Supplier Quality Assurance Manual

Special Devices, Incorporated

"Statement of Quality Policy"

"Customer satisfaction is the most important element in the success of SDI. Efficient manufacture of high quality products and on time delivery through continuous improvement will insure customer satisfaction. Continuous improvement will be achieved through knowledge, commitment and teamwork of all SDI employees."

This manual supersedes all previous forms of Special Devices, Inc. Supplier Quality Assurance Manual, and is to be used in lieu of any/all previous manuals.
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Reference Documents

AIAG B-10 “Trading Partners Labels Implementation Guide”
AIAG Heat Treat System Assessment (CQI-9)
AIAG Plating System Assessment (CQI-11)
AIAG Coating System Assessment (CQI-12)
AIAG Welding System Assessment (CQI-15)
AIAG Soldering System Assessment (CQI-17)
AIAG Manual “Production Part Approval Process” (PPAP)
AIAG Manual “Measurement System Analysis” (MSA)
AIAG Manual “Potential the Failure Mode and Effects Analysis” (FMEA)
AIAG Manual “Statistical Process Control” (SPC)
AIAG Manual “Advanced Product Quality Planning (APQP) and Control Plan”
Global Automotive Declarable Substances List (GADSL)
IPC 1752-1 Material Composition Declaration
ISO 9001:2008
ISO/TS 16949:2009
Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH) Regulation. EC No.1907/2006 and supporting amendments

Note: AIAG documents may be obtained from www.aiag.org.

Forms

Request For Corrective/Preventive Action (RFCA)  APD-PR0020
Problem Solving Report  APD/M-QA0342
SDI PPAP Requirement Checklist  APD-PR0013
Supplier Assessment Survey  APD-QA0345
Supplier Request For SDI Action (RFA)  APD-QA0248
Run @ Rate Analysis  APD-PR0017

Note: Electronic copies of all forms are available on our website or upon request. Please visit www.specialdevices.com or contact your SDE.
1. INTRODUCTION

1.1 Policy and Vision
It is the policy of SDI to achieve a clear competitive advantage through continuous improvement in quality, service, delivery and cost from our suppliers. It is the vision of SDI that suppliers shall adopt Continuous Improvement processes by promoting lean manufacturing principals and the use of six-sigma analysis tools.

1.2 Purpose
The purpose of this Supplier Quality Assurance Manual is to specify SDI quality system requirements for our suppliers. These requirements extend from supplier selection, to new product development, to production.

1.3 Scope
This manual describes the quality system requirements for current and prospective suppliers of materials to SDI. The manual is under the control of Supplier Development Engineering (SDE). SDE is responsible for supplier evaluations, by assessing conformance to the system and process requirements of this manual.

1.4 Responsibility
Suppliers are responsible for complying with the Supplier Quality Assurance Manual requirements. Failure to meet these requirements may result in the loss of existing and/or future SDI business. Suppliers shall adopt a goal of zero (0) Parts-Per-Million (PPM) defects and 100% On-Time Delivery to SDI.
2. QUALITY SYSTEM REQUIREMENTS

2.1 ISO/TS 16949:2009 and Alternatives

Suppliers shall be registered to ISO 9001:2008 (or later). Automotive suppliers should strive to be compliant with ISO/TS 16949:2009 (or later). Suppliers that are not ISO/TS registered may be audited by SDI Supplier Development Engineering (SDE). Suppliers that are not ISO 9001:2008 registered must supply a schedule to the SDE detailing their plans to become registered. The audit will determine if the supplier complies with all applicable elements of the latest edition of the applicable industry Quality System Requirements, including all supplements and reference manuals, including:

- Production Part Approval Process (PPAP)
- Advanced Product Quality Planning and Control Plan (APQP)
- Potential Failure Mode and Effects Analysis (FMEA)
- Measurement System Analysis (MSA)
- Statistical Process Control (SPC).

Should a quality system audit be necessary, the SDE will schedule the assessment audit with the supplier. The audit will be conducted using the QSA or SDI Supplier Assessment Survey (APD-QA0345), unless otherwise specified. The audit will include:

- Documentation of audit results
- Identification of concerns or issues
- Action plan to correct deficiencies, if needed. The Action Plan will include action(s) the supplier must take to resolve those issues that were identified during the audit, including establishing target completion date(s) for each action, and the name of the responsible individual for completion of the action item.

It is recommended that suppliers encourage direct material/service suppliers to be compliant with ISO 9001:2008 (or later) and for automotive suppliers, ISO/TS 16949:2009 (or later).
2.2 Basic Environmental Requirements

The supplier is solely responsible for being aware and complying with all relevant public standards. All suppliers shall comply with all applicable REACH requirements that affect products supplied to SDI.

