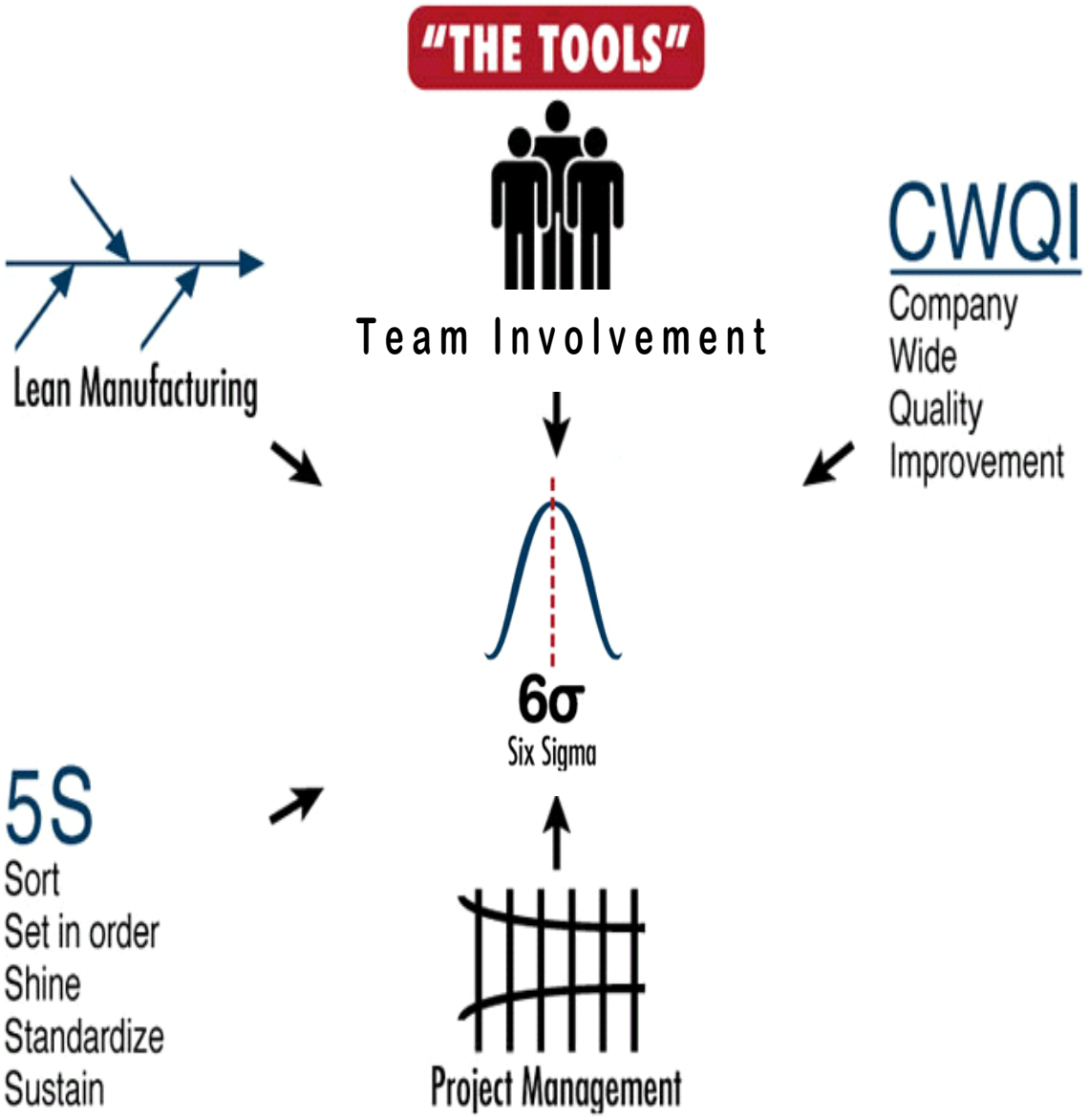
SIGMATRON INTERNATIONAL ONE SOURCE. GLOBAL OPTIONS.®

SUPPLIER QUALITY MANUAL



Supplier Quality Manual Index

1.0 INTRODUCTION

1. PURPOSE:

The purpose of this Supplier Quality Manual (SQM) is to communicate SigmaTron International Inc's. requirements to our suppliers. The document also details the processes employed to ensure that the Supply base meets these Quality requirements both internally and externally. The guidelines set forth in this manual for Quality are for purchasing of parts, materials, and services.

This Supplier Quality Manual does not constitute an offer or binding obligation of SigmaTron to purchase any parts, materials, or services from any supplier or potential supplier.

2. GOAL:

The goal of this SQM is to communicate our quality policies and requirements, in order to enable suppliers to more effectively work together with us to obtain mutual success. It shall outline the process for generally doing business with us, as well as the processes for continuous improvement, quality assurance systems requirements, customer satisfaction, and ongoing communication.

The ultimate objective is to fully integrate our supply base into our process, and with their cooperation, achieve total customer satisfaction by meeting and exceeding their expectations.

3. SCOPE:

This Supplier Quality Manual is applicable to all suppliers supplying production and/or pre-production material to any location of SigmaTron. Suppliers that fail to meet the minimum requirements as measured in performance ratings are subject to a review by procurement and quality teams and corrective action may be required.

4. VISION:

Be the leading Global Leader of Product, Services and Solutions by enabling "Total Customer Satisfaction".

2.0 DEFINITIONS AND RESPONSIBILITIES

1. DEFINITIONS:

- **SigmaTron International, Inc. (Referenced as "SigmaTron" in this document)**
  For the purposes of this manual, it is "applied" to all suppliers who support SigmaTron's business at all global manufacturing locations.

- **Supplier**
  Defined as provider of material, parts, assemblies, and services used by SigmaTron in this manual.

- **Commodity Team**
  Defined as Purchasing, Engineering and Quality Representative as required, needed or designated.

2. RESPONSIBILITIES:

SigmaTron:

- Implement appropriate aspects of this Manual;
- Provide all appropriate direction to suppliers regarding the guidelines, requirements, application, and contents of this Manual;
- Managing the revision process and providing access to the latest revision of this Manual to suppliers;
- Open communication channels with timely responses from SigmaTron Personnel;
- Timely issuance of supplier performance Score Cards.

Suppliers:

- Using the latest version of this Manual and other supporting documentation,
- Understanding the content of this Manual in its entirety and assuring all related departments are notified and understood.
- Recommend the use of all appropriate forms, procedures, guidelines, and requirements provided in this Manual or per their own standards, in meeting SigmaTron requirements.
- Commitment to excellent quality and continual improvements to meet or exceed Customers' requirements.
- Timely and effective Corrective / Preventive Action(s) in the event of a non-conformance and provide additional information or data to support the validation and effectiveness of the corrective actions.
- On-going responsibility to meet SigmaTron Quality Score Cards requirements being GREEN in all area of performance while providing open communication channels with timely responses from appropriate supplier personnel.

