

Quality Assurance Provisions

Santa Ana Division

Valued External Provider,

The table below identifies the different types of External Providers TTM utilizes and the Quality Clauses mandatory for each.

If, for some reason:

- You believe a clause is not applicable to your particular organization, or
- Your organization is unable to comply to a particular clause,

You must request a waiver of the requirement that includes the reason why the clause should be waived. Waivers will be reviewed and approved/disapproved by the TTM-Santa Ana Director of Quality.

Type of External Provider	Mandatory Quality Clauses
Calibration	A, B, C, E, F, G, H, I, K, M, Q, S, U
Provides processes or services on printed circuit boards (e.g. hole-filling, plating, hot-air solder, etc.)	A, B, C, D, E, F, G, H, I, J, L, M, N, O, P, S, T, U
Provides direct materials used to manufacturer printed circuit boards (e.g., laminate, pre-preg, soldermask, hole-fill epoxy, silkscreen, etc.)	A, B, C, D, E, F, G, H, I, L, M, N, O, S, T, U
Provides chemistry/chemicals	A, B, C, D, E, F, G, H, I, L, M, N, O, S, T, U
Provides tools used for processing of Printed Circuit Boards (e.g. router bits, drill bits, resist, etc.).	A, B, C, D, E, F, G, H, I, M, N, O, P, S, U
Provides Laboratory and/or Testing Services (e.g., testing coupons or boards; testing and analysis of samples supplied such as solder samples, copper samples, etc.)	A, B, C, E, F, G, H, I, L, M, P, R, S, U
Provides packaging materials	A, B, C, D, E, F, G, H, I, M, N, O, S, U
Recyclers and Other General Services (e.g., Janitorial Services, Auditors, etc)	C, E, M, P, S, U

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QUALITY CLAUSES

A. Communication and Documentation:

Changes proposed by the external provider, both material and process, which may affect form, fit, function, reliability, serviceability, performance, regulatory compliance and safety must be submitted in writing 60 days in advance of such change, for TTM–Santa Ana approval. This includes, but is not limited to, discontinuance of supply of any materials to this division, changes of sources of material and/or parts (part/material transfer), changes in manufacturing processes, test procedures, manufacturing locations, relocation or replacement of equipment and any similar changes that are anticipated by sub-tier external providers. Items affected by such changes may not be delivered to TTM–Santa Ana until the external provider has received written approval for the changes from TTM–Santa Ana. At a minimum, the change notice must include the external provider's affected part number or software revision (if applicable), date of implementation, reason for the change, specific details of the change and, if available, supporting data that demonstrates the change will not negatively affect TTM–Santa Ana process compatibility. In addition, TTM – Santa Ana reserves the right to request samples for evaluation prior to approval.

B. Quality Management System Requirements:

External providers shall be certified to an appropriate quality management system, ISO 9000 preferred or equivalent. However, as an absolute minimum, the external provider must have a documented system showing effective process control of the materials, services, or chemistry supplied to TTM-Santa Ana. Those controls shall be provided to TTM-Santa Ana upon request for evidence of an effective process control system. In addition, as part of the quality management system, the external provider must show evidence of actions being taken to correct any deficiencies, and evidence that their management is reviewing their quality system on a regular basis.

C. Packing slips and Invoices:

TTM – Santa Ana requires purchase order numbers to appear on all packing slips and invoices.

D. Non-conforming Materials:

TTM – Santa Ana will not accept any nonconforming materials or product without prior written approval by TTM.

E. Corrective Action:

Upon written request from TTM – Santa Ana, the external provider shall provide documented corrective action plan(s) to prevent future deviations from requirements within 14 days from receipt of a Supplier Corrective Action Request from TTM. As a minimum, the corrective action response must include root cause analysis, actions taken to correct and prevent a reoccurrence, and date of effectivity.

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F. Right of Access:

After providing advanced and reasonable notice, TTM-Santa Ana reserves the right of access to all applicable external provider facilities, at any level of the external provider chain, to allow their customers and/or regulatory authorities access to review any applicable records pertaining to an order of purchased goods or services. In addition, TTM-Santa Ana has the right to request source inspection at any time for any products to be delivered for a specified purchase order after providing reasonable notice.

G. Survey/Audit Request:

TTM – Santa Ana may audit the external provider's quality management system at periodic intervals, upon written advance notification.

H. Quality Requirements Flow-down:

It is the external provider's responsibility to ensure that TTM-Santa Ana and applicable customer requirements are flowed down to all sub-tier external providers.

I. Quality Record Retention:

The external provider is required to maintain records of acceptance activities for services performed and/or products and services delivered to TTM – Santa Ana. These records may include, as appropriate, test/inspection criteria, revision level of documents/equipment/software used, operating procedures (planning, routing or traveler sheets), dates of test/inspection and the results, and any physical specimens used as part of the inspection process. The records required shall be retained for an indefinite time frame (based on lifetime of customer products), unless otherwise stated on purchase order documentation, or as agreed upon with TTM – Santa Ana in order to meet customer retention requirements.