Suppliers providing automotive components and materials are required to demonstrate compliance with the latest GADSL list and End of Life Vehicle (ELV) directive and amendments, regardless of whether PPAP is required. The GADSL list is available at www.gadsl.org. Reporting must be completed via the International Material Data System (IMDS), available at www.mdsystem.com (SDI ID = 23926).

Suppliers providing non-automotive components and materials may be required to demonstrate compliance with RoHS and WEEE, or other governmental or industry requirements. Reporting should be completed via IMDS or using the IPC 1752-1, Class 3 RoHS Yes/No, JIG Format Substances method (available at www.ipc.org).

2.3 Prototype Fabrication and Quality Evaluation

In fabricating prototypes or pre-production parts, suppliers should mimic the planned production process to the greatest extent possible. Suppliers may be requested to provide material certifications, dimensional, performance or process data.

2.4 Special Characteristics

Suppliers shall implement special process controls (such as SPC) for special characteristics and document such action on the control plan.

Critical (Critical) and major (Major) characteristics shall meet $P_{PK} / C_{PK}$ values as specified in the current AIAG PPAP manual.

Quarterly Cpk reports are to be submitted to SDE each quarter unless waived by SDI. All requested reports should be sent to the respective SDE the first week of each calendar quarter.

2.5 Special Process System Assessments

Suppliers shall conduct special process system audits annually using the AIAG assessments: Heat Treat System Assessment (CQI-9), Plating System Assessment (CQI-11), Coating System Assessment (CQI-12), Welding System Assessment (CQI-15), and Soldering System Assessment (CQI-17).

Individual assessments are required for each heat treat, plating, coating, welding, and soldering process used in the supply chain (this includes all sub-suppliers). If multiple suppliers/sites are used for a process, an assessment must be conducted for each supplier/site.
2.6 Advanced Product Quality Planning (APQP) and Launch Readiness Reviews

The planning stage of launching a new program and the components to be used are critical to the long-term success for both SDI and its suppliers. During the development and validation phases of the launch, the Supplier will be requested to work with SDI’s Integrated Product Team (IPT) to resolve production and manufacturing issues prior to production launch. When required, Suppliers will be requested to submit APQP status reports for tooling, raw materials, quality, and performance issues. Suppliers may also be requested to complete a Supplier Design Review Checklist (APD-PR0014) with SDI personnel.

A Launch Readiness Review may be conducted on site at the supplier prior to or during PPAP and may consist of the following:

- Verification of Design Review Actions
- Program timing chart
- Review of customer requirements
- APQP documentation (PFD, PFMEA, PCP, SOPs, etc.)
- Run @ Rate verification
- PPAP Status.
2.7 Production Part Approval Process (PPAP)

PPAP is required for suppliers providing automotive parts. PPAP may be followed for commercial parts as determined by the SDE.

2.7.1 PPAP Document

Suppliers shall ensure that the PPAP document is in accordance with the requirements of the current AIAG PPAP manual. Contact the SDE to review the SDI PPAP Requirements Checklist (APD-PR0013) for the level of PPAP required. Level 3 PPAP with all SDI-specific requirements will be the default level. The supplier shall verify that all requirements are met prior to the submission of the PPAP to SDI. The Buyer or the SDE may require that sample parts be sent to SDI to verify that the parts run at an acceptable level in the SDI process. These PPAP sample parts shall be identified with green PPAP labels as described in section 2.10.1. The approved or interim approved signed warrant returned to the supplier is the authorization to ship materials as directed by the purchase order.

If PPAP does not meet requirements and deviation is requested, contact the SDE and provide a Supplier Request for SDI Action (APD-QA0248). A copy of the dispositioned RFA must be included in the PPAP submission (see 2.11).

NOTE: Once the process that produces a part has been validated (i.e., PPAP approved), the supplier cannot change any element of that process without prior SDI approval. This applies to all products using the PPAP process.

2.7.2 Prohibited/Reportable/Recyclable Materials

Evidence of submission via IMDS prior to PPAP must be included in the PPAP. Any changes to the materials used or expiration of an applicable exemption will require resubmission via IMDS and may require a revised PPAP submission (reference 2.11).

2.7.3 Annual Validation

Annual validation shall be conducted by all automotive suppliers. Annual validation may be required for non-automotive suppliers. Annual validation may include full dimensional layouts, capability studies, material testing and performance testing. All documents should be less than one year old. For additional information concerning this requirement contact your SDE.
2.8 Run-@-Rate Analysis

A Run-@-Rate audit may be required to demonstrate the manufacturing process is capable of producing components at quoted capacity that meet SDI quality requirements, and the process conforms to the manufacturing and quality plan documented by the supplier in the PPAP. All production tooling and documentation are to be in place and running at full capacity, utilizing all regular production direct and indirect personnel and support systems. The supplier or the SDE will coordinate this activity using the Run-@-Rate Analysis form (APD-PR0017).