3.0 TERMS AND CONDITIONS

1. Contracts & Agreement:

For details, suppliers are required to contact their Commodity Team or Buyer. This manual is a guideline for Quality and Process requirement. Along with this document, other terms can be reviewed on the SigmaTron Web site.

2. Shipment Requirement:

If required, Suppliers must submit a Certification of Compliance with the shipments that includes all CTQ data to local SigmaTron facility quality department. For the Double Boat CTQ and Key Process CTQ. The performance data for SigmaTron production runs must be documented and submitted if requested.

3. Change Notification:

It is the responsibility of the suppliers to notify SigmaTron Quality /Engineering and Purchasing in writing immediately of any change to/of the following:

- **QUALITY SYSTEMS CERTIFICATION STATUS -**
  ISO/QS/IATF Certification, Decertification, Probation
- **QUALITY ASSURANCE -**
  Fixture, Control Plans (Production and Audit), processing parameters, tooling
- **PROCESSING LOCATION CHANGE -**
  Within or external to current facility
- **MATERIAL CHANGE -**
  Material Supplier or material
- **INTERNAL DESIGN CHANGES -**
- **DELIVERY -** Carrier, Consignment, Lead-time
- **PERFORMANCE LEVEL DEGRADATION -** Ppk, PPM
- **FOR OTHER CHANGES, REFER TO SECTION 7, PARAGRAPH 13 -**

Any changes to the items mentioned above that are not communicated to SigmaTron in writing may result in a chargeback penalty to cover extra activity associated with verifying products or recalling product that has not been approved by SigmaTron and/or its customers.

3.0 TERMS AND CONDITIONS (Cont'd)

4. CTQ Requirement:

Supplier is required to control their process utilizing CTQ (Critical to Quality) as agreed and discussed and provide data as requested (see details in this manual under CTQ in the addendum).

5. Document Requirement:

Process Control Plans must include Critical to Quality Double Boat, Single Boat, and Key Process CTQ; these items must be on the part Control Plan and performance data kept by the supplier for the life of the part. A Process FMEA must be submitted if requested.

6. PPAP /FPA Requirement:

Refer to addendum if required by SigmaTron.

7. Deviation Requirement:

Any deviation in reference to dimensional and electrical CTQ requirements, must be approved in writing by SigmaTron's Supplier Quality Manager or designee and must have this authorization prior to shipping the affected production.

8. Chargeback Cost to Supplier:

Suppliers may be responsible for chargebacks if defective parts are shipped to SigmaTron plants or are rejected by end customers. Request for chargebacks will be initiated by Purchasing.

4.0 QUALITY SYSTEM REQUIREMENTS

1. Quality System Certification:

Suppliers shall demonstrate a top management commitment to quality and continuous improvement. This commitment should be evident in the Supplier's quality planning, quality control and quality improvement processes. SigmaTron prefers its suppliers to have Quality Systems registered to ISO-9001 standards.

In addition to a quality system, suppliers should have a quality policy and specific quality indicators. A system should be present to track quality metrics and monitor for negative trends. This system should clearly communicate the supplier's quality responsibilities, goals, status to date and actions for improvement and should be visible throughout the supplier's organization.

Suppliers are actively encouraged to implement an environmental system in compliance with a current version of ISO-14000.

Suppliers of Agency-certified parts such as UL must supply the Agency certification if requested.

2. Basic Quality Requirements:

In accepting SigmaTron International, Inc. Purchase Order Terms and Conditions (available at www.sigmatronintl.com), suppliers agree to comply with all current quality requirements and procedures, as specified by SigmaTron. Product and/or services shall meet all engineering specification requirements and function with no abnormalities.

3. Suppliers Notified of supplying parts for Automotive IATF 16949 or Medical ISO 13485 products:

SIGMATRON EXPECTS THESE SUPPLIERS TO HAVE A QUALITY SYSTEM THAT WILL MEET THE FOLLOWING QUALITY REQUIREMENTS AS DEFINED BELOW. WHILE WORKING TOWARDS THESE REQUIREMENTS, THEY MUST HAVE A CONTAINMENT PLAN BASED UPON THESE STANDARDS.

- Is the supplier ISO9001 registered? If not, it must demonstrate a commitment to meet this standard before the parts can be purchased for production.
- Suppliers notified of being on Automotive products must have or plan to be working towards Quality System IATF16949 if required by SigmaTron's customer.
- Suppliers notified of being on Medical Device products must have or plan to be working towards quality system ISO 13485 if required by SigmaTron's customer.
- As required by SigmaTron's customers, to meet all these ISO or IATF standards, suppliers to the organization shall demonstrate conformity by maintaining a third-party certification issued by a certification body bearing the accreditation mark of a recognized IAF MLA (International Accreditation Forum Multilateral Recognition Arrangement) member and where the accreditation body's main scope includes management system certification to ISO/IEC 17021.

4. Document Control:

SigmaTron uses prints and other controlled documentation such as Procurement or Engineering Specifications to communicate component requirements. Procurement or Engineering Specifications identify requirements for procured material beyond the scope of math data/drawings, purchase orders, and industry standards. Applicable Procurement or Engineering Specifications are typically reference on the prints for the part numbers for which they apply.

SigmaTron shall provide the latest revisions of Controlled Documentation to the appropriate person as identified by the supplier. Suppliers shall have a documented procedure for controlling these documents and a system to route SigmaTron drawing and specification changes to all necessary departments. Suppliers will use the latest revision of controlled documentation for purchasing, supplying, and inspecting based on the purchase order requirements. All superseded document shall be removed from general access and appropriately identified as “OBSOLETE”.

5. Print and Process Review:

It is the responsibility of supplier to carefully review SigmaTron drawings and related specifications to ensure they understand and can meet all requirements. If clarification of requirements is necessary, contact SigmaTron Purchasing before submitting a quote or producing samples or production parts.

6. Test and Measurement Equipment:

Suppliers shall comply with the calibration system described by the latest revisions standards, or their equivalents. Inspection gages along with test equipment shall be controlled and the periodic calibration cycle shall be sufficient to ensure accurate measurements. Additionally, suppliers shall require GR/R study of the data for CTQ specifications.

7. Use of Statistical Tools and Problem Solving Techniques:

Suppliers shall be committed to improving quality through preventive and corrective action programs. Such programs may include group problem solving and employee involvement programs. Additionally, suppliers should use the appropriate statistical tools required to establish, control, and verify product quality. These tools include, but are not limited to basic statistical concepts such as Pareto analysis, Cause and Effect diagrams, Statistical Process Control, Design of Experiments, and Mistake Proofing.

The use of such tools should be required by the supplier’s quality system and documented in the control plan, capability studies and other quality records. In addition to verifying compliance with specifications, these tools should be used to develop solutions to problems and to identify opportunities for improvement.

