Supplier Quality Manual

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Introduction
This Supplier Quality Document is intended to assist our current suppliers, and potential new Supplier's to understand the quality expectations of Trident Micro Systems (Trident).

Purpose
This Document establishes the minimum quality requirements for all suppliers of production materials, whether the products being furnished are provided by the supplier directly, or are purchased from sub-tier suppliers for the use in Trident products.

Application
Trident has adopted the Quality System Requirements described in ISO9000, as well as the Automotive Industry Action Group (AIAG) reference documents (detailed below) which are available at the website → www.aiag.org. Suppliers may use these reference manuals as a guide in their advanced quality planning, and use them to comply with Trident Supplier Quality Requirements:

- Advanced Product Quality Planning (APQP)
- Statistical Process Control (SPC)
- Failure Modes and Effects Analysis (FMEA)
- Measurement Systems Analysis (MSA)
- Production Parts Approval Process (PPAP)

Supplier Qualification
Only suppliers with current registration to ISO 9000, or a recognized equivalent will be considered as potential new suppliers to Trident. Exceptions to this are suppliers who provide COTS (commercial off the shelf) products or a supplier who is the only one that manufactures a specific part. In both cases, the supplier will be approved by Senior Management, the Purchasing Manager and Quality Control Manager. It is expected that suppliers will maintain all elements of the quality system as defined in the applicable standard. Prior to the placement of new business, a supplier selection review will be conducted to determine if the proposed or existing suppliers are capable of producing product which meet the expectations and specifications of Trident.

RFQ/APQP Documentation
Upon receipt of a Trident Request For Quote, potential suppliers must prepare and submit a document package with their quote, a written acknowledgement that technical documents provided by Trident are understood and deliverable (i.e. Supplier Quality Documents, drawings, packaging, labeling, RFQ No., etc.)

1 Management Responsibility

The supplier shall establish, document and maintain a quality system as a means of ensuring that product conforms to specified requirements. The supplier shall submit the following to Trident Purchasing personnel:

- Current copy of 3rd Party registration certification to supplier's Quality Management System (e.g. ISO 9000 or acceptable equivalent).
- If the supplier is not ISO certified and they have a plan to do so, then submit a schedule detailing the activities to become ISO certified. This could result in Trident requesting the potential new supplier to complete a self-assessment report, or Trident conducting the assessment at the potential new supplier's location.

2 Quality Planning

The supplier shall establish and implement an Advanced Product Quality Planning (APQP) process for new products supplied to Trident

2.1 Critical Characteristics (CC's)

The purpose of Critical Characteristics is to aid in the economical manufacture of quality products. CC's require extra controls because excessive variation may affect the products performance or the quality of subsequent manufacturing operations. Trident Engineering will identify CC's by placing an identifier (Diamond ◊) next to the specification on the design record, or an entry in the Notes section. In relationship to this design CC's concept, it is the responsibility of the supplier, in preparation of the Quality Plan, to identify additional control characteristic(s) as determined by their product and process knowledge. If the supplier retains the ownership of both the design and the manufacturing, then the supplier shall be responsible for both design CC's and process CC's. CC's must be clearly stated in the supplier's quality plan returned to Trident during the Production Part Approval Process. It is also understood that all product features shall be manufactured within all drawing specifications.

2.2 Control Plans

The supplier shall develop Control Plans for the product supplied. The Control Plan shall include the information required in the Control Plan form located in the Appendix of the most current edition of the Advanced Product Quality Planning (APQP) and Control Plan manual, published by the Automotive Industry Action Group (AIAG).

- Production Control Plan – documentation of product/process characteristics, process controls, tests, and measurement systems that occur during mass production.

2.3 Product Part Approval Process Requirements (PPAP)

This section defines the requirements for part qualification and approval.

The purpose of the PPAP process is to assure that purchased components and assemblies meet the drawings and specifications specified by Trident that define the component requirements. Trident requires its suppliers to submit PPAP documentation (Level 3 Warrant is the standard). Actual measured values shall be recorded as opposed to general statements of conformance or other notations simply indicating acceptance.

PPAP requires the following reports when characteristics are identified on engineering design documents.

