

Procurement Quality Terms and Requirements

The following DRS Test & Energy Management Quality Terms and Requirements apply as indicated in the Purchase Order or Contract. If you cannot meet any applicable term, notify the DRS-TEM Buyer listed on the face of the Purchase Order

1. Certificate of Compliance:

For tracking purposes each shipment shall be accompanied by a certificate of compliance signed by a company official responsible for product assurance. The certification shall identify as a minimum the purchase order number, line item number, part number as listed on the PO, quantity and the manufacturer. **Certification requirements for raw printed circuit cards are detailed in PQR # 18**

2. Quality Program:

Supplier Quality Programs and data retention shall meet the requirements of **ISO-9001/AS 9100** or an acceptable equivalent and shall be approved in advance by DRS-TEM. Independent third party certification is not required. Systems and processes once approved by DRS Supplier Quality Assurance shall not be changed by the supplier without prior written notification and approval by DRS Purchasing and DRS Supplier Quality Assurance. This encompasses any change in equipment, Manufacturing shifts, Materials or any other material or physical aspects of the process.

Suppliers doing business with or subcontracting to any sub-tier supplier on any Contract or Purchase order let by DRS-TEM shall be responsible for flowing down and enforcing any requirements that are stated on the original Purchase Order, Contract or other documents provided to the contractor. Suppliers are required to notify DRS-TEM of any problems with sub-tier suppliers that may affect Quality or delivery to DRS-TEM.

Suppliers having been approved by DRS-TEM supplier Quality Assurance and having an approved ISO registered systems or equivalent, shall have a current Quality Manual on file with DRS-TEM. Manuals over two years old are not considered current and will not be accepted.

Special processes such as plating, welding and casting are subject to review and approval by DRS-TEM. Suppliers required to conduct SPC shall maintain these records. Data that is required in the purchase order/contract are to be retained for 5 years at the supplier's facility in such a manner as to protect and facilitate its review. Data retention is from the date of purchase order completion.

The supplier shall maintain an active counterfeit avoidance program if supplying electronic components. The program shall center on the prevention of inclusion into any assemblies of counterfeit, non-authentic, altered or used components. These methods should include component testing, Manufacturers certification of authenticity, Part acquisition direct from manufacturers. Purchasing of components from unauthorized distributors is discouraged.

3. Shelf Life:

Age sensitive materials will arrive with at least 75% of the MANUFACTURERS shelf life remaining on the product. **THE DATE OF MANUFACTURE AND THE SHELF LIFE EXPIRATION WILL BE MARKED ON THE CONTAINER.** All chemicals will be shipped with Material Safety Data Sheet (MSDS).

4. Component Solderability:

All parts that require soldering shall meet industry standards for hand and machine soldering. It is the

supplier's responsibility to ensure compliance to **IPC/EIA J-STD-002**. Components that require re-tinning shall be tested and certified to **IPC/EIA J-STD-002 sec 4.3.1 test "E"** for leaded components and **4.3.2 test "F"** for leadless components. For ball grid arrays **IPC/EIA J-STD-013** applies.

NOTE: Subcontractors are required to verify that all MSD's (Moisture Sensitive Devices) Provided to and or purchased must comply with the baking requirements of IPC/JEDEC J-STD-033: Standard for Handling, Packing, Shipping, and Use of Moisture/Re-flow Sensitive Surface Mount Devices.

5. First Piece Inspection:

This applies to built to print (BTP) fabricated sheet metal or machined parts. These parts will have a first piece inspection completed. The initial shipment of parts shall be accompanied by the first piece unit and the dimensional data recorded in the supplier's format. The first piece unit will be tagged in a conspicuous manner as to identify it as the first piece. (Bagged, tagged or temporary label)

First Piece is only required on the first shipment of a new component, or on a component that has not been manufactured in the preceding 12 months. First piece is also required on any revision changes that affect the physical characteristics of the part. First piece is not required on documentation changes.

6. First article inspection:

This applies to all finished products or components that are not machined or formed to specific tolerances. The initial shipment shall be accompanied by the first article data recorded in the supplier's format. The first article unit will be tagged in a conspicuous manner as to identify it as the first article. (Bagged, tagged or temporary label)

First article is only required on the first shipment of a new assembly, or on an assembly that has not been manufactured in the preceding 12 months. First article is also required on any revision changes that affect the physical characteristics of the assembly. First article is not required on documentation changes.