8. Record Retention:

Unless otherwise specified by SigmaTron, the supplier shall be responsible for maintaining records and test specimens in accordance with the Supplier's Quality Management System requirements.

Suppliers are required to maintain documents such as purchase orders and amendments, PPAP submission packages, re-qualification and validation records, tooling, maintenance, traceability, engineering and inspection records providing evidence of conformity to requirements for the active life of the product or as specified by SigmaTron. Corrective/Preventive actions and supporting data shall be maintained for a minimum of five years, unless otherwise specified by SigmaTron. All records shall be stored, protected & retrievable upon request.

5.0 SUPPLIER AUDITS

1. Supplier Self-Audit:

Self-audits may be required if requested by Supplier Quality Manager, Engineering or Purchasing. Suppliers are required to get a current copy of latest self-audit and answer all the questions as listed in self-audit. There are requirements to provide applicable document examples and a copy of a Development Manual, Control Plan, PFMEA, Internal and External PPM data, Quality Reliability and Test equipment list and other documentation if required. An incomplete Audit will not be accepted.

2. Supplier On-Site Audit:

Based on the results of the self-audit or if there are concerns about the supplier's quality, their products or processes, an onsite audit may be required.

Suppliers should obtain and review the latest revision of the SigmaTron supplier audit forms for their reference. The forms can be obtained from the SigmaTron purchasing agent.

The audit may be conducted by a team consisting of a SigmaTron Buyer, Engineer and SQE or others assigned as designated and required. Separate procedure and audit forms are available if requested by supplier. Onsite Audits will contain a review of documents based upon the audit questions, implementation records and supported data that may need to be presented. The audit team will score the audit and there is a minimum score required to passing the Audit.

A passing Audit Score or meeting minimum score of the audit does not mean the qualification or approval of the supplier. It means that the supplier meets the audit requirements. Corrective action and follow up may be required based upon results of the on-site audit.

For suppliers notified to be supplying parts or components to Automotive IATF 16949:2016 products, additional audit practices must be followed that are listed in Section 11, Paragraph 1.

6.0 SUPPLIER DEVELOPMENT

1. Development Process:

This process may be applied to Suppliers based upon a selection criteria and other elements. The details are available to suppliers upon request .The key elements of this process are to review the Quality System, Process Controls, Process Capability requirement, CTQ requirement, Test and measurement equipment controls and capabilities, Supplier materials controls, internal/external PPM, Developing Process Control Plan, process FMEA, Supplier Performance review, NCR response, Continuous improvement of key process and plan review. This takes teamwork and means the supplier assigned stakeholders and SigmaTron SQE (Supplier Quality Engineer) will work towards an agreed improvement goal. The supplier will have a minimum score requirement to meet that goal. Upon achieving the score, the Supplier is considered Green Status; which means they have met SigmaTron Suppliers Development requirement.

There are mutual benefits to participate in this program. A few examples are reducing of waste, reduction in NCR, Lower PPM, Increasing Customer satisfaction, Quality improvement, Cost saving in eliminating COPQ and no interruption in delivery. Suppliers achieving a Green Status in Supplier Development may also have the opportunity to participate in new business and may have an advantage to other suppliers. Suppliers may contact Supplier Quality Engineer for more details about this program.

Following are Steps of Supplier Development Process:

1. Supplier must complete the SigmaTron Self-Audit.
2. Supplier must provide required documents as listed in Self-Audit as applicable
3. Supplier must meet minimum score of Self-Audits.
4. Supplier should work with SQM in development of customized Process Control Plan.
5. Critical to Quality dimensions must be included in Process Control Plan.
6. PFMEA must be developed and Process Mapping needs to be developed by the supplier.
7. SQE will conduct an Audit if required and all Audit findings must be resolved.
8. There is a minimum PPM requirement and supplier must meet this requirement.
9. Supplier must provide data of CTQ with shipment.
10. Supplier Performance will be monitored by the Scorecard, and if supplier maintains Green Status in all areas, they will be considered as meeting the Development requirement.

For suppliers notified to be suppling parts or components to Automotive IATF 16949:2016 products, additional Supplier Development practices must be followed that are listed in Section 11 Addendum Paragraph 2.

7.0 SUPPLIER PRODUCT, DOCUMENTATION AND CONTROL REQUIREMENTS

1. SigmaTron Owned or End Customer Owned Production Tooling and Fixtures at Supplier Location:

SigmaTron or end customer owned tooling is the property SigmaTron or the end customer and shall be labeled by the supplier as appropriate. SigmaTron owned equipment and tooling (i.e. dies, patterns, molds, special tooling etc.) should be permanently identified with a unique serial or asset number and company name, so that the ownership of SigmaTron equipment, tool and gage can be readily and easily identified. The location of this identification marking and the size of the font may be determined by the supplier as long as it is legible and affixed to the tool (not separate from the tool).

The supplier is responsible at all times, for the care, maintenance, safekeeping, and proper use of SigmaTron owned tooling and fixtures in their possession. This includes the prompt reporting of any loss, damage or destruction of tooling. Subject to the terms of the purchasing documents, the supplier may be liable when tooling deficiencies are identified.

In case of test equipment of SigmaTron used by supplier, the supplier is responsible either to have regular calibration done or contact SigmaTron for alternate arrangement. In any case, this is a supplier responsibility to make sure all test and measurement equipment is calibrated per NIST standards at all times.

The supplier shall also establish and document a preventive and predictive maintenance process for all equipment, tooling and gaging. Preventive and predictive maintenance schedules and records shall be maintained and made available upon request.

Supplier equipment, tools and gauges used in the manufacture of SigmaTron products shall not be sold or consigned to another entity without adequate notification and written consent from. Mergers, acquisitions, or affiliations also require adequate notification to enable SigmaTron to verify both the continuity of supply of product and the supplier's quality management system and its effectiveness. In such cases, or in the case of relocation to an alternative supplier location or facility, it is the supplier's responsibility to contact SigmaTron regarding potential production part approval process (PPAP) requirements.

Such tooling shall not be scrapped or relocated without written notification to SigmaTron. SigmaTron serves the right to take possession of the tooling at any time at no additional charge or obligation. If SigmaTron provides tooling and tooling design to a supplier, the original tool designs are considered the property of SigmaTron and the supplier shall provide copies of the designs upon request.

2. Sub-Supplier Control:

Where specified by contract or drawing, specification, customer directed buys, etc., the supplier shall purchase products, materials, or services from only approved sources. The use of SigmaTron and/or our customers' designated sources, including equipment, tool and gauging sub-suppliers does not relieve the supplier of the responsibility for ensuring the quality of purchased products.

If a sub-supplier is required to submit PPAP samples and after SigmaTron PPAP approval is granted, any sub-supplier and/or SigmaTron must approve any subsequent process change prior to formal implementation. See Section 3, Paragraph 3 of this manual for further clarification concerning this requirement.