Dimensional Report: The report must include a numbered drawing / specification to correspond with the dimensional report. The report must include actual specification, tolerance, and numerical results. The report should indicate a Pass/Fail designation for each dimension.

Material Report: This report must list the material specification as required by the engineering drawing / specification, as well as the actual specification material requirements, tolerances, and numerical results for each material. The report should indicate a Pass/Fail designation for each material.

Performance Specification Report: This must include a report for each performance specification listed on the drawing / specification, as well as the results for each specification. Results must include the specification requirements and actual results.

Part Submission Warrant (PSW): Level 3 warrant is required unless otherwise notified by Trident.

When submitting a PPAP, the Supplier should use the Advanced Product Quality Planning (APQP) documents provided by Trident. Otherwise other equivalent documents may be used.

As part of the PPAP process, Suppliers shall, as a minimum, develop the following documents.

Process Flow Chart

Process Failure Mode and Effects Analysis (PFMEA)

Process Control Plan

The Supplier shall also include those Critical Characteristics designated by Trident in the drawing, specification, or contract. The Trident Control Plan or other equivalent version may be used.

When required by the Trident PO, drawing, or engineering specification, the supplier may be required to certify compliance to the Motorola Controlled and Reportable Materials Disclosure No. 12G02897W18. Details for reporting will be provided separately.

The QA Department will review and approve/reject PPAP Warrants at Trident.

Copies of approved / rejected warrants are to be given to the Purchasing Department to indicate parts approval status.

Records of all sample submissions will be maintained by the Quality Department.

2.3.1 Significant Product Run

Trident recognizes that small production trials runs are common, the supplier shall use the guidelines described in the PPAP manual to maximize the number of parts run during the production trial run in order to have as many parts as possible available to inspect for capability studies. When not enough data is available (minimum of 30 samples) contact the Trident Supplier Quality Manager to develop a suitable plan.

The PPAP production run shall be manufactured at the production site using the tooling, gaging, process, materials, and operators from the production environment. Parts from each unique production process e.g. duplicate assembly line and or work cell, each position of a multiple cavity die, mold, tool or pattern, shall be measured and representative parts tested. Inspection and testing used for PPAP shall be performed by a qualified laboratory (Refer to the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG)). Commercial and/or independent test laboratories used shall be accredited to American Association for Laboratory Accreditation (A2LA) (Refer to ISO/IAC 17025:2005.) When a commercial laboratory is used, the supplier shall submit the test results on the laboratory letterhead or the normal laboratory report form. The name of the laboratory that performed the tests, the date(s) of the tests, and standards used to run the tests shall be indicated. Blanket statements of conformance are unacceptable for any test results.

2.3.2 Design Records

The supplier shall maintain all design records for the saleable product, including design records for component or details for products. Where suppliers are design responsible, records shall be made available to Trident upon request.

2.3.3 Changes to Existing Design or Process

In the event a supplier wishes to make changes to an existing product currently supplied to Trident, the supplier must provide written notification to the Trident Engineering Manager. The written notification (Product Issue Report, PCN/ECN or other suitable document) must include timing required to implement. The supplier must receive written approval from Trident Engineering prior to implementing the change.

2.3.4 Authorization to Change (Deviation)

The supplier shall obtain written authorization from Trident Engineering Department, prior to incorporating any temporary product or process changes on any product or component supplied to Trident.

2.3.5 Design Failure Modes and Effects Analysis (DFMEA)

Design responsible suppliers shall have a Design FMEA developed in accordance with, and compliant to the most current edition of the Failure Modes and Effects Analysis (FMEA) manual, published by the Automotive Industry Action Group (AIAG), for parts or materials for which the supplier is design responsible.

2.3.6 Process Flow Diagrams

The supplier shall have a process flow diagram in a format that clearly describes the production process steps in sequence. Refer to most current edition of the Advanced Product Quality Planning (APQP) and Control Plan manual published by the Automotive Industry Action Group (AIAG).

2.3.7 Process Failure Mode and Effects Analysis (PFMEA)

The supplier shall have a Process FMEA developed in accordance with, and compliant to the most current edition of the Failure Modes and Effects Analysis (FMEA) manual, published by the Automotive Industry Action Group (AIAG).

