

PURPOSE/SCOPE:

The purpose of this document is to describe the criteria for Supplier Performance Review and rating. The document also informs Suppliers and Subcontractors what standards the Suppliers are responsible to meet and how TTM Toronto monitors and controls Supplier Performance.

These provisions supplement the existing Terms and Conditions of the Purchasing Agreement and Supplier FAR and DFAR Requirements. Each Supplier or Service Provider listed on the Approved Supplier List shall access this document via the TTM website at http://www.ttmtech.com/support/supplier_req.aspx. The document shall be reviewed to ensure compliance to the below requirements. If a Supplier or Service Provider is unable to access the TTM website, they must contact the Purchasing Department to request a copy of this document. Exceptions to a specific provision require that a written request be submitted to the applicable Purchasing Manager.

DEFINITIONS:

Approved Supplier List: A List of Suppliers approved (by TTM and/or our customer where applicable) to supply specific materials or services to TTM.

Corrective Action: An action to eliminate the cause of non-conformity or other undesirable situation.

Critical Materials and Services: Materials and/or services falling under the category of Critical and Major Suppliers.

Supplier Corrective Action Report (SCAR): This is where nonconforming material is documented when it does not meet Quality Requirements. It is to be separated from inventory stock until a resolution is made with the Supplier.

1.0 Supplier Approval Process

1.1 ISO9001 and 3rd Party Certified Suppliers: ISO 9001 / AS9100 / ISO 13485 / IATF16949 Certified Suppliers are recognized by TTM as having a Formal Quality Management System.

Requests for Critical Suppliers to develop their QMS to ISO9001 through to IATF 16949 are sent on a biennial basis with records of responses retained.

- a) [TTM requests for suppliers to develop their compliance to RBA VAP \(Responsible Business Alliance Validated Assessment Program\) formerly known as EICC.](#)

1.2 Calibration Subcontractors: Are required to maintain a documented calibration program that is in compliance with the requirements of ANSI NCS Z540-3, which includes traceability to the National Institute of Standards and Technology (NIST) or ANSI/ISO/IEC 17025 (latest revision) where applicable.

1.3 Non-ISO Certified Suppliers: Non-ISO Certified Suppliers are required to have controls over their production processes, materials, records and documentation. Lists of minimum requirements are as follows:

- a) **Configuration Control:** System which maintains control over the interrelated functional and physical characteristics of a product – from the time the initial purchase order is received until the product is delivered.
- b) **Process Documentation:** Supplier processes that can affect product quality shall be documented and followed. This documentation shall also be available for auditing.
- c) **Process Flow:** A Process Flow shall be determined for processing work. The flow shall be documented, followed and available for auditing. Travelers are a typical method.

- m) **Corrective Action / Preventive Action:** When responding to a quality failure issue, Suppliers need to take both corrective and preventive actions. Examples of corrective actions are: rework of defective product, person who violated a process is coached by a mentor, faulty equipment is repaired. Examples of preventive actions are: process parameters are changed to improve product, new training is written and used for annual re-certification, error proofing methodologies and new items are added to the equipment maintenance schedule.
- n) **Training:** Suppliers are responsible to ensure their employees are capable of performing the duties necessary to produce quality product and create adequate records thereof. Any function that requires special knowledge or skills also requires training for the employees. Records shall be retained to verify training efforts and employee competency.
- o) **Calibration Control:** Measuring devices used to verify product conformance shall be calibrated and traceable to national standards. A sticker indicating the calibration date and expiration date is required. Gage R&R Studies should be performed on equipment. These shall be made available to upon request.
- p) **Packaging:** TTM shall ensure that product (i.e. panels or printed circuit boards) are properly packaged prior to being transported to a Subcontractor (i.e. Via Fill, ENEPIG, ENIG, HASL). The Subcontractor shall establish and maintain a documented system for the control and monitoring of its packaging and shipping practices with provisions for handling, preservation, storage, packaging and final shipment. The system must be designed to ensure the quality of the deliverable material through prevention of damage, deterioration and degradation. When the packaging requirements are not detailed on the Purchase Order, the method used will be "best commercial practices". All Laminate and Prepreg materials are to have individual boxes/bags with proper separation between each panel to prevent handling damage.

Note: TTM Receiving is responsible for verifying that the Material Supplier or the Subcontractor properly packaged the product. If not, TTM Purchasing and Quality shall be immediately contacted.