The supplier shall establish the inspection or other activities necessary for ensuring that the purchased product meets specified purchase requirements, including regulatory requirements.

Suppliers shall promote sub-supplier monitoring of the performance of their manufacturing processes.

SigmaTron reserves the right to visit sub-suppliers.

3. Control Plans:

Control Plans are formal documented descriptions of the systems installed to control both products and processes. They form an integral part of product quality planning and shall be used by the supplier to communicate special product and process characteristic controls, gauge controls and SigmaTron specs as a minimum. Control Plans are generated in three distinct phases:

- Prototype: A description of the critical-to-quality characteristics (CTQ's), dimensional, material, and functional and performance testing that will occur during prototype build.

- Pre-launch: A description of the critical-to-quality characteristics (CTQ's), dimensional, material, functional, and performance testing that will occur during production trial runs, prior to start-of-production. Note: The pre-launch control plan normally details larger sample sizes and increased frequency of checking to ensure that all potential non-conformities are identified and acted upon prior to production release.

- Production: A comprehensive description of critical-to-quality characteristics (CTQ's), product and process controls, gauge controls, and SigmaTron specs that will occur during serial production. For automotive products, this document shall also include the "New Product Containment" portion of the plan as well.

- Containment: A preventative action by supplier to stop a known source of a problem, or not shipping any parts or assemblies until the source of the problem is identified and a corrective action is implemented and approved.

4. Verification Test Results:

Some products may require testing and analysis beyond inspection for dimensional properties to verify conformance. Examples include Electrical Test data, Reliability data, life test data, Failure Analysis, chemical analysis, mechanical testing, corrosion testing, x-ray testing, etc. The supplier shall verify that these requirements have been met for all parts and purchased materials, where SigmaTron has specified electrical, physical, chemical, metallurgical, or any other requirements. The test results and related information presented will include the property tested, the date and quantity tested, and the results of the analysis. When an outside service is utilized, the name of the organization shall be included in the submission, as well as their certification to appropriate testing bodies / standards.

5. New Supplier or Part Qualification:

- When a new supplier part is identified by either Commodity team or outsourcing group, the supplier is requested to submit samples with all required inspection and test data for evaluation by SigmaTron.

- If a PPAP is required a supplier must follow the level of PPAP as given. If no level is provided, the supplier shall follow standard AIAG PPAP documents.

- For an electronic component the supplier must submit the test data including the electrical test results, reliability data.

- Supplier must have achieved the parts qualification status from SigmaTron prior to Production build.

- The supplier must meet procurement requirements as listed in the SigmaTron International, Inc. Purchase Order Terms and Conditons, and referenced on SigmaTron's website.

- Supplier may be required to complete a SigmaTron Supplier Self Audit and/or allow SigmaTron personnel to complete an on-site audit. The SigmaTron Supplier Self-audit and Site audit criteria may be requested from the SigmaTron Buyer or Supplier Quality Manager.

- Lot numbers, manufacturing, inspection and test records shall be maintained for outside services (i.e. heat treatment, plating, painting etc.). Product identification and traceability (lot control) must remain intact throughout the suppliers' process. If the product is transferred into different containers, then all lot control information must be transferred and maintained.

6. New part prototypes (when required):

A minimum sample size of 30 pieces should be used to perform a process capability study for prototype product (due to reduced run sizes). Suppliers should select samples for the study from the beginning, middle and end of the production run. If lot/sample size is less than 30, then all CTQ Characteristics shall be measured 100%, and all measurement results shall be submitted for evaluation.

SigmaTron may grant conditional prototype approval if the value for Cpk or Ppk does not meet the process capability target. When the Cpk or Ppk is < 1.00, or process capability is not known (new process or a process that has been changed and needs to be verified), the Supplier shall use containment (generally 100% inspection) to effectively separate non-conforming material from the population until such time that the prototype process / tooling demonstrates capability (Ppk > 1.67 / Cpk > 1.33).

7. Restricted Materials Reporting:

Suppliers will be required to report their material and substance composition of all products supplied to SigmaTron. These reports may be for RoHS, REACH, Conflict Minerals or other similar regulatory or material reporting restrictions. SigmaTron will notify the suppliers of what reports are needed and the appropriate format for the reports for any part or component. SigmaTron may exercise its options to hold the supplier solely liable in the event product supplied does not conform to regulatory requirements.

8. Packaging:

The supplier is required to utilize packaging systems that will assure satisfactory protection against damage, contamination, mixed product, and corrosion during manufacture, subsequent storage, and shipment of all products to SigmaTron. When applicable, the quality system shall also include storage control provisions for product having a limited shelf life.

If the packaging has not been pre-defined by SigmaTron, the supplier may be required to submit a packaging specification proposal for approval to the relevant SigmaTron procurement, supplier quality, or materials representative during the Advanced Product Quality Planning process. Following acknowledgement and / or approval, the supplier shall ensure that their products are packaged, handled, and transported in a manner that preserves the conformity of their products during internal processing and delivery to SigmaTron. It shall be the responsibility of the supplier to set up and perform the appropriate packaging trials to determine the effectiveness of their packaging design. The acknowledgement and / or approval of packaging specifications by SigmaTron do not relieve the suppliers' responsibility for ensuring that the packaging meets intended usage and preservation requirements.

9. Certificates of Conformance:

If required, a certificate of conformance shall be submitted with the shipment to a SigmaTron production facility, as well as maintained on file at the supplier and made

readily available to SigmaTron upon request. It shall be up to the individual SigmaTron manufacturing facility as to their specific local requirements, and may be included in the purchase order as well.

All material certifications are valid for one year. It shall be the responsibility of the supplier to maintain current material certifications at all times. SigmaTron shall reserve the right to request updated documentation at any time.

10. Labeling:

Supplier shall be in accordance with the latest valid version of either the AIAG or specific SigmaTron Shipping Label Specification.

11. Product Identification and Traceability:

All suppliers shall establish and maintain documented procedures for identifying the product by suitable means, from receipt through all stages of production, and delivery to the customer.

The supplier shall identify product by suitable means throughout their internal processes, including manufacturing processes, ensuring traceability to raw material.

12. Supplier Change Request:

Suppliers and / or sub-suppliers shall not make any unauthorized changes to products (e.g. material, parts, components, services, etc.) and / or processes used to produce a product supplied to SigmaTron, which has previously been PPAP approved by SigmaTron. This includes any changes to production control plans.

The supplier shall notify SigmaTron's facility's purchasing and quality manager(s) of intentions to change a product or process. The notification should be accompanied by a suitable timing plan and quality plan. Suppliers shall gain approval prior to making any such changes.

The affected SigmaTron plant(s) will review and determine the effects of the potential change(s), and approve or reject the suppliers change request and supporting quality plans within fifteen (15) working days from receipt. However, if the potential change effects SigmaTron customers' requirements, then the period for approval / rejection may be subject to extension.

