplier must show continuous improvement until process capability meets standards defined below.
- **Critical to Process Characteristics (Ⓟ) :** Process Characteristics cannot be defined physically and are a function of the process. The intent of this designation is NOT to drive specific capability or documentation requirements, but rather to ensure that the manufacturing process that generates certain features is not changed without notification and approval from Product / Manufacturing Engineering.

The below table shows the process capability with respect to Special Characteristics:

Symbol	Special Characteristics Name	GR&R	Pokayoke	Process Capability	Process Performance
		in %		Cpk	
⊜	Critical Characteristics (Safety /Regulation Characteristics)	≤ 10 %	Mandatory Design / Process	Cpk ≥ 2	SPC / Cpk - Not OK : 100 % Check
⊜	Major Characteristics	≤ 30 % with reduction Plan	Strongly Recommended Design / Process	Cpk ≥ 1.67	SPC / Cpk - Not OK : 100 % Check
◯	Key Characteristics (significant Characteristics)	≤ 30 %	Recommended Design / Process	Cpk ≥ 1.33 or 100 % Go or NoGo	SPC / Cpk - Not OK : 100 % Check
◇	Critical To Product Characteristics	≤ 30 %	Recommended Design / Process	Recommended Cpk ≥ 1.33	Recommended continuous improvement to meet process capability

- Wherevers applicable the Capability studies will include at least 30 pieces, either from a consecutive run or at the gaging frequency in the control plan.

- Special Characteristics shall be held to 100% pass for inspection as per sampling plan. If during Product/Process development you believe there will be difficulty meeting the print requirement, you MUST immediately notify and develop a plan to assure compliance or obtain formal written deviation approval from AVTEC team.

Process Capability (C_{pk}) is a comparison of the inherent variability of a process output to specification limits *under statistically stable conditions*. There are a number of techniques for assessing the capability of processes. AVTEC suppliers must use methods defined in Statistical Process Control (SPC) published by AIAG for determining process capability and process performance, unless an alternate method is approved in writing by AVTEC.

A Cpk of at least 1.33 is required for AVTEC critical dimensions.

When required to submit process capability data to AVTEC, the supplier must calculate process capability using the following method, unless an alternate method is approved by AVTEC:

C_p = Process capability ignoring Process centering = $\frac{USL - LSL}{6\hat{s}}$

Cpk = Process capability = min $\left(\frac{USL - Avg}{3\hat{s}} , \frac{Avg. - LSL}{3\hat{s}} \right)$ Including centering

USL = Upper Specification Limit
LSL = Lower Specification Limit
Avg. = Process Average = $\overline{\overline{X}}$

$\hat{s}$ = Estimated Standard Deviation = $\hat{s} = \frac{\overline{R}}{d_2}$
$\overline{R}$ = Average Range

d_2 = Constant from statistical tables

For unilateral tolerances, the same logic is employed, except that only the specified side of the tolerance is used to calculate C_{pk}. When $\overline{X}$ & R charts are used for capability studies, the subgroups must contain pieces taken consecutively from the process and the subgroups must be arranged sequentially in the order they were produced.

3.7 Failure Modes and Effects Analysis (FMEA)

When requested, the supplier must perform a Process Failure Modes and Effects Analysis (PFMEA), and submit it for approval. For parts and assemblies that are designed by the supplier, the supplier should

also perform a Design Failure Modes and Effects Analysis. The PFMEA considers all reasonably foreseeable potential failure modes of each process. Based on the potential seriousness and likelihood of the problem, the supplier develops manufacturing controls. The PFMEA should be a living document, and should be updated when process changes occur, or when defective material is produced. PFMEA methods and examples can be found in Potential Failure Mode and Effects Analysis published by AIAG.

3.8 Control Plan

When requested, the supplier must develop a control plan, and submit it for approval. The control plan and is a detailed description of the supplier's proposed processing steps required to produce the part, and the controls that are put into place to control the quality at each step. The control plan must include all in-house processing, external processing, inspection, packaging, and shipping. Suppliers may use their own format. Measuring devices and fixtures designed and built to check AVTEC parts must be identified with a gage number and drawing, and must be listed on the control plan.

