Certification and Qualification Information for Specifications with MIL-STD-790

DSCC-VQP
JULY 1, 2008

PREAMBLE

This document is applicable to the MIL-STD-790 program administered by the Defense Supply Center, Columbus (DSCC) in its capacity as the Qualifying Activity. This publication has been developed to outline and discuss the elements needed for manufacturers to successfully qualify their products for listing on the Qualified Products List (QPL).

The QPL Program offers many advantages and opportunities to both manufacturers and users of electronic, construction, and mechanical components. QPL products provide superior performance, quality, and reliability from a known cadre of qualified manufacturers. The QPL products provide fewer Diminishing Manufacturer Sources (DMS) problems and a lower cost of ownership. In addition, the QPL Program maintains configuration control and assures the military system is logistically supportable throughout its life cycle.

I hope this document provides an overview of the qualification program and helps manufacturers get started in qualifying their products. The Sourcing and Qualification Unit stands ready to assist you with all of your component questions and with getting started in the qualification program.

Any QPL Program questions or clarifications of a general nature should be directed to:

U. S. Postal Service
Defense Supply Center Columbus
ATTN: DSCC-VQ
Joseph Gemperline
P.O. Box 3990
Columbus, OH 43218-3990

Private Carriers (e.g.,. UPS, FED EX, etc.)
Defense Supply Center Columbus
ATTN: DSCC-VQ
Joseph Gemperline
3990 East Broad Street
Columbus, OH 43213-1199

Phone: (614) 692-0663
Fax: (614) 692-6942, or (614) 692-6943
e-mail: Joseph.Gemperline@dla.mil

Thank you for your participation and support of the Department of Defense (DoD) Product Qualification Program.

Sincerely,

JOSEPH GEMPERLINE
Chief
Sourcing and Qualifications Unit

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INTRODUCTION

This publication has been developed to outline and discuss the elements needed for manufacturers to successfully qualify their products for listing on the Qualified Products List (QPL).

Certified manufacturers will find it useful as a reference guide and non-certified manufacturers will be challenged by the many advantages and opportunities available to the QPL supplier of military products.

This booklet also provides beneficial information to the user Original Equipment Manufactures (OEMs), Systems Program Offices (SPOs), etc. on the advantages in procuring the highest quality and reliability level products available.

The information in this document is supplementary to Provisions Governing Qualification (SD-6) and Defense Standardization Program Policies and Procedures (DoD 4120.24-M). It does not supersede or waive the provisions of these documents or of the applicable military or federal specifications.

The details discussed in this publication apply only to qualification programs administered by the Defense Supply Center, Columbus, Sourcing and Qualifications Unit (DSCC-VQ) in its capacity as Qualifying Activity for general specifications.

The manufacturer, by application and subsequent listing on a Qualified Products List (QPL), agrees to comply with all provisions specified in the applicable specification and herein.

This publication outlines the necessary elements for an acceptable QPL program. This publication will list the key elements needed, but leaves the format and implementation of these elements to the manufacturer.

CAUTION: The information in this booklet is of a general nature because it covers a wide cross-section of QPL programs. For the specific qualification requirements for a given technology, the applicable specifications and standards must be reviewed. In addition, we suggest that you contact the applicable qualification point-of-contact to discuss your specific qualification plans and make sure you fully understand the applicable requirements. Failure by the manufacturer to fully understand the qualification requirements or clarify any questions they may have regarding the meaning and intent of this document prior to qualification testing, may result in unnecessary testing, non-compliant testing, and delay your qualification approval.

Points of Contact

DSCC-VQP
Defense Supply Center Columbus
Sourcing and Qualifications Unit
Passive Devices Team

DSCC-VQE
Defense Supply Center Columbus
Sourcing and Qualifications Unit
Electronic Devices Team

Fax numbers: (614) 693-1660, or (614) 692-6942

Name	Phone Number	DSN	E-mail address
Alan J. Will (Team Chief-VQP)	(614) 692-0619	850-0619	alan.will@dla.mil
Ray Kolonchuk (Team Chief-VQE)	(614) 692-0621	850-0621	raymond.kolonchhuk@dla.mil

Group I: 3030 Belts/ 5905 Resistors/5910 Capacitors/5915 Filters/5950 Transformers/5965 Headsets, Loudspeakers, and Microphones/5999 Miscellaneous/ 4720 Hoses/Wipers, 4730 Fittings

Dwight Oglesby	(614) 692-0609	850-0609	dwight.oglesby@dla.mil
Gene Ott	(614) 692-0665	850-0665	gene.ott@dla.mil
Mark Parshall	(614) 692-0666	850-0666	mark.parshall@dla.mil
Jeff Zern	(614) 692-0597	850-0597	jeffrey.zern@dla.mil