13. Product Change Notice Requirements:

Supplier change requests shall be submitted to SigmaTron for changes including, but not limited to:

- Changes of sub-suppliers;
- Changes in heat-treat, plating, coating, solderability;
- Changes to supplier-designed components;
- Relocation of product/tooling to an alternative manufacturing location;
- Use of alternative material or components;
- Changes in process sequence;

Product Change Notice Requirements (cont'd):

- Changes in equipment;
- Tool movement within the same plant, and / or;
- Replacement of SigmaTron owned gauges.

Any such change made without prior written approval by SigmaTron constitutes a violation of purchase order terms and conditions, both standard / ISO-9000 practice, and the supplier's third-party certification. Suppliers who fail to comply with these fundamental requirements may be placed on new business hold, and shall be liable for all damages, losses and liabilities associated with such a change.

14. Product and/or Process Deviations:

It is the policy of SigmaTron not to accept any product that does not meet requirements. However, under extenuating circumstances, requests for any such deviations shall be submitted to the SigmaTron receiving facility's quality manager, who will review the request with SigmaTron's engineering group. Deviation requests shall include, but not be limited to:

1. The reason for the deviation,
2. Quantity of parts or time period the deviation is requested to extend to, and
3. Part and packaging identification proposals to ensure traceability.

If a deviation is approved, it shall only either extend to the quantity of parts or time period stipulated. Any shipments received outside of the deviation that do not conform to specifications will result in the rejection of suspect product, the issuance of a supplier corrective action notice, and supplier scorecard score reductions.

8.0 SUPPLIER NON-CONFORMANCE REPORTS & CORRECTIVE ACTIONS

1. Nonconformance:

In the event that a product nonconformance is identified, it will be rejected and quarantined. SigmaTron will notify the Supplier through the use of an NCR or Non-Conformance Report and provide as much identifying information about the product as possible. Every NCR will be considered for supplier performance rating and all the cost associated with the incident will be borne by the supplier at a rate determined by SigmaTron. All cost and accounting implications from the incident will be forwarded to the Finance Department for credit.

The NCR Key Area is classified as follows (See Example of NCR below.) but not limited to:

a) Incoming Inspection Reject: Material rejected at Incoming Inspection because it does not meet SigmaTron specifications.
b) Manufacturing Line Reject: Material rejected in the Production Area where non-conformity is found in the material.
c) Packaging Slip Error: Discrepancy between the material received and the packaging slip delivered for it.
d) Field Reject: Material rejected at the customer plant or reported by the final customer.
e) Short Shipment: Quantity of material received if below the quantity of material requested.
f) Over shipment: Quantity of material received if greater than requested by SigmaTron.
g) Late shipment: Material shipment received later than requested.
h) Early shipment: Material shipment received before SigmaTron required it.
i) Any other discrepancy that does not fit in any of the previous categories.

When nonconforming material is found the Supplier is required to immediately quarantine, inspect, segregate and correct all product, and similar product, within its own facilities, as well as material already in transit, and include suspect material already at a SigmaTron manufacturing facility. These steps will be taken to assure that SigmaTron will not receive additional shipments of suspect product, as well as to purify its current suspect material already in stock. The cause of the nonconformance shall be identified, corrected, and controlled.

Any product rejected due to the fault of the Supplier will be subjected to one of the following actions:

- Return to Supplier at Supplier's cost for full credit or refund;
- Return to Supplier for rework at Supplier's cost - all repairs shall be completed to the drawing requirements;

In special cases (i.e. where nonconformance jeopardizes production delivery dates being met), SigmaTron will 100% inspect or rework the material. SigmaTron will typically notify the Supplier before this activity begins with an estimate of the cost and a timeframe for completion. The Supplier will be billed for the agreed upon material and labor costs associated with the rework or sorting. There will be a charge back to supplier for sorting and all related cost of poor quality. See attached procedure of charge back for details.

SUPPLIER QUALITY INCIDENT REPORT EXAMPLE ONLY

EACH SIGMATRON MAY USE THEIR OWN VERSION OF NCR AND 8-D REQUEST

Supplier:	Manufacturer:	Mfr. P/N:

SIGMATRON P/N:	Rev:	P.O. #	Date Rec'd:	Lot. No.:

Description:	Date Inspected:	Qty. Inspected:	Qty. Rejected:

Discrepancy Description and Details:

Location where problem was found: Part specification:

Supplier Contact Name:

Sorted Qty.	Total Rejects	Total Sorted Hrs.	Total Charges in Dlls $	Notes:

DISPOSITION:

☐ Return to Supplier

SHIPPING ADDRESS:

VENDORS ACCOUNT # :	**SHIP DATE:**	**AUTHORIZED BY:**	Credit Only:
	SHIP VIA:		Price / ea. $:
PACKING SLIP / INVOICE #:	**REPLACEMENT ON PO #:**	**QUANTITY :**	Debit Amt. $:
		RMA:	

☐ Rework ☐ Sort by plant ☐ Sort by Supplier ☐ Scrap charged to Plant ☐ Scrap charged to Supplier
☐ Use as is

Date Code(s):	Originator: _____	MRB Approval

Approval:

_____ _____ _____

Product Engineering Supplier Quality Eng. Buyer

SUPPLIER CORRECTIVE ACTION REQUEST:

Please complete the portion below identifying the cause of non- conformance, root cause and corrective action. Reply no later than 30 days (Maximum)

PROBLEM DESCRIPTION:

Root Cause:
Containment Corrective Action (Responsible and Implementation date):
Irreversible Corrective Action (Responsible and Implementation date):
Irreversible Corrective Action Verification (Responsible and Implementation date):

Authorized Signature:	Department:		Return to: SigmaTron Facility Purchasing Agent and Quality Manager
Correction Action Accepted Signed / Date		DMR Close Signed / Date	

2. Emergency Response Action:

Following the receipt of an emailed NCR informing the supplier of a rejection at a SigmaTron facility, the supplier shall notify SigmaTron within 24 hours with the details of the first 100% certified delivery, including, but not limited to, the delivery lot number, quantity, method of identification (product and packaging), means of transport (premium freight) and estimated time of arrival. Such notifications must be provided to SigmaTron's receiving facility's purchasing agent and quality manager prior to the receipt of a replacement and / or new delivery.

3. Containment Level I:

Suppliers shall implement Containment Level I (CL 1) immediately upon receiving notification from SigmaTron of a rejection. The goal of CL 1 is to cleanse the entire supply system of any non-conforming material and shield SigmaTron from receiving any additional defective product. The supplier is required to quarantine and sort all potential non-conforming product within their facility, at their sub-suppliers, in transit, and at SigmaTron facilities and SigmaTron's customers' facilities.