The control plan must include all critical characteristics. Where detailed instructions are required, the supplier details those instructions in a work instruction, or equivalent, which must be listed in the control plan. Inspection methods, sample sizes, and sampling frequencies should be based on the process capabilities, seriousness and likelihood of potential non-conformances, and process stability. Critical characteristics that do not meet AVTEC's process capability requirements must be inspected 100%, unless AVTEC approves alternate control methods in writing.

3.9 Material Safety Data Sheets (MSDS)

As applicable, Material Safety Data Sheets (MSDS) must be provided during PPAP Document submission.

3.10 Agency Approvals and Compatibility Reports

The supplier is responsible to provide the proper agency approval test reports per AVTEC requirement. Examples are UL, CE, FCC, TUV, etc. The supplier is also responsible for agency test reports from their sub-supplier or other outside test agencies.
The suppler is responsible to submit test results that verify compatibility as required (USB, 1394 etc.). Testing may be done by the supplier or by a test facility certified by the supplier.

3.11 Traceability

The supplier must plan for traceability of components. The supplier will provide a written plan specifying how components will be marked with serial or lot numbers and date codes if required, or how containers will be identified with lot numbers or date codes if component marking is not required. The plan will also include sizes of lots or batches. Where possible, batch sizes should be minimized to aid in containment should quality problems be found.

4.0 Manufacturing Control

4.1 Process Control

AVTEC suppliers are required to control all manufacturing processes in accordance with the control plan, which is approved during part qualification.

4.2 Statistical Process Control

Where specified in the control plan, the supplier is required to apply effective statistical process controls. Effective controls must include:

- The control chart displays control limits that are correctly calculated (specification limits may not be used as control limits).
- The control chart is at the process area, visible to the operator, or persons who are responsible for controlling the process.
- For each out-of-control condition, actions are taken to bring the process back into control. Actions taken to bring the process back into control are recorded.
- Product produced during any out-of-control condition is sorted, scrapped, reworked or disposition through the supplier's NC material handling process

4.3 Process Performance Requirements

Process Performance (P_{pk}) is the comparison of the actual process variation to the specification limits. When required to submit process performance data to AVTEC, the supplier must report process performance using the following method:

Critical Characteristics: A P_{pk} at least 1.33 is required. Any critical characteristic failing to meet the minimum requirement requires a containment plan and an improvement plan.

Other Characteristics: A P_{pk} of at least 1.00 is required. The supplier is not required to calculate and report process performance for non-critical characteristics, unless requested by AVTEC. When specified by AVTEC, other characteristics failing to meet the minimum requirement also require a containment and improvement plan.

P_{pk} = the minimum of either $\frac{USL - Avg.}{3s}$ or $\frac{Avg. - LSL}{3s}$

USL = Upper Specification Limit

LSL = Lower Specification Limit

Avg. = Process Average = $\overline{\overline{X}}$

s = Estimated Standard Deviation $s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \overline{\overline{x}})^2}{(n-1)}}$

n = Total number of parts inspected

For unilateral tolerances, the same logic is employed, except that only the side of the tolerance that is specified is used in to calculate P_{pk}.

4.4 Continual Process Improvement

The ability to respond quickly and accurately to defects or failures that occur in the process of production is fundamental to good quality control. Once defects or failures are detected and removed, corrective action must be taken on the root cause to prevent reoccurrence. The supplier is required to make and maintain a production process that facilitates the detection of defects and failures.
Out-of-control or unstable processes (which have assignable causes) and processes that do not meet the minimum C_{pk}/ P_{pk} requirements must be identified and corrected. The Supplier must also improve processes with low yield rates.