2.3.8 Dimensional Results

The supplier shall provide evidence that dimensional verifications required by the design record have been completed and results indicate compliance with specified requirements. The supplier shall submit a copy of the drawing with each dimension, test, and or specification identified with a unique number. These unique numbers shall be entered onto the dimensional or test results sheets that are located in the Appendix of the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

2.3.9 Material Test Results

The supplier shall perform tests for part(s) and production material(s) when chemical, metallurgical, dimensional, physical, electrical, and reliability requirements are specified by the design record or Control Plan form located in the Appendix of the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

2.3.10 Performance Test Results

The supplier shall ensure that all tests are completed for all part(s) or product material(s) when performance or functional requirements are specified by the design record or Control

Plan form located in the Appendix of the most current edition of the PPAP Manual, published by the Automotive Industry Action Group (AIAG). Supplier may use outside accredited lab/test facilities to perform required tests.

2.3.11 Initial Process Studies

The level of initial process capability or performance shall be determined to be acceptable prior to submission for all Critical Characteristics (CC's) designated by Trident Engineering on the design record.

For CC's that can be studied using variable data, the supplier shall utilize one of the following techniques to study the stability of the process:

- X-Bar and R Charts, n = 5,

  OR

- Individual X – Moving Range,

For initial process capability studies using 30 to 300 parts, Trident acceptance criteria for evaluating process study results are as follows:

Minimum Capability Requirements: short term Ppk of 1.67 or greater with long term capability Cpk of 1.33 or greater based on a stable process.

The supplier shall contact Trident Supplier Quality Manager if the criteria cannot be attained by the PPAP submission date. The supplier shall then submit to Trident a formal corrective action plan to assure defective products are not shipped to Trident.

2.3.12 Measurement System Analysis Studies (MSA)

When required by the Trident Quality Manger, the supplier shall have applicable Measurement System Analysis studies (e.g. gage R&R) for all equipment used for new or modified gages, measurement, and test equipment.

(Note: Trident may accept the use of Gage R&R studies on families of gages and equipment. Contact the Trident Supplier Quality Manager with questions.)

2.3.13 Part Submission Warrant (PSW)

Upon satisfactory completion of all required measurements and tests, the supplier shall record the required information on the Part Submission Warrant (PSW). Refer to the Appendix in the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

2.3.14 Appearance Approval Report (AAR)

An Appearance Approval Report (AAR) shall be completed for each part(s) for which a submission is required if the product/part has appearance requirements on the design record. Appearance items are identified on Trident design records in the Notes section. (The AAR and how to complete an AAR can be found in the Appendix in the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

2.3.15 Sample Production Parts

All sample parts shall be sequentially numbered and 100% inspected. Containers shall be clearly marked “samples” on outside corners of each box. All parts shipped prior to PPAP approval will be considered “sample” components and identified for attention of the Trident Purchasing Manager.

2.3.16 Customer PPAP Status

Full Approval: indicates that the part or material meets all Trident specifications and requirements. The supplier is therefore authorized to ship production quantities of the product.

Interim Approval: permits shipment of material for production requirements on a limited time or piece quantity basis. (Note: in this situation Trident will notify the supplier, agree upon an action plan, and require the supplier to re-submit Interim Approval Report documentation.)

Rejected: means that the submission, the production lot from which it was taken and accompanying documentation does not meet Trident’s requirements. The submission and/or process, as appropriate, shall be corrected to meet customer requirements. A re-submission must be approved before production quantities may be shipped.

2.3.17 Record Retention

PPAP records shall be maintained for the length of time that the part or product is active plus one year (active is defined as both production and service). The supplier shall ensure that the appropriate PPAP records from a superseded part PPAP file are maintained. (e.g. Records or documents that should be carried forward from the old file to the new file would be material certs, dimensional results, etc.)

3 Nonconforming Material

A supplier must immediately notify the Trident Quality Manager and/or Purchasing Manager if it is discovered that nonconforming material may have been shipped to Trident. Immediate notification should be made by telephone followed by written documentation of the problem, lot size, shipment dates, lot identification etc.