1.4 Supplier Self-Assessment Survey (SSAS): The Supplier Self-Assessment Survey and a standard non-disclosure agreement will be sent to Critical and Major Suppliers or Subcontractors as part of the qualification process. The SSAS and NDA must be completed by the Supplier or Subcontractor and returned to the TTM individual(s) who sent the documents.

1.5 Outside Services (Subcontractors): Purchasing will verify that a Subcontractor is listed on the Approved Supplier List prior to issuing a PO for product processing. If the Subcontractor is not listed, Purchasing and Quality must ensure action is taken to approve supplier or send to an alternate approved supplier.

1.6 On-Site Audit: TTM, our customers and Regulatory Authorities shall be granted right of access to all Supplier and Sub-Tier Supplier Facilities inclusive of all Quality Records involved in fulfilling TTM Purchase Orders. There is more information regarding On-Site Audits detailed in Section 3.

2.0 Specifications, Standards & Material Certifications

2.1 IPC Material Specifications: Suppliers who provide laminates, Prepreg, Foil, or Plating Metal Services shall ensure the quality of their materials meet the quality levels defined by the appropriate IPC Material Specifications (e.g. IPC-4101, IPC-4103, IPC-4562, IPC-4563, and IPC-TM-650).

2.2 TTM Base Material Specifications: TTM has Base Material Specifications in addition to the IPC Material Specifications posted on http://www.ttmtech.com/support/supplier_req.aspx

2.3 Competence & Awareness: Suppliers must have evidence that personnel that have contributed to manufacturing and/or processing of their product or service are knowledgeable in their position and have been properly trained. In addition, Suppliers or Subcontractors must ensure that their employees are aware of their contribution to product and/or service conformance, product safety to which they are contributing to and demonstrate an ethical behavior when working with TTM and TTM's Customers.

2.4 Process Control / Quality Control: Suppliers shall inform TTM prior to making any changes to material and/or processes, that may impact, form, fit, function; reliability; serviceability; inventory; performance; regulatory compliance; and/or safety. The Notification must be in writing, at a minimum of 12 months in advance of the changes. Formal approval is then required from TTM. Change Notification is also inclusive of the following:

- Material Supply Discontinuance
- Material Sources and/or Parts
- Formulation Change
- Test Methods used to Confirm Product Compliance
- Manufacturing Locations
- Addition/Removal of Equipment
- Raw Materials Suppliers
- Subcontracted Services
- Continuity of Disaster Preparedness Plan

2.5 Material Certificates of Conformance: Suppliers who provide critical materials (that become part of TTM products) shall provide TTM with Material Certificates of Conformance (C of C's) for each distinct lot of material provided. A C of C shall accompany every shipment.

(a) **Validity:** Measurements and analysis shall be done to assure all materials sent to TTM conform to IPC Materials Specifications and TTM PO. Measurement methods and schedules are listed in the applicable IPC document tables.

(b) **Retention:** Suppliers will maintain a copy of the material C of C's for a minimum of 7 years or as stated in the Purchase Order.

(c) **Availability:** Suppliers shall provide copies of C of C's within 48 hours after a request has been issued by TTM, a TTM customer, or a Regulatory Agency.

(d) **Certificate Requirements:** All Certificates of Compliance shall have the following items:

- Subcontractor/Supplier's Name
- Purchase Order Number
- Lot Number / Batch Number
- Part / Tool Name
- Manufacturing Date
- Distributor Manufacture Date or Cut Date
- Material Expiration Date (for limited life material) – a minimum of 1 year or 80% of the shelf life is required upon material receipt unless otherwise approved by TTM
- Quantity

- Date and signature of the authorized company representative
- When Special Processes are required by Drawing or Specification, the C of C must clearly state the applicable Military and/or Customer requirement, specification, revision.

Note: In order to sign an inspection certificate or a Certificate of Compliance, the credentials of the signatory shall be such that they hold a technical or quality position within that company and is competent to certify that the product delivered is compliant to all drawings, standards, specifications and purchase order requirements outlined on the certificate.

If a Supplier uses a Subcontractor or purchases raw material from another Supplier, the Supplier is responsible to flow down these same requirements to their Vendors and Subcontractors.

2.6 Fraud & Falsification: Where the External Supplier's Services or Materials are performed or used, directly or indirectly, on products for TTM; the Supplier shall ensure that essential attributes of the work (and the work of their sub-tier Suppliers) are carefully checked or inspected and that records accurately reflect the results. The External Supplier shall not, in any manner, falsify, conceal or alter any material fact, or provide any false, fraudulent or fictitious statement of representation in connection with the work under any contract.