AVTEC requires that the following items be performed in order to carry out process improvement-

- Processes must be consistently "error proofed" to prevent defects or failures from occurring or reoccurring. This technique should change the process to mechanically prevent defects or failures from going to the next process/station. Then human factor will be reduced and better product quality.
- Provide and maintain an operation environment oriented toward production of quality products. This should include, and not be limited to: education/training of workers, good housekeeping practices, proper equipment/inspection tools, and good working conditions.

4.5 Lot Control

A lot consists of product of one-part number and revision that are made at the same time, under the same processing conditions, from the same lot of raw materials. The primary purpose for identifying lots is to determine the scope of actions that must be taken when problems arise during further manufacturing or with customers. Each container of material shipped to AVTEC must be identified with the Supplier's lot number. Inspection records must be traceable to lot numbers.

The following are typical conditions that result in a change of lot numbers:

- Change of part number or revision
- Change of part number or revision of components
- Interruption of continuous production (typically for more than a few hours)
- Repairs or modification to the tooling or equipment
- Tooling changes (other than minor adjustment or replacement of consumable tooling)
- Change to a different lot of raw materials
- Process changes

4.6 Legal Compliance, Work Safety & Hazardous Materials

Supplier shall at all times comply with all applicable Central, State and municipal laws, regulations, standards, and codes. Supplier shall obtain all applicable permits, licenses, exemptions, consents and approvals required for the Supplier to manufacture and deliver the Goods and perform the Services.

Hazardous materials are defined for purposes of these Terms and Conditions as any substances regulated as contaminants, or as threats or potential threats to human health, safety or the

environment, by environmental regulations in India. The Supplier must comply with the following requirements for shipment of Hazardous Materials:

- Transportation of Hazardous Materials - Supplier shall ensure that all materials shipped by the Supplier are properly described, classified, packaged, marked and labeled and are in proper condition for transportation according to applicable regulations governing the transportation of hazardous materials. Supplier shall ensure that all personnel shall receive hazardous materials training as required by applicable regulations. Supplier shall further ensure that a valid 24-hour emergency response number (domestic and international) is supplied on the shipping documents for hazardous materials and that the appropriate material safety data sheet has been given to the proper emergency response organization prior to shipment. Notwithstanding the Incoterm / payment terms agreed under respective purchase orders, Supplier shall always be shown as the "shipper" on all documents relating to the shipment of any hazardous materials provided under this Purchase Order. Buyer is not to be shown as the "shipper" on any such documents. The contents pertaining to the title transfer as contained in Clause 6(a) shall be applicable to this clause as well.

- Supplier agrees to indemnify, defend and hold harmless Buyer, its affiliates, its officers, directors and their successors and assigns, from all claims, demands, expenses (including reasonable attorneys' fees) liabilities, causes of action, enforcement procedures, and suits of any or nature (collectively "Claims"), of which Buyer may incur as a result of Supplier's non-compliance with Supplier's obligations under this Section and any governmental laws and regulations applicable to the packaging, classification, labeling, training, handling and transportation of hazardous materials, whether such action is brought by a governmental agency or other person or entity, except to the extent that such Claims result from Buyer's negligence or willful misconduct.

4.7 Maintenance

The supplier must maintain all facilities, manufacturing machines, tools, measuring devices, and other equipment in such a manner that the supplier can support AVTEC’s production requirements, and the quality of parts manufactured for AVTEC is not degraded in any way.

5.0 Drawings/Changes

5.1 Drawing and Change Control

The supplier must have a documented system for assuring that the latest AVTEC drawings are in effect at their facility. The supplier’s quality management system must contain a documented procedure that describes the method used for the receipt, review, distribution, and implementation of all changes to drawings and specifications. In addition, the procedure must address control of obsolete drawings and specifications. A documented procedure should also detail the method used to contain new or modified parts until approved by the customer.

5.2 Process Changes, Engineering Changes

Suppliers must have systems in place to control changes to drawings, specifications, processes, or produced parts. Systems should be capable of handling changes being requested by the customer, and also changes requested by the supplier.