Containment Level I Guidelines:

- Containment areas must be off-line and have a well-defined process flow, including clearly identified areas for incoming and outgoing material.
- Containment areas must be clean, equipped and well illuminated.
- Acceptance standards and containment instructions must be clearly documented with Boundary samples available, if required.
- Personnel performing containment must be trained.
- Results of the containment shall be recorded and reviewed for necessary corrective actions on a daily basis. Records of containment shall be maintained for two years and made available upon SigmaTron request.
- The identification method of material passing through containment shall be agreed to with the relevant SigmaTron Supplier Quality Manager.

Exit criteria for CL 1 shall be agreed with the relevant SigmaTron Supplier Quality Manager and shall include as a minimum, an agreed pre-determined quality level for the next three consecutive production runs and / or deliveries following a rejection. Containment must not be removed before a permanent corrective action has been validated.

4. Containment Level II:

Containment Level II (CL II) is defined as the implementation of additional controls by an impartial third party selected by SigmaTron at the expense of the supplier. CL II is enacted when a supplier's CL I activity fails to shield SigmaTron from receipt of non-conforming material.

The SigmaTron Supplier Quality Engineer (SQE) determines if CL II is required. The SigmaTron Plant Quality Manager and Materials Manager or Purchasing Agent will initiate CL II activities by selecting the third-party who is to conduct the CL II activity and by sending correspondence to the supplier's key management personnel informing them of the decision.

The CL II letter shall detail the specific non-conformance, and required supplier actions, including inspection and exit criteria. The supplier is responsible for confirming receipt of the CL II letter by signing and returning a copy of the letter to the SigmaTron Plant Quality Manager.

The SigmaTron Plant Quality Manager assigns a sorting agency (third party) to perform the CL II activities. The supplier's input on the company used will be considered in the decision making process. The SigmaTron Plant Quality Manager will define the required checks and facilitate the definition of the exit criteria.

The third-party agency is responsible for performing the containment activity in accordance with the pre-defined inspection criteria and recording methods. Records of the containment shall be provided by the third-party agency to both the supplier and the SigmaTron Plant Quality Manager.

The supplier is responsible for issuing the purchase order to the third-party agency and is liable for payment of all associated costs. Initiation of CL II does not relieve the supplier of any relevant CL I activities following the aforementioned CL I guidelines and responsibilities.

CL II shall not be removed until a review of the data indicates that all significant issues show evidence of closure and are evidenced in both the CSL II records and the records from the CL I activity upstream in the process. If applicable, a CL II exit meeting will be held at the supplier's facility to review both the CL II containment records and validation results of the permanent corrective actions.

Following this review, the SigmaTron Plant Quality Manager will evaluate the findings and if found to be acceptable, will communicate in writing that the supplier has been removed from CL II.

5. Corrective Action:

Suppliers shall begin to resolve issues associated with non-conforming or suspect product immediately upon notification by SigmaTron. Suppliers shall provide a response to all written complaints and report back to SigmaTron within the requested timeframe.

At minimum, the response shall include details regarding containment and segregation of non-conforming or suspect material, root cause analysis, rework, and defined actions to alleviate the problem from reoccurring. The Supplier shall also maintain a corrective action program with its suppliers. Depending on the severity of the issue, SigmaTron may pursue the issuance of a supplier corrective action notice, supplier scorecard score reductions, or further actions based on the implementation of the supplier performance escalation process.

The Supplier shall use a team-based approach to problem solving methodology, and should utilize wherever possible quality tools when determining root cause,

The method of root cause verification shall also be determined and utilized. The selected permanent corrective actions should be communicated within 14 days from the original rejection date. If root cause analysis / corrective action process cannot be completed within the 14-day period, the supplier shall provide SigmaTron with a documented update on the root cause analysis / corrective action status; which will contain the schedule for periodic updates and the target date for completion. Implemented corrective action plans shall be validated by either the supplier, and / or witnessed by SigmaTron' s Supplier Quality Manager)

All NCRs must be closed at maximum 30 days, and if required, Supplier must submit Corrective Action data with a sample for validation of CAR.

6. Preventive Action:

Is defined as an action directed at the supplier's system, intended to prevent recurrence of a specific problem by directing analysis and action towards correcting the system. The relevant supporting process documentation e.g., FMEA's, control plans, procedures, work instructions, maintenance plans, etc., must be updated by the supplier to include the problem solving findings and actions. The Supplier shall make these documents available upon request for review.

9.0 SUPPLIER PERFORMANCE SCORECARD

The Supplier Scorecard is the method for performance feedback to the supplier.

These evaluations will be performed by the Plant Quality Group. The Scorecards are normally updated monthly.

The following supplier performance indicators will be reported to select or key suppliers:

- Incoming accepted rate
- Incoming defective rate
- Production process defect rate
- Complaints from end customer
- Number of corrective actions
- Corrective actions completed on time
- Delivery performance
- Overall service score

The following additional supplier performance indicators will be reported to suppliers of parts manufactured into Automotive IATF 16949 products:

- Customer disruptions at the receiving plant, including yard holds and stop ships
- Occurrences of premium freight
- Special status customer notifications related to quality or delivery issues
- Dealer returns, warranty, field actions, and recalls.

Supplier Performance Escalation Process:

SigmaTron utilizes a supplier performance escalation process to resolve systemic supplier performance issues.

Corporate purchasing and senior management review the overall performance of the supply base on a regular basis to establish those suppliers that have not met the SigmaTron scorecard minimum requirements. Suppliers not maintaining the minimum SigmaTron corporate requirement will be subject to the supplier performance escalation process. This may include updates to the supplier scorecard rating, which may prevent a supplier from receiving new business. Also, depending on seriousness of the issue(s) this can require the removal of business from a supplier for SigmaTron from contractual requirements.

10.0 CONTINUOUS QUALITY IMPROVEMENT

In order to compete in today's global market, we must continually supply our customers with products and services that are "World Class", both in terms of quality and cost. We cannot provide this level of product and / or service without the same performance levels coming from our supply base

1. **Lean Manufacturing** - A change from the traditional "Push" manufacturing process to a "Pull" process based on known demand. The benefits of Lean manufacturing are a reduction in cycle times and inventory that result in increased capacity and customer responsiveness.

2. **5 S's** - The predecessor to Lean Manufacturing that concentrates on eliminating waste through housekeeping and safety. A 5S work place is **sorted** for non-value material, **set** in order by assigning everything a place, **shined** by keeping it clean and swept, **standardize** so everything is in its place, and **sustaining** this discipline on an ongoing basis.

3. **Company Wide Quality Improvement (CWQI)** - This is a tool that SigmaTron uses as an improvement program for offices and business processes where routine transactions and functional interactions are addressed. The outcome of CWQI activities is eliminating the nuisance problems and non-value-added activities.