Group II: 5935 Connectors/6145 Wire and Cable/GP60 Fiber Optics

Alex Baillieul	(614) 692-2867	850-2867	alexander.baillieu.dla.mil
John Casto	(614) 692-7076	850-7076	john.casto@dla.mil
Jeremy Funk	(614) 692-6608	850-6608	jeremy.funk@dla.mil
Kathy Lyons	(614) 692-7108	850-7108	kathleen.lyons@dla.mil
Rich Marbais	(614) 692-6120	850-6120	richard.marbais@dla.mil
Yen-Ting Shen	(614) 692-8367	850-8357	yen-ting.shen@dla.mil

Group III: 5920 Fuses/5925 Circuit Breakers/5930 Switches/5945 Relays/5955 Crystals and Oscillators/5999 Miscellaneous

Bob Bates	(614) 692-0504	850-0504	robert.bates@dla.mil
Kevin Rudd	(614) 692-0594	850-0594	kevin.rudd@dla.mil
Art Woolum	(614) 692-0505	850-0505	william.woolum@dla.mil

Group IV: 1650 Aircraft Hydraulic, Vacuum/ 2530 Vehicle Brake, Steer Axle, Wheel and Track Components/ 4930 Construction

Bill Werman (DSCC-VQE)	(614) 692-0631	850-0631	william.werman@dla.mil

NOTE: This information is correct as of the date of publication. For up to date information, check the VQ web page.

Requests for an audit or for further information about the MIL-STD-790 program should be directed to one of the VQP/VQE contacts listed above.

Comments or recommendations which may be of use in improving this document should be addressed to: Defense Supply Center, Columbus, ATTN: DSCC-VQP, P.O. Box 3990, Columbus, Ohio 43218-3990. Requests for copies of this document should also be forwarded to DSCC-VQP.

DSCC:	Defense Supply Center, Columbus
DSCC-V:	Logistics Office (Samuel E. Merritt, Director)
DSCC-VQ:	Sourcing and Qualifications Unit (Joseph Gemperline, Chief)
DSCC-VQE:	Electronic Devices Team (Raymond Kolonchuk, Chief)
DSCC-VQP:	Passive Devices Team (Alan J. Will, Chief)

Request for copies of DoD 4120.24-M (Defense Standardization Program (DSP) Policies and Procedures, SD-6 (Provisions Governing Qualification Qualified Products List)) MIL-STD-790, MIL-STD-202, and any other military document should be addressed to DoD Single Stock Point Special Assistance Desk, Bldg 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, (215) 697-2667 or (215) 697-2179, M-F 7:30a.m. to 4:30p.m. (EST). See web site www.dodssp.daps.mil.

Any QPL Program questions or clarifications of a general nature should be directed to:

U. S. Postal Service
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Private Carriers (e.g.,. UPS, FED EX, etc.)
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3990 East Broad Street
Columbus, OH 43213-1199

Phone: (614) 692-0663
Fax: (614) 692-6942
e-mail: joseph.gemperline@dla.mil

NOTE: All forms referenced herein are available from the DSCC-VQP point of contact, the DSCC-VQP Forms booklet, or by visiting our web site (reference page 2 of this booklet).

REFERENCES

Military specifications and Qualified Products Lists (QPLs) for a specific stock class may be requested by contacting the applicable DSCC-VQ agent called out on our web site.

http://www.dscc.dla.mil/offices/vq/

The numbers and titles of the military standards, manuals, and handbooks referenced by this document are listed below.

NUMBER	TITLE
DoD 4120.24-M	Defense Standardization Program Policies and Procedures
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-883	Test Methods and Procedures for Microelectronics
MIL-STD-1344A	Test Methods for Electrical Connectors
SD-6	Provisions Governing Qualification
ANSI/NCSL-Z540-1 or ISO 10012 -1	Calibration Systems Requirements
	Laboratory Suitability Information
	List of Commercial Laboratories Suitable for Testing Military Devices

Copies of DoD 4120.24-M, Military Specifications, Military Standards, and SD-6, may be obtained from:

DoD Single Stock Point Special Assistance Desk
700 Robbins Avenue, Building 4D
Philadelphia, PA 19111-5098

Phone (215) 697-2179, FAX (215) 697-1462

The Sourcing and Qualifications Unit has a web site. See next page for details.

