THE MILITARY QUALIFICATION PROGRAM

BRIAN P. McNICHOLL

DEFENSE ELECTRONICS SUPPLY CENTER
(DESC)

The DESC Engineering Qualification Division, Directorate of Engineering Standardization, administers the electronic components qualification program for the military departments. The entire process by which products of manufacturers and distributors are examined and tested and then identified on a list of qualified products is known as qualification. The process is used to procure reliable manufacturers' products for Government use without the long, complex and sometimes expensive first article inspections required after each contract award. Qualification testing is conducted prior to and independent of any procurement action. Firms which qualify maintain their eligibility through periodic qualification retention testing.

The purpose of qualification is to provide long, complex tests prior to and independent of any acquisition, some of which would otherwise be required after each award. Testing of a product for compliance with the requirements of a specification in advance, and independent, of any specific acquisition is known as qualification testing. To establish a Qualified Products List (QPL), an approved and dated military or Federal specification must exist which requires qualification and sets forth the qualification examination, tests and criteria for retention of qualification.

The fact that a product has been examined, tested and placed upon a QPL signifies only that at the time of examination and test the manufacturer could make a product to meet specification requirements. Inclusion on a QPL does not in any way relieve the manufacturer or distributor of the contractual obligation to deliver items meeting all specification requirements. Nor does the inclusion of a product on a QPL guarantee acceptability under a contract since the products must conform to specification requirements. Qualification does not constitute waiver of the requirement for other inspection or quality control measures satisfactory to the Government.

Department of Defense policy prohibits the inclusion of qualification requirements in Government specification without justification and approval by the Defense Material Specifications and Standards Office. Only one of three reasons will receive approval for qualification:

- a. the time to test is extensive
- b. there are needs for unusual test equipment
- c. life survival type items.

The major reason used to justify qualification is that the time required to properly test electronic parts is in excess of 30 days.

We have previously stated three reasons for including qualification in a specification. However, we have not discussed some of the benefits of a qualification program. An effective qualification program is constantly searching for and developing new sources. The qualification personnel are knowledgeable about the manufacturing capabilities of various manufacturers and which ones should be solicited for interest in qualifying to new specifications. When a QPL is in existence, the production lead time is greatly reduced while quality and reliability improvements are realized.

The qualification program is structured so that data on defective parts and latent defects is made available to Government engineers and can subsequently be used to improve the specifications. A very active corrective action program also enhances quality of the product. The device reliability requirements are continually evaluated and as they improve are included into the acquisition process.

The following steps are normally followed by DESC to develop a qualified source in the order shown:

*DESC-EQ
Solicits Manufacturers

*MANUFACTURER
Applies for Authorization to Qualify
After solicitation has identified sources interested in qualifying to a military specification, the qualification process permits manufacturers to request authorization from the Government (DESC-EQ) to test the product to the requirements of a military specification which defines that type of product. Application to perform qualification testing is made on DESC Form 36A, shown in figure 1. This contains the information necessary for DESC to make an initial assessment of the testing, calibration and capabilities of a manufacturer.

Authorization for the applicant to test the product is not provided until the qualifying activity is satisfied testing facilities are appropriate as specified by requirements in the product specification or in compliance with special guidance on instructions of the military services. A facilities survey consists of a visit to the plant and/or laboratory where actual tests will be conducted. In addition to an examination of production and test facilities, the DESC engineer may inspect systems, quality, and reliability assurance programs plus line certification when required by the specification.

DESC informs the applicant of the authorization to test by DESC Form 19, "Authorization to Conduct Qualification Test." The DESC Form 19 addresses specifics on what, when, where, how, and how many items are to undergo test.

Test results will then be reported against test report numbers assigned by DESC. A copy of the letter is provided to the Defense Contract Administrative Services (DCAS) to alert DCAS that the services of one or more of its personnel will be required to witness the test.

A QPL is issued as soon as practicable after issuance of a specification. Until a product is tested and approved for listing, the qualification requirement in a specification must be waived.

When a specification covers more than one type, class, grade, or other designation of a product, all products qualifying shall be on a single QPL. An example of this is specifications MIL-S-19500 and MIL-M-38510 for solid state devices. These two specifications list hundreds of types of transistors, diodes, and integrated circuits described to more than 500 ancillary specifications. The actual count of specific items (part numbers) run in the thousands when all variables are considered.

Under a family-of-products concept, not each individual part must be tested for qualification purposes. A "family of products" is defined as all products of the same classification, type, etc. produced with the same production facilities, processes and quality of material under the same management and quality controls.

Each specification requiring qualification must be reviewed every two years to verify the need to continue the requirement.

The cost of testing is almost always completely absorbed by the applicant and of course the cost of tests is reflected in the price of the qualified part.

Qualification testing must be monitored and verified by a Government Quality Assurance Representative (QAR) from one of the Defense Contract Administration Services (DCAS) Regions of the Defense Logistics Agency (DLA). The QAR signature verifies in a test report that tests were performed but does not signify Government approval.

Results of tests with the QAR verification are compiled in prescribed format and submitted to DESC for evaluation. The DESC engineer, as an agent for the military services, then determines if the product conforms to the requirements of the specification. Thirty work days is allowed for the evaluation.

After evaluation of the test results, the manufacturer is notified by DESC if the product qualified. A letter of notification is sent to the applicant showing how the product will be listed on the QPL and the conditions governing such listings.

Quality conformance testing is used to demonstrate the continual ability to meet military specification requirements. It also provides quality and reliability confirmation to users. It should be noted that qualification is not a one time proof of capability; it is a continuous program whereby a manufacturer must constantly verify the quality of his product through testing.

In order to accomplish this major task for the 152 QPLs DESC manages, we must perform at least
275 audits of manufacturer's facilities a year and review 3,000 test reports in the same time period. Audits vary in length from one man for one day to four men for five days.

The DESC Engineering Qualifications Division also maintains a test facility which performs qualification verification testing, evaluation of discrepant material and receiving inspection of new procurements for semiconductors. This test facility employs a newly developed Teradyne T347C Test Console for semiconductor devices. This is an automated, programmable unit that will test a specific device to a set of electronic parameters and automatically print out the test results. Facilities are available and are being expanded for environmental and other electronic tests of various types of components such as integrated circuits, resistors, capacitors, filters, crystals, oscillators, etc. It will also support confirmation of qualification testing, DCIS investigations, confirmation of acceptability of corrective actions, validate design changes, and assist in identifying counterfeit items.

In summary, qualification is the acceptance of a manufacturer's product that has been tested and examined and found to meet the requirements of a military specification. It is also a continuous process of proving product quality through periodic quality conformance testing. The purpose of qualification is to provide long, complex tests prior to and independent of any acquisition, some of which tests would otherwise be required after each award.

DoD, DLA, and DESC are vitally concerned about the quality of parts being supplied to the Government. This concern is being expressed by performing more in-depth audits including a more rigorous examination of company test records. We are preparing to coordinate the inclusion of the reliability assurance requirements of MIL-STD-790 into many more of our military specifications.