J. Quality Record First Article Submittal:

A first article form must be submitted with each work order that was processed. The first article paperwork must include as a minimum, the date of manufacturing and record of documented inspection results, and evidence of product acceptance by the organization prior to shipping to TTM-Santa Ana.

K. Calibration System Requirements:

Calibration subcontractors shall establish and maintain a documented calibration program that is in compliance with the requirements of ANSI NCSL Z540-3, which includes traceability to the National Institute of Standards and Technology (NIST). Subcontractors who have service agreements for equipment manufactured by them shall assure the equipment is serviced and verified to their recommended requirements.

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L. Quality Record Certificate of Conformance:

A Certificate of Conformance must be sent with each lot of materials/chemistry delivered to TTM-Santa Ana. The certificate of conformance, as a minimum, shall contain:

- Subcontractor/Vendor name
- Purchase order number
- Lot identification
- Part/tool name
- Manufacturing date
- Expiration dates (for limited life material)
- Date and signature of authorized company representative.

M. Order of Precedence:

In case of conflicts between purchase order, shipper, or referenced specification (includes customer specification or TTM 'QS' specification), the referenced specification will take precedence.

N. Foreign Object Elimination:

- a. The external provider shall establish and maintain an effective Foreign Object Damage/Debris (FOD) Prevention Program to reduce FOD.
- b. The material supplied to TTM – Santa Ana shall be manufactured in an environment that is free of foreign objects (debris). The external provider's program shall utilize effective FOD prevention practices. The program shall be proportional to the sensitivity of the design of the product(s) to FOD, as well as, to the FOD generating potential of the manufacturing methods.
- c. The written procedures or policies developed by the seller shall be subject to review upon request by the TTM – Santa Ana.

O. Counterfeit Part Prevention:

For those who provide materials, the external provider shall not deliver products that contain counterfeit electrical and/or mechanical material/elements. External provider must notify TTM and disclose the source of materials if the materials become the subject of a legal or counterfeit issue. External provider shall have a program in place to be able to authenticate the materials being delivered to TTM. The link to TTM Technologies position and requirements for counterfeit parts is located at the following link:

http://www.ttmtech.com/support/supplier_req.aspx

Click on: [Supplier Counterfeit Parts Requirements.pdf](#).

TTM Technologies may submit a material to an outside lab for testing to confirm validity of materials used in the product at any time without the external provider's consent.

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P. ITAR Compliance:

The external provider must be ITAR (International Traffic in Arms Regulations) compliant and provide evidence upon request that personnel who are within the facility or supply a service to TTM-Santa Ana product are either U.S. citizens or permanent residents (applies when working on ITAR product). If the external provider conducts work on ITAR product or has access to ITAR drawings, they must also be registered for ITAR with the Department of Defense.

Q. Calibration ITAR Requirements:

Calibration external providers who come into the TTM facility must be U.S. persons (U.S. citizen or permanent resident). If the person coming in is a permanent resident, TTM must be notified up front and person must supply copy of resident card before notification of visit to the TTM facility.

R. Certification of Laboratory Reports:

Laboratory reports provided by laboratories for documented testing per regulatory standards shall identify appropriate accreditation.

S. Fraud & Falsification:

Where the external provider's services or materials are performed or used, directly or indirectly, on products produced under contract, that may affect the national security of the United States and the requirements, these contracts are designed to ensure that essential attributes of the work force and their sub-tier external providers are carefully checked or inspected and that records accurately reflect the results of the work. The external provider 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 within the jurisdiction of the Government. Doing so is not only prohibited, but may be punishable under Federal Law.

T. Conflict Mineral Reporting:

The following statements apply to those who need to provide conflict mineral reports:

- a. External provider 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 report CMRT shall be completed in English and submitted in Excel format.
- b. External providers to PCB divisions shall utilize source smelters that are validated as conflict free smelters (CFS) by third party organizations such as CFSI, LBMA, or RJC. External providers to EMS divisions shall utilize CFS source smelters whenever possible as customer bill-of-materials specifications permit.
- c. External providers shall notify TTM-Santa Ana at least 90 days prior to any change in source smelters and shall confirm such changes in a revised CMRT.

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U. Competence & Awareness:

External providers 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, external providers must make their employees aware of their contribution to product or service conformance, product safety to which they are contributing to, and to have an ethical behavior when working with TTM-Santa Ana, and their suppliers.

In the event there are questions or you require additional information, contact:

- Jonathan Sullivan, Director of Quality
714-327-3075, jonathan.sullivan@ttmtech.com, or
 - Jesse Prieto, Sr. Customer Service/Purchasing/SAE Manager
714-327-3092, jesse.prieto@ttmtech.com
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*I, _____, on behalf of _____ have received, read,
and acknowledged the above letter in regards to TTM-Santa Ana's material and service
requirements.*

Signature: _____

Date: _____