2.7 Foreign Object Elimination: The Supplier / Subcontractor shall establish and maintain an effective Foreign Object Debris (FOD) Prevention Program to reduce the potential of FOD. The Material shall be manufactured in an environment that is free of foreign objects (debris), utilizing effective FOD Prevention practices proportional to the sensitivity of the design of the product(s) or processes to FOD.

2.8 Continuity or Disaster Preparedness Plan: The Supplier shall establish a Continuity or Disaster Preparedness Plan in the event of a major Natural Disaster, Pandemic, or any unexpected occurrence forcing emergency shutdown of the manufacturing of goods, delivery of materials or provision of service, to minimize the impact on TTM. A copy of the Plan must be available upon request.

2.9 Conflict Mineral Reporting: The following statements apply to those Suppliers that are required to provide Conflict Mineral Reports:

- a) Please access the TTM Supplier Website at http://www.ttmtech.com/support/supplier_req.aspx
- b) Click on: Conflict Materials Requirements for Suppliers
- c) External Suppliers shall annually submit the latest version of a completed and accurate conflict minerals reporting template (CMRT) issued by the Conflict Free Sourcing Initiative (CFSI). The CMRT Report shall be completed in English and submitted in Excel format.
- d) External Suppliers shall utilize source smelters that are validated as conflict free smelters (CFS) by a 3rd Party Organizations (e CFSI, LBMA, RJC).
- e) External Suppliers shall notify TTM at least 90 days prior to any changes in source smelters and shall confirm such changes in a revised CMRT.

2.10 Counterfeit Parts Policy: TTM only accepts raw materials that are accompanied by the lot specific material Certificate of Conformance from the Original Material Manufacturer. Counterfeit parts prevention is governed by the requirements and guidelines of the Industry Standard SAE AS5553, SAE AS6496 and SAE AS6174.

- a) Please access the TTM Supplier Website http://www.ttmtech.com/support/supplier_req.aspx
- b) Click on: Supplier Counterfeit Parts Requirements

- c) TTM Technologies is a registered member of GIDEP (Government Industry Data Exchange Program), which is monitored by TTM for any quality issues, inclusive of any known counterfeit parts issues identified through the industry.
- d) The TTM GIDEP Representative will notify Purchasing if a GIDEP Alert has been released. If an Alert is received, TTM will notify the appropriate external parties, as detailed in SAE Counterfeit Parts Standards.
- e) TTM also monitors Suppliers and Incoming Material and takes appropriate action when suspect or confirmed fraudulent/counterfeit parts are detected.

3.0 Supplier Status & Maintenance

3.1 Quality Records Retention: Supplier will retain quality records for products, equipment or services provided to TTM for a minimum of 7 years, after the requirements of the procurement action have been fulfilled – or as stated on the Purchase Order.

- a) At the end of the retention period, Supplier will destroy all documents and other materials (including electronically stored data) that contains any Confidential Information, and shall certify such destruction in writing to TTM, including a list of the materials destroyed, if requested.

3.2 Records Format & Availability: Copies of quality records or documents may be saved in electronic or paper format, but shall be available to TTM, TTM customers, or Regulatory Authorities within 48 hours of request.

3.3 Self-Evaluations: Suppliers may periodically be asked to complete a self-evaluation form (i.e. Supplier Self-Assessment Survey).

3.4 Scorecards: Supplier may be measured periodically with Scorecards. The selection of these Suppliers is determined by Purchasing. The purpose of the Scorecards is for TTM to be readily able to review the Supplier's Performance. Scorecards can have a significant influence on Procurement decisions.

- a) **Performance Categories:** TTM Supplier Scorecards are broken into 4 categories / subgroups:

Quality

- DPPM Review
- Corrective Actions

Cost

- Payment terms

Delivery

- On Time Delivery, Product Lead Time, Timeliness of Order Acknowledgement
- Availability of replenishment programs, such as Consignment agreement, Vendor Managed Inventory, etc.

Technology

- Technology Development
- Technical Support & Responsiveness

- b) **Scoring:** Each of these categories is scored on a weighted scale. The weighting of each category and criteria for scoring is detailed in TTM Scorecard.
- c) **Performance Targets and Thresholds:** Targets and thresholds will be determined and set by Purchasing as deemed necessary.

3.5 On-site Audits & Right of Access: As detailed in Section 1.0, TTM, TTM Customers, and Regulatory Authorities shall be granted the right of access to all Suppliers and Sub-tier Supplier facilities and records involved in fulfilling TTM Purchase Orders. The Sub-tier Suppliers shall be informed by the Supplier of