NOTE: The PPAP process is directed at a given part number for a specified revision level produced in a specific area of the manufacturer's facility. **Suppliers may not make any changes in their process, location, material, or to the part without written approval from AVTEC.** The supplier must formally request a process change on all AVTEC components.

5.3 Supplier Process Change Request (SPCR)

A Supplier Process Change Request (SPCR) is used to request a change to a released part, process, drawing, or specification. AVTEC encourages SPCRs for process improvement with the stipulation that before an SPCR is submitted, the supplier thoroughly reviews their FMEA and control plan to assure that all process-related issues have been addressed and resolved.
Format **AMF 455** must be used to raise a request. AVTEC will provide the format when supplier asks for it.

The originator of an SPCR includes the following information:

- Drawing or part number
- Drawing or part title
- Description of problem or recommended change
- Reason for change or "rationale"
- Proposed effective date

The supplier submits the SPCR with the revised FMEA and control plan (if applicable) to AVTEC for evaluation of the following:

- Supplier-demonstrated process capability and stability
- PPAP with change details comparison
- Industry standards
- Supplier process engineering capabilities
- Supplier's adherence to control plan

After AVTEC has completed the review, and concurs with the supplier, AVTEC will notify the supplier as to the final disposition of the SPCR and part submittal requirements and dates.

When monitoring is required, the appropriate markings must be identified on the lots etc. for a specified time frame as decided jointly with AVTEC and the supplier.

5.4 Supplier Deviation Request

A supplier is never permitted to knowingly ship product that deviates from the print, specification limits, or design intent without written authorization from AVTEC. If such a condition exists, the supplier may request AVTEC to allow shipment of the product. This is accomplished by initiating a Deviation Request. Format **AMF 456** that must be used to raise a request. AVTEC will provide the format when supplier asks for it.

If directed by AVTEC, the supplier must send samples of non-conforming items to AVTEC for evaluation. The cost of any testing required to determine the acceptability of the product will be charged to the

supplier. AVTEC will determine the item's acceptability and what corrective actions (if any) are required beyond the deviation. If approved, AVTEC will send a written deviation approval to the supplier.

The deviation is only intended to be an interim action and **is not** to be construed as an engineering change. The supplier must begin work immediately to correct the condition in question. This must be accomplished within the time frame stated on the deviation. Failure to comply with the mutually agreed upon closure date for the deviation may result in the supplier's rating being affected.

In all cases, the supplier must fully contain all product suspected of being non-conforming at their facility. In addition, the supplier may be required to sort any suspect product at AVTEC.

Any parts sent to AVTEC that have been approved on a Deviation must be clearly identified on the box, container, or other packaging method with the appropriate markings decided jointly by AVTEC and the supplier.

6.0 Packaging & Labeling

6.1 Packaging

Each supplier must adequately plan for packaging. AVTEC encourages supplier-initiated packaging improvements. Suppliers will provide packaging that provides protection from any damage that may occur. Packaging, labeling, and shipping materials must comply with the requirements of common carriers, in a manner to secure the lowest transportation costs.

Packaging for ESD sensitive items must meet appropriate ESD packaging requirements. Contamination is a serious concern to AVTEC. Packaging must protect the components from contamination, including fibers from the packaging materials.
Packaging sign-off is necessary for material dispatch meant for regular production. There shouldn't be any deviation without the written approval from AVTEC.

6.2 Labeling

Each shipping container or inside package must contain the following information:

- AVTEC part number (if no AVTEC number exists, supplier part number is used)
- Quantity
- Supplier's Name
- Purchase Order Number (if required)
- Lot identification (if required)
- Required ESD Susceptibility Label on packaging for ESD sensitive items, using the Electronic Industries Association Standard EIA-471 symbol or equivalent.

7.0 Corrective Action System

AVTEC requires suppliers to utilize a closed-loop corrective action system when problems are encountered in their manufacturing facility, or after nonconforming product has been shipped to AVTEC.

7.1 Corrective Action Process Approach

The corrective action system utilized should be similar to the process outlined below. The focus should be on identifying the root cause(s) of the problem and taking action to prevent its recurrence.

