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Procurement Quality of Solid State Components by Government Contractors

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PROCUREMENT QUALITY OF SOLID STATE COMPONENTS BY GOVERNMENT CONTRACTORS

(From JEDEC Council Ballot JCB-93-30 and Standards Proposal No. 3016, formulated under the cognizance of the JC-13 Committee on Government Liaison and the G-12 Committee on Solid State Devices.)

1. SCOPE

This standard defines the practices to be used by government contractors related to the procurement of solid state components. These practices include parts selection, supplier management, and receiving inspection and test.

2. OBJECTIVE

It shall be the objective of government contractors to ensure that end item hardware utilizes the highest quality parts and materials at the lowest possible total cost of ownership while ensuring compliance with unique contractual requirements. This objective is to be achieved through careful selection of suppliers and parts, followed by a comprehensive supplier management program, a supportive program to verify visual and electrical characteristics, and a performance feedback program including assembly, test, and field operations.

3. PARTS SELECTION

The goal of parts selection shall be to maximize the use of standard parts.

3.1 Related Information

Information related to standard and/or recommended parts shall be made available to contractor design engineers in order to encourage their use. In addition, applicable part characterization and performance data should be made available during the part selection process.

3.2 Use of Nonmilitary Parts

Use of nonmilitary parts will require a technical evaluation by the contractor to ascertain the level of verification/qualification testing required.

4. SUPPLIER MANAGEMENT

4.1 Supplier Approval

A listing of approved suppliers linked by part number shall be maintained by the contractor, and available for review. An assessment of both the supplier's technical capability to produce the part as well as the quality system should be conducted. The use of a recognized third party assessment of supplier capabilities is encouraged.

4.2 Supplier Performance Assessment and Improvement

Government contractors shall work closely with the component suppliers to assess the performance and continuous improvement of the product quality. The emphasis should be placed on component manufacturing process controls, and compliance to applicable part specifications. Contractors and component manufacturers should develop a program plan stating procedures and methodologies to be used to comply with requirements.

4.2.1 Acceptance Program

The contractor shall conduct an electronic component acceptance program that may consist of 100% verification of mechanical and electrical characteristics, a sampling plan based on historical use and/or receiving data, or an equivalent method utilizing process data. Inspection and test upon receipt by government contractors may be reduced on those components with a demonstrated acceptable performance, and when controls are in place at the manufacturer to assure repeatability. Any method utilized other than 100% receiving inspection and test must be substantiated by objective evidence utilizing supplier and/or contractor data.

4.2.2 Part- and Supplier-Specific

All data shall be part- and supplier-specific. Government contractors are encouraged to utilize component manufacturer average outgoing quality data by part and/or package to supplement data derived from one of the other methods. Contractors may combine correlated data in order to derive a more accurate representation of supplier product quality.

4.2.3 Quality and/or Process Data

The quality and/or process data shall be analyzed to identify issues or trends with respect to specific variables or inspections/tests. This information shall be used by the supplier and contractor to develop action plans to address corrective actions or opportunities for quality improvement.

4.2.4 Component Supplier

The component supplier shall be provided with feedback from the contractor relative to the performance of the product for the purpose of product quality improvement.

4.2.5 Utilizing Attribute Data

When utilizing attribute data derived by the defense contractor to measure component supplier performance, these data should be correlated, and concurrence reached between the supplier and the government contractor as to the accuracy of the data.

5. COMPONENT CHARACTERIZATION AND CORRELATION

It shall be the objective of both the contractor and the component supplier to develop and maintain characterization data relative to the critical performance characteristics of each component when appropriate.

5.1 Characterization Data

Characterization data may consist of Group A electrical data, inline test data, or other process-related data.

5.2 Characterization Methodology

When the characterization methodology is selected, a determination shall be made relative to the necessity of performing, receiving, inspection, and test at the government contractor's facility.

5.3 Development of the Characterization

All tests and data contributing to the development of the characterization of the component must be correlated to any previous rescreening testing conducted by the contractor.

5.4 Component Manufacturer

The component manufacturer shall notify the contractor of any changes in testing methodology or software affecting form, fit, or function as defined by the contractor and supplier.

6. RECEIVING INSPECTION AND TEST

The intent of government contractor receiving inspection and test is to augment the supplier control system and reduce the level of nonconforming product entering the assembly process. The decision to perform electrical and mechanical verification at receiving may be based on several factors. These factors may include, but are not restricted to the following:

- 1) The lack of component characterization data,
- 2) the criticality and/or relative risk of the component in its application,
- 3) demonstrated performance of the component, and
- 4) applications specifics testing.

Decisions regarding receiving inspection and test of components should be made on a supplier and part basis.

6.1 Contractor Electrical Testing

Contractor electrical testing may be performed at a 100% level or utilizing a sample plan, or not tested when substantiated by data. The contractor and supplier shall approve use of any third party test contractor utilized. All failures observed during the testing are important and no percent defective allowable (PDA) shall be utilized. All failures must be categorized, and those determined to be the responsibility of the supplier must be discussed with the supplier to determine applicable failure analysis and correlation procedures.

6.1.1 Utilizing Sampling

When utilizing sampling, one of the following may be applied:

- 1) Sampling of each lot using a recognized sampling method (e.g., MIL-STD-105),
- 2) Periodic inspection of a parameter or lot, or
- 3) Statistical process controls either at the contractor's or the supplier's facility, including variables data where applicable.

6.1.2 Performance of Components

Contractors are encouraged to share data related to the performance of components in order to increase effectiveness, while minimizing total cost of receiving inspection and test. All data should be correlated between the contractors and the suppliers. Supplier concurrence should be received prior to release of data.

6.1.3 Performance Data

Performance data must be continually analyzed to determine the appropriate level of testing. Receiving inspection and test may be reinstated or increased in those situations where it is determined to be the most effective in reducing the risk of nonconforming product entering the contractor's manufacturing process.

6.1.4 Cost Effective Methods

Government contractors should consider other cost effective methods of performance verification in instances where major program schedule or cost impact may result. Examples are extremely complex parts, those with a high risk of induced testing damage, or where the cost of receiving inspection and test is significantly higher than that of a similarly processed basic part.

7. PERFORMANCE FEEDBACK

The contractor must assure that performance data related to components is collected from all relevant in-house assembly and test operations, as well as from the contractor's customer use.

7.1 Evaluation of Performance Data

Performance data collected from assembly, test, and customer operations must be evaluated. Data shall be correlated, communicated to the component manufacturer, and a determination made as to the level of contractor receiving inspection and test or other appropriate actions to reduce or preclude recurrence.