7. Workmanship:

Suppliers are responsible for delivering products that are fit for use, meet the specifications identified on drawings and are manufactured such that they are free from sharp edges, burrs, scratches, dents and Blemishes. Electronic assemblies shall be soldered in accordance with **IPC/EIA J-STD-001** or as specified in the supporting documentation. The use of organic acids (OA) and /or any water-soluble flux/paste is prohibited on electronic assemblies. Fluxes are identified in **IPC/EIAJ-STD-004**. This applies unless waived by DRS Quality Assurance in writing.

8. Statistical Process Control (SPC):

Group I suppliers shall have a SPC process in place that includes a plan. Suppliers shall be able to demonstrate actual use of SPC to control the process and identify opportunities for improvements. DRS-TEM reserves the right to review all SPC data. SPC process will be in accordance with **IPC-9191**.

9. Calibration Services:

The supplier of calibration services shall have a system that meets the requirements of **ISO-10012** and **ISO-9001** and shall be able to demonstrate traceability of standards used to the National Institute of Standards and Technology (N.I.S.T). Calibration services will provide with each item calibrated a certificate of calibration identifying calibration date, due date, standards used and any significantly out of

tolerance condition and will be signed by a representative of the company responsible for Quality Assurance.

10. Packaging:

The packaging materials shall not degrade or damage any portion of the product being shipped; materials will be packaged and shipped using best commercial practices. The purchase order will reflect any special packaging requirements for electronic parts. Moisture sensitive devices (MSD) will indicate the moisture sensitive level (MSL) on the outside of the package. Packaging will be in compliance with **IPC / JEDEC J-STD-033** ESD sensitive parts will be packaged and marked accordingly using ESD warning labels and ESD protective containers. This will be in compliance with **EIA-541**.

11. ESD Program:

The supplier shall maintain an ESD program as outlined in **ANSI/ESD-20.20**.

12. Government Surveillance/Source inspection:

Government inspection/source is required at the contractor facility. Notify DRS-TEM 15 days in advance of the estimated completion date to arrange for a Government inspector.

13. DRS-TEM Surveillance/site inspection:

The seller shall maintain a quality system fully compliant with ISO 9001/AS-9100 or equivalent and will permit an on-site verification of the system by a DRS Quality Representative upon request and with reasonable notice.

14. Mercury Free Certification:

When required, parts shall be certified to be free of Mercury or exposure to Mercury. Test data to support this certification will be maintained for a period of 5 years from the completion of the purchase order or contract.

15. Radioactive Restrictions:

When required, parts shall be certified to be free of any radioactive material

(16. Reserved)

17. Special packaging provision:

Raw circuit cards are to be individually wrapped in a clear plastic sleeve to facilitate contamination free handling and viewing of any data printed on the card. This applies to single and bulk quantities.

18. Printed Circuit Board Requirements:

Product Quality Requirements (PQR) for Rigid Printed Boards, Flexible Printed Boards including Rigid-Flex and High Density Interconnect (HDI) Layers or Boards **Document # PE52265CL**. Copies of this requirement are available from Supplier Quality Assurance. (256)-895-2340.

19. Non-Franchised Active Component Suppliers

This requirement applies to active component suppliers only. An example of active components is Integrated Circuits, oscillators, rectifiers, diodes, etcetera. For further part identification contact the buyer listed on the PO.

Components with date codes exceeding two years, on date of shipment to DRS TEM, shall require re-tinning of the leads, proof of re-tinning is required. (PO, C of C from the plating house) A Manufacturer's Certificate of Compliance (C of C) is preferred for components. For this purpose the Original Component

Manufacturer (OCM) refers to the manufacturer of the device. If the Manufacturer's C of C is not available, the following shall be required:

- All date codes shall be verified as valid Original Component Manufacturers (OCM) date codes.
- All devices shall meet the solderability requirements of **IPC/EIA J-STD-002**.
- Full electrical functional test and certification that devices meet the requirements of the OCM specification/data sheet. The test report shall identify the quantity tested and the quantity failed. The
- devices shall be clearly identified as passed or failed. Tested parts, those which pass shall not be co-mingled for shipping purposes with those parts that failed.
- All devices shall be handled and packaged in accordance with standard ESD/MSD requirements.
- Full inspection and verification by the supplier that the mechanical characteristics of the device, such as leads, part configuration and body meet the OCM specification/data sheet. A statement that the devices operate as stated on the specification/data sheet shall be included with the C of C. The C of C shall be signed by the Supplier's authorized representative.
- Blank verification shall be performed on all programmable devices.
- A copy of all applicable test reports, certifications, date codes, lot codes and quantity of each date code and lot code must be included with all shipments.