- Use a team approach
- Describe the problem
- Contain the problem
- Identify and verify root causes(s)
- Implement permanent corrective actions
- Verify corrective action effectiveness
- Close the corrective action

7.2 Supplier Corrective Action

AVTEC issues a Corrective Action Request (CAR) to a supplier when non-conforming parts are found at incoming inspection, in production, in test, or by an AVTEC customer. They can also be issued as a result of a supplier audit. The supplier is required to respond by returning the CAR back to AVTEC with the "Team Response" fields completed.
The following provides a brief outline of the CAR procedure that suppliers to AVTEC should comply with:

- AVTEC requires that the supplier takes immediate containment action upon notification of the nonconformance. The supplier must submit a written response to AVTEC, reporting the Supplier's initial observation and defining the interim containment plan within 24 hours of notification. The Supplier's Initial Observation is an acknowledgement that the Supplier has been informed of the problem, and has begun to gather information about the problem.

- The containment plan must clearly define the containment actions at the supplier's facility to assure that no nonconforming product is shipped to AVTEC. If suspect product has already been shipped, the supplier must address all suspect stock in transit and any stock at AVTEC. The supplier will assist in identifying customer risk by identifying all suspect lot numbers and associated quantities involved.

- Within 48 hours after the original notification of AVTEC, the supplier must implement the containment actions.

- Within 7 working days from the initial notification date, the supplier must complete the 8D report and implement the corrective actions to prevent recurrence of the problem. Actions such as "train the operator," "discipline the operator," or "increase inspection," are typically not acceptable corrective actions.

- The supplier is required to keep AVTEC informed of progress towards implementing the corrective action. When corrective action implementation is complete, the supplier and AVTEC verify that the corrective action is effective in preventing the problem's recurrence.

8.0 Ship-to-Use (STU)

AVTEC utilizes a Ship-to-Use (STU) policy to reduce the problems associated with receiving nonconforming product from suppliers, while minimizing incoming inspection and speeding up the process of moving product to production.

Suppliers with all parts on STU and high ongoing quality performance are Preferred Suppliers. Preferred Suppliers are given first opportunity to quote for new business and are given preference.

AVTEC administers the STU program on a part-by-part basis. STU applies to all material and components purchased for use in released product at AVTEC. It does not include pre-released parts, samples, prototypes, pilot runs, First Articles for new tooling, and other low volume applications. STU material will be moved directly into production, bypassing incoming inspection.

8.1 Ship-to-Use Requirements

The supplier attains Ship-to-Use status with each proposed part by meeting the following criteria:

- For non-critical parts, the part achieves STU status upon First Article qualification, assuming all other requirements are met as detailed below.
- For critical parts, the supplier must be qualified through an on-site quality management system assessment. At AVTEC's discretion, the formal on-site assessment may be waived with a fully completed supplier self-assessment.
- For critical parts, the most recent three lots received must have passed all incoming inspections
- The part must have no outstanding corrective action requests (CARs) for issues affecting form, fit, function, reliability, or customer acceptance.
- The 3-lot requirement may be waived for a critical part if any of the following conditions are met, the provided a mutual agreement is reached between AVTEC and the supplier:
  - The part was modified from an existing part on STU by a part number or revision change, and the changes did not affect form, fit or function.
  - The part has less than 3 lots received within 6 months.
- For products shipped as complete, sealed, point-of-sale items from the supplier, AVTEC will determine if that product may be placed as STU immediately. This decision is based on the supplier test and manufacturing process/capability and availability of equipment to do meaningful testing.

If a supplier produces a part in more than one facility, each facility must qualify individually for STU.

8.2 Ship-to-Use Suspension

The supplier is placed on STU suspension when any of the following conditions occur:

- A lot fails an incoming inspection audit.
- A supplier-caused CAR is initiated for an issue affecting form, fit, function, reliability, or customer acceptance.
- The supplier fails a quality management system assessment.
- A control plan audit shows the supplier is not following their approved control plan.