2.9 Packaging

Packaging requirements include the following:

- Only one part number in a box or packaging unit
- Only one lot number in a box or packaging unit
- Packaging will be in a quantity/lot size as agreed for the Kan-Ban signal size
- Packaging shall be in a manner and type that precludes damage to material during the packaging and transportation process
- Bar code label for each packaging unit per AIAG B-10 Trading Partners Labels Implementation Guide, unless otherwise specified, and shall include:
  - SDI part number and revision level
  - Part name/description
  - Quantity
  - Supplier name and supplier code
  - Lot Number
  - Date
  - Heat number if requested.
- Drawing or contractual requirements may specify additional required documentation (certificate of analysis, material certifications, etc.).

A description of the packaging method should be included in the PPAP submission.
2.10 Lot Identification, Marking and Lot Traceability

As part of the PPAP package the supplier shall include the definition of a “lot” and package marking instructions. The supplier should include a sample of the marking label. Additionally, the supplier shall include the lot traceability procedure that outlines how raw materials, processes, equipment, operators, and production dates are identified from the supplier lot number.

2.10.1 PPAP and Engineering Use Only Labels

Suppliers shall send all “PPAP” requested parts and “Engineering Use Only Parts” with labels visible on the outside of each container or box. Label examples are included below. Supplier may be asked to submit inspection data to SDE with the parts.

![PPAP and Engineering Use Only Labels Example]

2.11 Supplier Request for Action

SDI considers all the elements making up the process for all parts, at all suppliers, as critical. Once the process that produces a part has been validated (i.e. PPAP approved), the supplier cannot change any element of that process without prior SDI approval. Suppliers shall submit a written request for product or process change or a notification of change, to SDE, as outlined in the current AIAG PPAP Manual, using Supplier Request for SDI Action (APD-QA0248). If required, the supplier shall obtain SDI approval prior to implementing the change. Only a signed approved Parts Submission Warrant Letter (PSW) constitutes approval. For additional information concerning how to fill out this form contact your SDE.

The following actions will constitute an RFA:

- Waiver / Deviation
- Request for Process Change (includes raw material)
- Request for Drawing Change
- Other.
2.11.1 Deviations - Waivers

Deviations are required for material that does not meet one or more of the drawing requirements or any portion of a specified standard (including purchase order). Suppliers are responsible for the material shipped, and material received that does not meet drawing requirements will be counted against the supplier performance record.

The supplier shall submit a Supplier Request for SDI Action (APD-QA0248), to the Buyer and SDE, and obtain written authorization prior to shipment for any known non-compliant material. Only an approved Supplier Request for SDI Action constitutes approval to ship non-compliant material, and only for the agreed upon quantity/time frame. For additional information concerning how to fill out this form contact your SDE.

2.12 Drawing Revisions and Changes

Throughout the course of validation and production, suppliers may need to request a drawing change. Change request submission should be coordinated with the Buyer or SDE using Supplier Request for SDI Action (APD-QA0248). Once the change is authorized, an updated PPAP submission is required. Approved drawing changes will be formalized in a revised drawing and a purchase order amendment prior to implementation. For additional information, contact the Buyer or SDE.

2.12.1 Single Part Number Drawings

SDI drawings maintain revision control levels through the use of an “alpha or alpha/numeric” designation in the upper right corner of our drawings. This revision will apply to all documents and correspondence addressed to SDI except as noted below.

2.12.2 Multiple Part Number Drawings

Some component drawings have multiple configurations listed, and are referred to by SDI as “Tab” drawings. For Tab drawings, the revision letter (alpha or alpha/numeric) associated with each specific part number shall apply, and this revision will be used for all documents and correspondence addressed to SDI.
2.13 Concern Management

Upon receiving a SDI Request for Corrective Action (APD-PR0020) or Problem Solving Report (APD/M-QA0342), the supplier shall implement and submit a containment plan within 24 hours to the SDE. Within 14 days (or as required by SDE), the supplier shall submit a completed corrective action plan or a reasonable approach to developing one in case of complex issues. The supplier shall use a systematic problem solving method such as 8D, or other analysis tool acceptable to SDE. All responses must be submitted in one of the SDI formats.

Suppliers shall immediately notify the Buyer or SDE upon discovery that nonconforming or suspect product has been shipped to SDI.

2.13.1 Containment/Certification of Sort

Suppliers are responsible for containing non-conforming material at all locations, including material in-transit, at sub-suppliers, all supplier locations, and at all SDI locations. This containment action consists of labeling the outside of each container indicating that sorting or rework has been conducted. The label shall be specific as to the activity conducted indicating the certification. Any rework activity must be approved by SDE. If a containment action is determined to be ineffective, SDI may require a Third Party containment action. Use of a Third Party service may be at the expense of the supplier. The supplier is responsible for investigating any part(s) that were/are produced using the same equipment or processes, and may be required to sort material at SDI. Suppliers shall label each container with statement of containment actions. Containment costs incurred by SDI will be charged back to the supplier.