20. Quality requirements for turn key CCA assemblies:

1.1 Quality System Requirements

- 1.1.1. The CM (Contract Manufacturer) will as a minimum have and maintain a quality system fully compliant with ISO 9001:2000 or an approved equivalent and will permit on-site verification of the system by a DRS Quality Representative upon request with reasonable notice. A 3rd party ISO registration is not required.
- 1.1.2. The CM's Quality system will focus on measuring and improving customer satisfaction, root cause identification and closed-loop resolution of non-conformance for materials and services within their supply base, the supplier will also maintain an active control process over its suppliers, in-house operations and customer feedback.
- 1.1.3. The CM will establish and maintain in-process and out-bound inspection activities for the basis of measuring in process and final yields for each part number. This will be reported to the DRS Quality representative on time line to be decided prior to the start of the production run. Web access to this data is permissible. The yields will be inclusive of all non-conformance categories. Consecutive yields as dictated by procedure of 100% per lot and no inspection failures at DRS TEM will qualify the supplier to be considered as a Certified Supplier.
- 1.1.4. The Contract Manufacturer (CM) will submit a Quality Plan in the form of a flow chart. A Quality Plan identifying key processes and inspection points will be sufficient.
- 1.1.5. The supplier shall maintain an active counterfeit avoidance program. The program shall center on the prevention of inclusion into any assemblies of counterfeit, non-authentic, altered or used components. These methods should include component testing, Manufacturers certification of authenticity, Part acquisition direct from manufacturers. Purchasing of components from unauthorized distributors is discouraged.
- 1.1.6. For the purpose of manufacturing, the order of precedence is the Purchase order, Master drawing, Engineering change orders (ECO) and any additional written instructions. Verbal changes or changes transmitted other than through the designated buyer are not valid.

1.2. Inspection and First Article Inspection

- 1.2.1 All Assemblies will be subject to first article inspection and approval by DRS. All such inspections and approvals shall not relieve the CM of its obligations under the Purchase Order, this includes but is not limited to the applicable warranty. DRS shall have the right to inspect the products at any time during the manufacturing process at CM's facilities or elsewhere provided DRS gives reasonable advance notice of each visit, and such visit does not disrupt the manufacturing capability of the CM, or violate the CM's safety, security policies, or clean room procedures. DRS will at our discretion conduct First Article Inspection at the supplier's facility for each part number or assembly.
- 1.2.2 The First Article documentation package will contain all physical inspection and test data. CCA's will require cleanliness test data (Ionic); to verify conformance to cleanliness requirements of class three, this will be one assembly per lot or run, Ionic's will be per IPC-TM-650. Assembly acceptance criteria will be per IPC-A-610 class 3. Manufacturing will be per ANSI/J-STD-001 class 3. All other requirements called out on the drawing apply. This includes any approved ECOs.
- 1.2.3 Each shipment or first article will be accompanied by a C of C both signed by an authorized Quality Assurance designee. The C of C's shall identify
- Part number, serial number, lot number and date of manufacture.
 - Cleanliness testing data to be attached (ionic) if applicable.
 - Testing data for ICT or FCT, if required, shall be attached if applicable
- 1.2.4 Any deviation or waivers will require pre-approval from DRS; requests will be forwarded to the appropriate buyer as noted on the purchase order. Requests for deviation or waiver will be submitted on form TEM-024-02
- 1.2.5 Assembly Process verification on site is required on every shipment. Request for inspection shall be addressed to Ken Loree at kloree@drs-tem.com with cc to mburgeson@drs-tem.com. Such requests shall be made 5 business days in advance. DRS reserve the right to waive the source inspection.

1.3 CCA Process requirements

- 1.3.1 Solder chemistry/Cleaning Chemicals. The use of ROLO flux is preferred. Use of any OA type flux will require submittal of SIR Testing per IPC-TM-650. HPLC testing per IPC-TM-650 test results should validate the assembly/test articles to be free of corrosive chemicals including the presence of any ionic contamination. The testing shall be current and recent; any testing done more than a year ago shall not be acceptable.
- DRS shall be provided a list of all solders, fluxes, chemicals, glues and adhesives. Once they are declared for use, shall not be changed without prior authorization by DRS QA.
- 1.3.2 Appropriate ESD controls in accordance with ANSI/ESD S20.20 or equivalent shall be utilized.
- 1.3.3 Any repair shall require prior DRS QA approval. Rework is acceptable if done in accordance with IPC-7711. Repairs, when approved, shall be in accordance with IPC-7721.
- 1.3.4 Part marking shall be in accordance with drawing requirements.
- 1.3.5 BGA x-rays are to be provided as part of First Article Requirements.
- 1.3.6 Solder joint acceptance shall be in accordance with IPC-A-610D class 3 for inspection and ANSI/J-STD-001 class 3 for manufacturing. DRS TEM does not require compliance with RoHS.