If STU is suspended, AVTEC personnel investigate and determine whether the suspension extends to other part numbers/tools furnished by that supplier, issues a Corrective Action Request (CAR) if a CAR has not already been issued, and works with the supplier to correct the problem.

When the supplier's STU status is returned to good standing, AVTEC notifies the supplier of the change in status.

If a supplier does not implement effective corrective action, or if the supplier is put on suspension repeatedly, AVTEC determines whether the supplier's STU status should be discontinued. This decision may also include a decision to move the business to an alternate supplier. (Escalation matrix to be formed by SS/SCM/STA)

9.0 Supplier Monitoring

AVTEC continually monitors its suppliers to ensure they continue to meet AVTEC's requirements, and to ensure that the supplier continues to ship acceptable parts. This may consist of:

- A quality management system surveillance audit at the supplier's facility
- An on-site audit of the supplier's control plan
- A random incoming inspection audit of a batch of product
- Source inspection of product at the supplier's facility
- Nth Article Inspection
- Review of supplier-furnished data packages
- A supplier progress review meeting conducted periodically at the supplier's site or at AVTEC to review supplier performance and progress

Supplier performance is evaluated on the following factors:

Sr.No.	Criteria	Sub Criteria	Responsibility	Sub -Weightage (%)	Total Weightage (%)
1	Supplies	Schedule Adherence	MP & L	40	50
		Premium freight		5	
		Support & Responsiveness		5	
2	Quality	PPM	SQA Team	25	50
		Quality Report (QR)		15	
		Support & Responsiveness		5	
		Field Issue		5	

Schedule Adherence: Report is prepared by SCM Team considering the material received in the month against the schedule.
Premium freight: In case of no incidence of premium freight, weightage is 5% otherwise 0%. Even if premium freight is born by supplier rating will be 0%.
Support & responsiveness (Supplies): Rated Manually out of 5. Based on On-time Supplies (line losses), Crisis Management, Advance shipment Notice, Corrective action for Poor Delivery, CDR's

PPM: - Supplier Rejection PPM is generated through Oracle System.

PPM Level	*0*	*1-50*	*51-100*	*101-200*	*201-500*	*>500*
Weightage	*25*	*20*	*15*	*10*	*5*	*0*

Quality Report: - In case of any supplier defect observed at the time of use of material, QR is given by STA to supplier. In case no QR raised in the month than weightage is 15, whereas one QR raised then weightage will be 5 and more than one then 0.
Support & responsiveness (Quality):- Rated Manually out of 5.Based on receipt of SPC Data on time, Submission of G3D&G8D, Repetition of QR's, Audit Adherence and Closure of Points, New developments, Submission of layout reports, PDI reports, Material test certificates.

Field Issues: - No field issues observe in a month then 5 otherwise 0.

9.1 Supplier Audits

Periodically, AVTEC may audit the supplier's quality management system. The supplier must make their facility available for on-site process verification by AVTEC personnel at any time, with reasonable notice. This may be a full or abbreviated documentation and on-site audit. The purpose is to evaluate any changes that may have occurred in the supplier's quality management system, and to assess the supplier's continuing commitment to quality improvement.

Periodically, AVTEC may also audit the supplier's continuing conformance to the control plan approved in the First Article process.

9.2 Inspection Audits

AVTEC expects its suppliers to furnish material that conforms to all requirements, and that does not need to be inspected when AVTEC receives it. Material that has not achieved Ship-to-Use status, or that is on STU suspension is inspected on a lot-by-lot basis. AVTEC uses a C=0 sampling plan (refer to Annexure 3) that rejects the entire lot when a single non-conforming part is found in the sample. At AVTEC's discretion, in order to meet production requirements, 100% sorting may be done as necessary at the supplier's expense.

AVTEC may inspect product at the supplier's facility to detect potential problems prior to shipment. AVTEC may also inspect product at sub-tier suppliers.