In the event that material is sent back to the supplier for sorting, the supplier must report the results of the sort to their SDE within 5 business days of receipt of returned material unless prior agreement is made with the SDE.

2.13.2 Rework

No rework of material is authorized without prior SDI approval. Rework must be supported by operating and inspection instructions. SDI may require special identification and segregation of the reworked product.

2.13.3 Root Cause Analysis and Permanent Corrective/Preventive Action

The supplier is expected to assemble a team and use problem solving tools that are readily available, such as the 5-Why, fishbone diagrams, six-sigma analysis tools, etc. In some instances, SDI may require the supplier to document the detail behind the corrective action response.
2.14 Supplier Performance Reporting

Suppliers are measured for quality and delivery performance. Depending on the commodity and volume of shipments, Supplier Scorecards may be sent to suppliers monthly.

2.14.1 Parts-Per-Million (PPM)

Quality is measured based on parts-per-million defective (PPM). The PPM goal for supplied materials is zero (0). Suppliers having 10 PPM or greater may be required to submit a corrective action plan.

\[
PPM = \frac{Actual \text{Quantity Defective}}{Total \text{Parts Received}} \times 1,000,000
\]

Suppliers are responsible for the quality of the material they deliver. By requesting a deviation before shipment of non-conforming material, the supplier may avoid the negative impact on PPM. If non-conforming material reaches SDI, the supplier will be notified through a Discrepancy Report (DR) and/or Request for Corrective Action (RFCA). This complaint will include details of the nonconformance. Subject to review and approval of the SDE, the supplier may have an opportunity to sort the suspect material and report back to the location the actual number of non-conforming pieces. If the supplier can provide certified replacement stock before the suspect material is needed, the SDE may adjust the number of discrepant pieces to zero (0).

Material/components requiring rework may be excluded from PPM at the discretion of the SDE. Reworking of material requires prior approval by the SDE and may require the supplier to submit a request for a process change (see section 2.9).

2.14.2 First Time Quality (FTQ)

First Time Quality is measured by comparing the quantity of lots accepted versus the quantity of lots rejected [dispositioned as return (RTV) or scrap (at supplier cost)], accepted upon deviation, and received with documentation errors (missing certification, label discrepancy, etc.). The goal is 100% FTQ. Suppliers having less than 97.5% FTQ may be requested to submit a corrective action plan.

\[
FTQ = \left(1 - \frac{\# \text{Lots RTV} + \# \text{Lots Deviation} + \# \text{Lots Document Error}}{\text{Total Lots Received}}\right) \times 100\%
\]

2.14.3 On-time Delivery (OTD)

On-time Delivery is measured by counting the number of delivery issues per reporting period. A delivery issue is any delivery event requiring SDI Purchasing involvement, including missed or late shipments, short shipments, etc. Specific focus is on events that could impact SDI manufacturing (unplanned changeovers, line shutdowns, etc.). The goal is zero OTD events.
2.14.4 RFCA Responsiveness
RFCA Responsiveness is measured by comparing the actual RFCA closure date against the due date specified in the RFCA. RFCAs are to be closed on or before the due date. Suppliers submitting the RFCA for closure 7 or more days beyond the due date may be requested to submit a corrective action plan.

2.14.5 Cost Incidents
A cost incident is any event resulting in increased cost to SDI. This includes items such as premium freight incurred due to late delivery or defective material, customer chargeback or sorting charges due to defective product, production line shutdowns, etc. This list is not intended to be inclusive of all events. The goal is zero incidents.

2.15 Record and Product Sample Retention
Suppliers must have a method allowing for the safe and accessible storage of all records, including procedures, documentation, data and samples pertinent to SDI product and processes for a minimum period of 20 years from the date of manufacture. Retrieval of archived data must be achievable within a 24 hour period.

If a supplier goes out of business or stops production of SDI material or component, that supplier is still responsible for the maintenance of the above mentioned documentation for the same period of time. The supplier will provide to SDI the location where the documents will be stored and a contact list with address and phone number where records will be retained. SDI maintains the right to obtain any of these documents upon request. The supplier may request, in writing, to transfer these documents to SDI.

2.16 Contingency Plan
Suppliers shall develop a contingency plan for potential catastrophes disrupting product flow to SDI, and advise SDI at the earliest possible opportunity in the event of an actual catastrophe. In the event of an actual catastrophe, suppliers shall provide SDI access to SDI tools and/or their replacements.