- 1.3.7 DRS may, at its option, reject and return any products which do not conform to the Order, applicable drawings, and specifications. The rejected products which DRS returns to the CM, as well as any replacement or repaired products which are returned to DRS, shall be at the CM's risk and expense.
- 1.3.8 DRS may, at its option use either a sampling plan or 100% inspection. Lots which fail to pass such sampling plans may, at DRS' option, be inspected 100% at CM's cost. The CM shall first have the right to inspect parts on DRS' premises to determine the non-compliance and appropriate disposition. DRS shall return any defective or nonconforming articles or lots to CM at CM's risk and expense.
- 1.3.9 Testing will be accomplished in accordance with the Purchase Order, print and any other supporting documentation

1.4 Corrective actions

- 1.4.1 DRS may, at its option, require written responses to a Supplier Corrective Action Request (SCAR) issued by DRS. CM's shall acknowledge the SCAR within 24 hours of notice. The CM shall develop and submit a plan to DRS that includes the identification of the nonconforming product, root cause, as well as the CM's proposal for resolution, and submit this plan to DRS within 10 business days from the date of receipt of the SCAR.
- 1.4.2 The CM shall evaluate each rejected item to determine if it conforms, in all material respects to the Specifications. DRS shall give the CM written notice of any rejection of an item N/C Non-conformance report as soon as reasonably possible. Such written notice of rejection of an item for failure to materially conform to the Specifications shall include a detailed description of DRS basis for asserting that the item does not materially conform to the Specifications ("Non-Conformance report").

If the CM disputes the basis for rejection set forth in a Non-Conformance report, it shall provide written notice of the same to DRS within ten (10) business days to Quality Assurance and the Purchasing department following the receipt of the Non-Conformance report. If the CM does not dispute the basis for rejection set forth in the Non-Conformance report the CM shall follow its standard RMA procedure.

1.5 Material Control

- 1.5.1 All components supplied under this order shall comply with the following:
 - Components both active and passive shall not have a date code more than two years old. All parts with date codes of more than two years old shall require approval by DRS.
 - Components shall be subjected to a process review for the identification of Fake, Counterfeit, altered or other non-genuine parts.
 - Parts bought for DRS programs which are not bought from franchised dealers will have been tested by the component supplier. The test data and a certification of conformance will be provided to the CM. This data will be available for review by DRS.
 - Raw circuit cards bought for DRS assemblies shall have the appropriate test data and cross sections available for testing and review by DRS.
 - All data and samples shall be archived for a period of not less than five years from the completion of the contract.

- Date code sensitive materials will be monitored. Out of date material will not be used on DRS assemblies.
- Shipments to DRS will conform to best commercial practices associated with the shipment of ESD sensitive materials.

1.6 Workmanship

1.6.1 Suppliers are responsible for delivering products that are fit for use, meet the specifications identified on drawings and are manufactured such that they are free from sharp edges, burrs, scratches, dents and Blemishes

1.6.2 Parts subjected to special processes such as painting, plating, welding etcetera will be certified by the supplier of the process.

1.6.3 Electronic assemblies **other than circuit card assemblies** shall be soldered in accordance with **IPC/EIA J-STD-001** or as specified in the supporting documentation.

All shipments are subject to various inspections. The supplier shall notify the listed POCs the appropriate number of business days in advance as directed by each requirement to schedule a source inspection. Contact points are DRS-TEM Incorporated 110 Wynn Drive | Huntsville, Alabama 35805 | email: mburgeson@DRS-TEM.com or Mark Burgeson at Phone 256.895.2340 | Fax 256.895.2471 or Kloree@drs-tem.com or Ken Loree at phone 256-895-2447. Copyright © 2000 DRS-TEM LLC., ALL RIGHTS RESERVED This Web site also contains trademarks of other companies. Unless indicated otherwise, all prices are in United States dollars and subject to change without notice. DRS-TEM, LLC. Is an Equal Employment Opportunity employer.