9.3 N^{th} Article Inspection (Layout Inspection Report)

The supplier should perform annual Nth Article inspections of each critical part to verify continuing conformance of the part to the specification. This is also required if an engineering change affecting form, fit, or function occurs. The Nth Article requirement is not applicable to non-critical parts.

For all sub-components, the manufacturing supplier is responsible to ensure that the components that make up each assembly are qualified and monitored through the supplier's own part qualification system.

At the discretion of AVTEC, Nth Article can be postponed beyond, or required prior to, the annual expiration. Considerations such as component volume, program life cycle and supplier/part performance are used in the decision to pull in or extend the requirement for Nth Article.

9.4 Supplier-Furnished Lot Documentation

AVTEC may require the supplier to furnish inspection, test, process performance, or other quality data with each shipment to ensure that the product meets AVTEC's requirements. When data submission is required, the data must accompany each shipment, or be e-mailed or faxed to AVTEC at the same time the lot is shipped. All documentation must be clearly identified with AVTEC's part number, and the supplier's lot number.

When specified by AVTEC, the supplier must submit monthly data packages. Data packages typically consist of copies of control charts and process capability calculations for specified characteristics.

Once the supplier has completed two consecutive quarters of data submissions, the supplier may request elimination of the data submission if records show that the characteristic consistently satisfies AVTEC's requirements for process stability and process performance, and if the characteristic has caused no problems in AVTEC's production. AVTEC will notify the supplier in writing if the data submission may be discontinued.

9.5 Supplier Escalation & Improvement Program

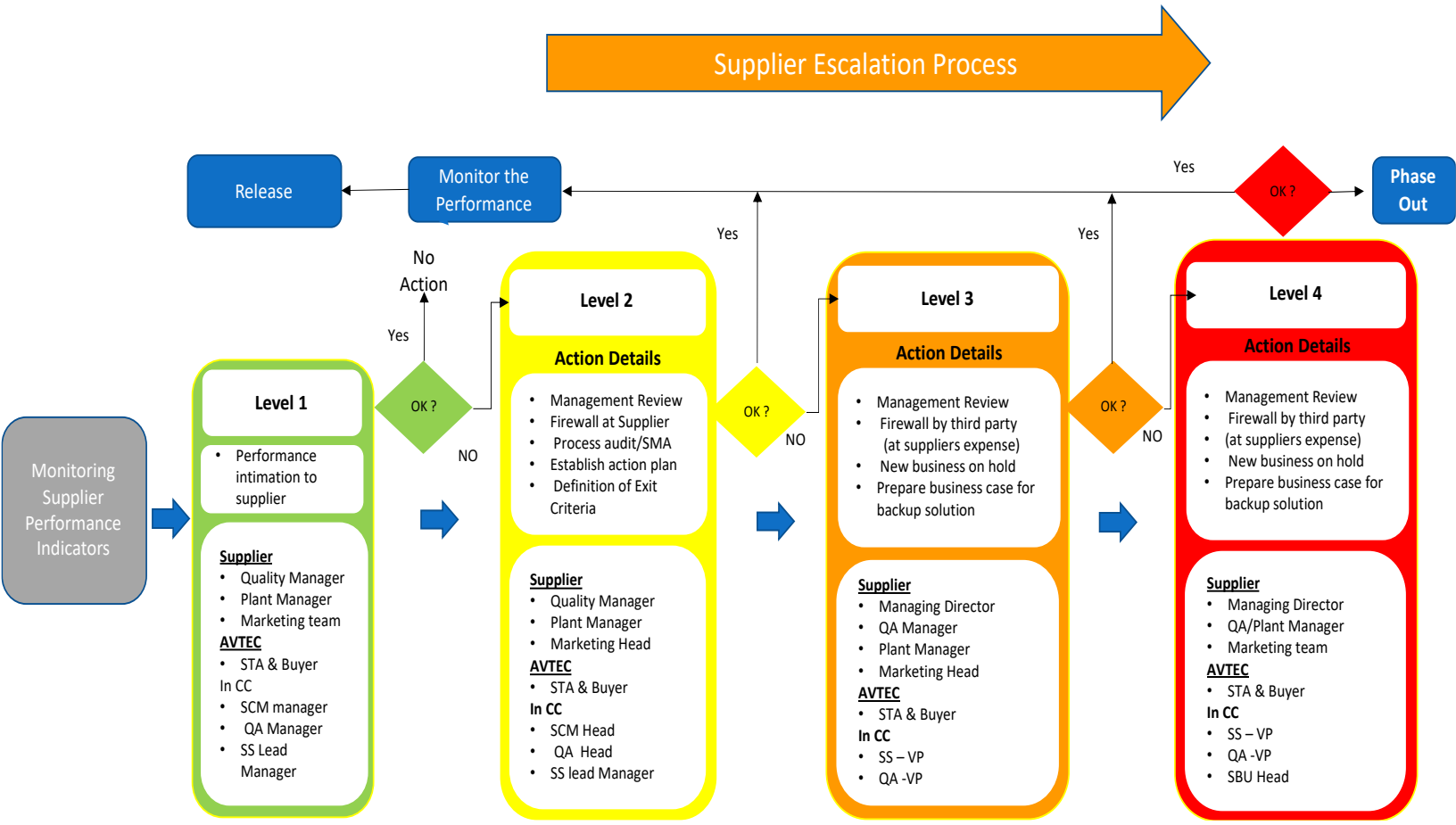
The goal of AVTEC Limited supplier improvement programs are to initiate and drive improvement activities with suppliers who are performing below expectations.