4. **Six Sigma** - The critical thinking methodology to eliminate wasteful variation by understanding an outcome is dependent upon the inputs: Y=f(x). To achieve world-class levels of quality performance through the use of statistical tools that Measure, Analyze, Improve and Control.

Sigma References

Sigma Level	Cpk Level	Short-Term PPM	Long-term PPM
1	0.33	158,655	691,462
2	0.67	22,750	308,537
3	1.00	1,350	66,807
4	1.33	31	6,209
5	1.67	0.3	232
6	2.00	0	3.4

11.0 ADDENDUM REFERENCES AND SPECIAL REQUIREMENTS

Some additional processes may be required of some suppliers.

1. IATF 16949:2016 additional Automotive Supplier Audit requirements:

- SigmaTron may conduct Supplier audits of automotive suppliers if deemed necessary or required and assess the following areas:
  i. The supplier management approach to sub-suppliers
  ii. Risk Assessment of the supplier
  iii. Sub-supplier monitoring
  iv. Supplier QMS development and progress. If the supplier has an automotive QMS the audit shall be consistent with the IATF 16949 :2016 guidelines.
  v. Supplier product audits
  vi. Supplier process audits
  vii. Supplier product regulatory/safety requirements
- Based on the results of the audits, SigmaTron shall determine how often and the scope of future audits.
- SigmaTron will maintain records of the supplier audits in line with its record retention practices.

2. IATF 16949:2016 additional Automotive Supplier Development requirements:

- SigmaTron will evaluate automotive Supplier performance with the normal and additional quality performance indicators in Section 9.
- The results of all the performance indicators will be used to determine the priority, type, extent and timing of any additional supplier development that may be needed.
- Additional Supplier development may also be identified by:
  i. the Supplier self-audits
  ii. The SigmaTron Onsite Audits.
  iii. Third party QMS certification status
  iv. Risk analysis
- Any Supplier unsatisfactory performance issues may result in additional actions and opportunities for continual improvement.

3. Design Failure Mode and Effects Analysis (DFMEA):

FMEA's should be prepared and maintained by the supplier, and shall comply with the guidelines set forth in the AIAG (Automotive Industry Action Group)Potential Failure Mode and Effects Analysis reference manual.

The Design DFMEA: If a DFMEA is to be generated by a supplier, then a design and / or several design alternatives should be objectively analyzed with regard to their specific

design targets (i.e. reliability, design for manufacture, recyclability etc.) to prevent or avoid product-related potential failures prior to drawing release / design “freeze” and subsequent serial production.

Following “design freeze” and during the entire “life” of the product, design change modifications should be analyzed and documented in the DFMEA. The experiences gained should be considered when developing future products, and included in “Lessons Learned” and other “RPN Reduction” programs.

SigmaTron RESERVES the right to participate in supplier DFMEAs.

The Process DFMEA or PFMEA: A structured approach used to deduce potential failure modes at SigmaTron process step / function of a manufacturing process, allowing prevention and detection controls to be designed in to the manufacturing process and thus, avoiding unnecessary defects and failure costs in production.

Following the commencement of serial production and during the entire “life” of the product, process-related changes are analyzed and documented in the PFMEA. The experiences gained are considered when developing future processes, and included in “Lessons Learned” and other “RPN Reduction” programs.

SigmaTron reserves the right to participate in supplier PFMEAs.

4. PPAP Master Document Retention/Submission Matrix:

FOR PPAP/FPA Procedure and Form Please Contact the Buyers or Corporate Supplier Quality Manager.

S = Submit document to SigmaTron.
A = Submit document to SigmaTron for approval signature.
R = Retain document, and make readily available to SigmaTron upon request.
* = Retain documents and submits to SigmaTron upon request.

No	Requirement	PPAP Level					Comments
		1	2	3	4	5	
1	Design records of Saleable Product - For proprietary components / details; - For all other components/ details if applied.	R R R	S R S	S R S	* * *	R R R	
2	Engineering Change Documents, if any	R	S	S	*	R	History of technical changes
3	SigmaTron Engineering Approval If Required	R	R	S	*	R	
4	Design DFMEA if applied	R	R	S	*	R	
5	Process Flow Diagram	R	R	S	*	R	
6	Process DFMEA	R	R	S	*	R	
7	Dimensional Results	R	S	S	*	R	Include drawing w/ numbered features corresponding to dimensional report. Record actual measurement results (the use of OK / NOK should be avoided)
8	Material, Performance Test Results.	R	S	S	*	R	All material certifications are valid for 1 year.
9	Initial Process Capability Study	R	R	S	*	R	
10	Measurement Systems Analysis Studies	R	R	S	*	R	Refer to AIAG Measurements System Analysis manual for methodology and acceptance criteria.
11	Qualified Laboratory Documentation if applied	R	S	S	*	R	Third-party certification, including scope.
12	Control Plans	R	R	S	*	R	
13	Part Submission Warrant (PSW)	A	A	A	A	R	Approval required prior to tooling payment. Also required for all submissions, regardless of the type / level.
14	Appearance Approval Report-AAP, If applicable	S	S	S	*	R	
15	Bulk Material Requirements Checklist (For bulk material PPAP only)	R	R	R	*	R	
16	PPAP Sample Product	R	S	S	*	R	Quantity to be confirmed with SQE and / or Commodity Mgr. / Buyer.
17	Master Sample, If required	R	R	R	*	R	
18	Checking Aids – Gauge Specification	R	R	S	*	R	
19	UL Qualifications	R	R	*	*	R	

20	Electrical Test Data	R	R	*	*	R	
21	Quality Reliability Requirement	R	R	*	*	R	

5. PPAP Submission Levels:

Level 1 - Warrant only, and for designated appearance Items, an Appearance Approval Report.

Level 2 - Warrant with product samples and limited Supporting documents.

Level 3 - Warrant with product samples and complete Supporting documents.

Level 4 - Warrant and other requirements as defined by SigmaTron.

Level 5 - Warrant with product samples and complete.

6. PPAP Responsibilities:

1. SigmaTron Buyers, Engineering or Quality will initiate the PPAP request to the Supplier. Electrical test data from Supplier may be required.
2. SigmaTron Engineering or Quality is responsible for analysis acceptance or rejection of the samples provided by the supplier for part or component approval.
3. SigmaTron Engineering or Quality is responsible to review the data for part approval provided by Supplier to verify critical specification and application related testing of the components. This will be completed in order to obtain component / manufacturer approval status.
4. Supplier Quality Manager can work with Supplier in helping or review of PPAP, if needed.

SUPPLIER PPAP REQUIREMENTS REFERENCE CHECK LIST

For PPAP/FPA Procedure and Forms Please Contact Buyers or Corporate Supplier Quality Manager.