If the sample(s) from an incoming lot of a supplier's material is rejected, Trident reserves the right to reject the entire lot or make other disposition. Trident Quality or Purchasing Department, will in turn notify the supplier. The Trident Nonconformance Report is used to communicate the nonconformance details to the supplier. Upon notification, the supplier must within 24 hrs, provide a written containment and replacement plan to the Trident Quality and Purchasing Managers. Containment may include full replacement of all suspect material, 100% inspect of all product at or en route to Trident location, as well as all product in process at the suppliers facility or subcontractor if appropriate.

Depending on the impact and severity of the nonconformance, the Trident Purchasing and or Quality Manager may issue a Supplier Corrective Action Request (SCAR). The supplier shall respond to the corrective action report stating the root cause of the problem, short-term corrective action, and long-term irreversible corrective action taken to prevent a recurrence. In all cases, the supplier shall 100% inspect suspect material until corrective action(s) have been implemented. Containers shall be clearly marked to indicate they have been 100% inspected.

To protect both Trident and the customer's production schedules, Trident reserves the right to initiate 100% inspection at their facility or by a third party. All expenses incurred shall be billed to the supplier responsible for the defective product.

3.1 Disposition of Nonconforming Material

Nonconforming material found at Trident is subject to several possible dispositions dependent on the nature of the nonconformance and supplier input.

- Supplier to rework and or sort at Trident facility at the supplier's expense
- Scrap at Trident facility at supplier's expense
- Return to supplier at supplier's expense
- Use with a Trident approved written approval

3.2 Packaging, Labeling and Traceability

Packaging must be sufficient to guarantee safe arrival to Trident. Packaging should also be kept to minimal size necessary to guarantee safe arrival to Trident. Each shipping container must have a label; the label must provide the following information:

- Trident Part Number as specified on the Trident PO
- Purchase Order Number
- Vendor Traceability Number (ex: lot number, date code, serial number, or order number)
- Quantity Shipped (lbs, number of parts, etc.)
- If the product is a sample, clearly mark 'SAMPLE' on the package
- Maximum weight per container is not to exceed 25 pounds.
- The supplier must have a system that insures shipping information documentation retention for a specified amount of time. This time is 3 years and could be longer if determined necessary by the supplier.
- The supplier must ensure that documented systems are in place at all sub-suppliers to control traceability of all critical components to raw materials and date of manufacturer.

For products shipped to Trident from outside the USA, shipping containers shall be identified with the material appropriate "COUNTRY OF ORIGIN".

Packing slips must accompany all shipments.

Bill of lading (freight shipments) must be provided along with packing slip.

3.3 Supplier Specific Requirements

3.3.1 Chemical or Hazardous Material Suppliers

Trident requires MSDS documents.

3.3.2 Tooling and Equipment Suppliers

PPAP report must include dimensional analysis on all dimensions. Trident will prescribe all necessary checks of capacity and quality for each new machine purchased.

3.3.3 Outside Laboratory

A2LA or ISO/IEC 17025 certification will be the preference for Trident. If lab work can not be completed by a certified lab, additional labs may be used.

3.4 Monthly Supplier Ratings

Monthly supplier ratings are generated by the Trident Purchasing Manager. Ratings are developed based upon quality (defect rate) and on time delivery performance.

If the supplier rating drops below an acceptable level then the supplier is placed on "Conditional" status. The Purchasing Manager is responsible for monitoring these suppliers and may request corrective action from the supplier to improve their performance.

Performance resulting in major disruptions at Trident may result in the supplier rating status to be "Unapproved". In this case, the Purchasing Manager must chair a meeting with the Exec, VP and Quality Mgr. to discuss action plans. The action plans are to be published and monitored by the Purchasing Mgr., with assistance from the Quality Manager as identified in the meeting.

Action plan options include...

a) Letter to the supplier requiring an action plan to deal with the issue.
b) Suppliers on-site assistance in dealing with the issue,
c) Begin sourcing to another supplier location,
d) 3rd party on-site assistance to deal with the issue (at the supplier’s expense)

3.5 Supplier Development

ISO 9000 quality system certification is our preferred approach for supplier development. We feel this will help in developing a partnership and open a line of communications between our companies. Suppliers may contact the Trident Purchasing and or Quality Managers if they have questions.