Supplier improvement programs AVTEC monitors supplier performance on a monthly basis. When any of the monitored measurement parameters indicate low performance trend or significant abnormality, the supplier is considered for elevation into a supplier improvement program. There are different variants of supplier improvement or supplier development programs being conducted by AVTEC, depending on the problem and specific situation for each supplier. Suppliers may be notified of the potential inclusion in any supplier improvement program by an intimation letter sent to the supplier's quality department. The letter will include the reason or reasons a supplier is being considered for supplier improvement entry.

Supplier improvement activities are initiated and monitored through an elevation process. Each stage will have defined criteria for entry and exit and identified actions to be completed during the stage. Exit criteria are based on improved performance results and implementation of process improvements. Suppliers that do not meet the criteria for a stage by the target completion date may be elevated to the next stage.

Each time the supplier is elevated to a higher stage, the actions required will be those of all previous stages, plus the additional actions required by the new stage. At any time that the exit criterion is met for a specific stage the supplier is moved to the "Monitoring" status. Supplier performance is tracked based on the AVTEC performance criteria.

A Supplier can be placed in a supplier improvement program based on performance for an individual part Number, Multiple Part Number basis of organizational performance


Supplier Escalation Process
Monitoring Supplier Performance Indicators
Release
Monitor the Performance
Yes
OK ?
Phase Out
No Action
Yes
Yes
Yes
Level 1
Performance intimation to supplier
Supplier
Quality Manager
Plant Manager
Marketing team
AVTEC
STA & Buyer
In CC
SCM manager
QA Manager
SS Lead Manager
OK ?
NO
Level 2
Action Details
Management Review
Firewall at Supplier
Process audit/SMA
Establish action plan
Definition of Exit Criteria
Supplier
Quality Manager
Plant Manager
Marketing Head
AVTEC
STA & Buyer
In CC
SCM Head
QA Head
SS lead Manager
OK ?
NO
Level 3
Action Details
Management Review
Firewall by third party (at suppliers expense)
New business on hold
Prepare business case for backup solution
Supplier
Managing Director
QA Manager
Plant Manager
Marketing Head
AVTEC
STA & Buyer
In CC
SS – VP
QA -VP
OK ?
NO
Level 4
Action Details
Management Review
Firewall by third party
(at suppliers expense)
New business on hold
Prepare business case for backup solution
Supplier
Managing Director
QA/Plant Manager
Marketing team
AVTEC
STA & Buyer
In CC
SS – VP
QA -VP
SBU Head