DATE: _____

PART NUMBER:_____ REVISION CHANGED LEVEL: _____

PART NAME:_____ SUPPLIER: _____

		YES/NO	If "NO", Explanation Required
1	Design records of Saleable Product -for proprietary components/details -for all other components/details, if required		
2	Engineering Change Documents, if any		
3	SigmaTron-Engineering-Approval-If Required		
4	Design DFMEA-If applied		
5	Process Flow Diagram		
6	Process DFMEA		
7	Dimensional Results		
8	Material, Performance Test Results		
9	Initial Process Study		
10	Measurement Systems Analysis Studies		
11	Qualified Laboratory Documentation		
12	Control Plans		
13	Part Submission Warrant (PSW)		
14	Appearance Approval Report (AAR) If applicable		
15	Bulk Material Requirements Checklist (For bulk material PPAP only)		
16	PPAP Sample Product		
17	PPAP documents		
18	Checking Aids – Gage Specification		
19	Records of Compliance with SIGMATRON Customer-Specific Requirements		
20	Sub-supplier PPAP if applicable		
21	PSO / Run & Rate		
22	IMDS / European End-of-Life-Vehicle (ELV) Directive 2000 / 53EC Declaration (RoHS Certification) if applied		
23	NAFTA Declaration if required or applied		
24	FMVSS302 if applicable		
25	UL Qualification		
26	Electrical Test Data		
27	Quality Reliability Requirement(s)		

Print Name / Title (Supplier) _____

Phone Number_____

Email Address_____

5. CTQ(CRITICALTO\QUALITY)CHARACTERISTICS-AND REQUIREMENTS:

Critical-To-Quality (CTQ) characteristics (critical / significant / key) are product and / or process characteristics, which are identified, documented, and communicated initially during the APQP planning and definition phase(s), and reviewed in subsequent phases to ensure their continuing suitability. CTQ characteristics shall,

- Comply with all SigmaTron specified definitions and symbols
- Be identified in process control documents, including drawings, FMEAs, control plans, and operator instructions.

CTQ: Is a product characteristic for which reasonably anticipated variation could significantly affect the products safety or compliance with government regulations and / or safe vehicle / product function, and is ranked with a severity of 9 or 10 in FMEA (refer to AIAG FMEA manual ranking tables for further guidance). The use of statistical techniques is required, to determine process stability / capability of product/process critical characteristics (Ppk / Cpk – Index). Once stability/capability is established, the use of 100% control and/or preventive Poka Yoke is required.

"Bold CTQ": Is a product characteristic for which reasonably anticipated variation is likely to significantly affect customer satisfaction with a product (other than safety compliance) such as its fit, function, mounting, appearance and / or the ability to process or manufacture the product and is normally ranked with a severity of 5 to 8 and with an occurrence of 4 or above in P-FMEA. The use of statistical techniques is required, to determine process stability/capability of product/process significant characteristics (Ppk / Cpk – Index). Once stability/capability is established, the use of preventive / detective Poka Yoke and / or ongoing statistical process control (SPC) is required.

"Single CTQ": Is a product or process characteristic (e.g. temperature, pressure, speed, etc.) which has been reduced from a significant characteristic following the P-FMEA analysis

CTQ REQUIREMENT: SigmaTron requires that our selected suppliers must provide Critical to Quality data as discussed.

6.0 CUSTOM ELECTRONIC AND MECHANICAL/PLASTIC COMPONENTS AND PARTS QUALIFICATION REQUIREMENTS:

1. **INSPECTION LAYOUT OF MECHANICAL PARTS** - Dimensional evaluation from the SigmaTron Controls print (100%) is required of all parts and product materials with dimensional requirements. A **minimum of five samples is** required to be evaluated. The data collected must be recorded on a data sheet with cross-references to the print. When an outside inspection service is utilized, the name and phone number of the organization must be included in the submission.

2. **CAPABILITY STUDY** - Short-term process capability must be demonstrated for SigmaTron control characteristic identified in the Process Control Plan. However, before this capability study is conducted, gage accuracy and gage RARE studies should be completed to ensure high confidence in the measured data. The capability study parts must be run from production tooling after the process has stabilized. **Thirty pieces** is required for a **capability study**. In the case of molded parts, the entire shot (all cavities plus the runner and/or sprue) is to be retained from the SigmaTron tool and cavity. Randomly select and measure 30 parts according to the Process Control Plan requirements. Calculate and record the Cpk for the single and double boated CTQ dimensions. A Cpk of 1.67 is the minimum required on all CTQ dimensions to establish that the process is in control.

3. **ELECTRICAL TEST DATA** – SigmaTron requires supplier to submit all electrical circuit testing data including component high pot test, continuity test as applied. Minimum sample size 2.

4. **UL QUALIFICATIONS** – UL qualification of the materials and components required.

5. **QUALITY RELIABILITY REQUIREMENT** – SigmaTron requires supplier to submit Quality Reliability of the test data either of the sample parts or historical data.

6. **PROCESS FLOW CHART** (if required) - A Process Flow Chart should be created to provide SigmaTron with a better understanding of the supplier's process and control system. This document needs to provide a graphical representation of the activity being performed, a written description of the operation and inspection practices for all Critical and SPC Characteristics.

7. **PROCESS CONTROL PLAN** (if required) - A written description summarizing the system used to control the quality of the products produced by the supplier is to be provided in the Process Control Plan. The Process Control Plan must itemize the Critical and SPC Characteristics identified by the SigmaTron print. **Note:** Product must receive Approval before shipments from a supplier. Once samples are fully approved the **Supplier Certification Process** will follow.

8. **PROCESS FAILURE MODE AND EFFECTS ANALYSIS** - A process FMEA should be performed for the process(s) utilized to generate SigmaTron products.

12.0 REFERENCE DOCUMENTS

- ISO 9001:2015 - Reference applicable Clause
- ISO 13485:2016 - Refer to Manual for applicable clauses
- IATF16949:2016 - Refer to Manual for applicable clauses
- SigmaTron Corporate Quality Manual 400-CORP-400
- AIAG - Production Part Approval Process (PPAP) reference manual
- AIAG – Advanced Product Quality Planning (APQP) reference manual
- Copy of Supplier Self-Audit/Site-Audit Checklist may requested from Buyers or Supplier Quality Manager
- Supplier Performance Scorecard
- PPAP/FPA Procedure and Forms - Contact Buyers or Corporate Supplier Quality Manager
- SigmaTron International, Inc. Purchase Order Terms and Conditions – Contact Buyers or see the SigmaTron website

13.0 REVISION HISTORY

Rev.	Date	Revision Description	Written	Approved
A.	3/1/2008	Initial release of Supplier Development Manual	M. Arif	L. Bandler
B.	10/8/2014	Updated requirement combined SigmaTron	M. Arif	A. Abell
C.	4/25/2018	Update to meet Corporate Manual 400 –CORP -400	M. Arif	A. Abell, J. Sheehan
D.	1/8/2020	Updated IATF 16949: 2016 Requirement for Automotive component suppliers	M. Arif	A. Abell, J. Sheehan