SOURCING AND QUALIFICATION UNIT (DSCC-VQ)

Defense Supply Center Columbus, 3990 East Broad Street, Columbus, OH 43213

http://www.dscc.dla.mil/offices/vq/

The Sourcing and Qualification web pages were originally developed mid 1995 to provide a user-friendly approach to downloading the Unit's Query Tool programs. The web pages have since been expanded to disseminate much of the public information that was formerly distributed on paper. We are developing cost effective real-time alternatives to the traditional paper documents, and providing them on the World Wide Web.

General features of the VQ web pages:

- Most pages and graphics are very small for fast transfer to the user's computer
- Pages have been written to utilize the latest features of the Hypertext Markup Language (HTML) language and the Active Server Pages technology. Pages are best viewed on the latest versions of the popular web browsers, but should display acceptably on any older browser.

Items currently available on the VQ web pages:

- General information from the Unit office including the mission, and organizational statement.
- General information for each of the Unit's four Teams (**Custom Devices**, **Hybrid Devices**, **Passive Devices**, and **Electronic Devices**). Information includes program information, contacts, and QML/QPL status, downloadable forms, and various reports.
- **Qualified Manufacturers List (QML), Qualified Products List (QPL)** and **Qualified Products Database (QPD) Supplemental Information Sheet (SIS)** documents available in the Adobe Portable Document Format, including historical revisions, and downloadable databases (on selected QMLs/QPLs). Also, qualification actions awaiting inclusion in a QPL, QML, or QPD are listed where applicable.
- An **on-line part search** capability. Downloading is not required. Many QPLs and QMLs are searchable via this capability. Microsoft Access 2000 formatted databases for many of the searchable QPLs and QMLs are also available for download. The end-user may then run their own custom queries and reports.
- Information about the Unit's **ISO 9001 value-added audit program** including background information, audit information, and the DSCC-VQ ISO 9001 Registration list.
- Reports and information including progress reports, program initiatives, newsletters, and program updates.
- Information about the Unit's **Commercial Laboratory Suitability Program** (Includes List of Commercial Laboratories Suitable for Testing Military Devices), including a real-time commercial laboratory suitability listing.

For further information about the Sourcing and Qualification Unit web pages, contact:
VQWebTeam@dla.mil
Ned Raybould, 614-692-0582, vqh.esr@dla.mil
Rick Barker, 614-692-0596, vqh.rb@dla.mil

Last updated: June 24, 2008

SECTION I
Provisions Governing Certification and Qualification

1.0 Certification and Qualification within the U.S.

1.1 The manufacturer shall contact DSCC-VQP by letter and/or e-mail requesting that the facility/line be certified. This letter shall include the location of the facility, specifications involved, listing of products to be qualified, and a proposed date of when it is anticipated the facility/line will be ready for an assessment.

1.2 The DSCC-VQP point of contact (POC) will respond by letter and/or e-mail informing the manufacturer of the necessary steps to be followed and of the pre-assessment documents to be submitted. Once the pre-assessment documents have been successfully reviewed, DSCC-VQP will schedule the facility for an initial assessment. Prior to the initial assessment, DSCC-VQP will review the documentation and discuss all concerns with the manufacturer in an effort to resolve all open issues.

1.3 The pre-assessment documentation will consist of the following as a minimum:

a. Quality manual.

b. Calibration procedure.

c. DSCC Form 36 or equivalent (List of equipment used for qualification and quality conformance inspection).

d. Organizational chart - Top level management down to quality assurance as a minimum.

e. Number of employees

f. Self assessment procedure, findings from last audit, and corrective actions (including any facilities used for sub-assemblies).

g. Copies of actual flowchart(s) and traveler(s) (route sheet).

Additional items may be requested depending on the type of facility, type of qualification, product specification(s) involved, etc.

1.4 The initial assessment will take place as soon as scheduling allows. This type of assessment normally requires two DSCC-VQP auditors and lasts approximately two to four days. During the assessment, the manufacturer shall have the personnel involved in the actual manufacture, assembly, and test operations of the product to be qualified, available, and ready to demonstrate and explain their role in the process.

1.5 Upon completion of the assessment, all discrepancies found will be given to the manufacturer in writing and explained, as necessary, at the final debriefing. The manufacturer will be given some time for completion of corrective actions (normally 30 to 60 days). Upon receipt of corrective actions, they will be reviewed and approved as quickly as possible. Some additional discussion on the proposed corrective actions is normal, but the process is usually completed within two weeks.

1.6 At the time of approval of the manufacturer's corrective actions, DSCC-VQP will issue certification of the manufacturer's facility/line. A certificate will be issued to the manufacturer and will be valid until withdrawn by the Qualifying Activity. This certification will be reissued following each successful reaudit for as long as the manufacturer remains involved in the QPL Program. This certification may be withdrawn by DSCC-VQP at any time, either for cause or for a manufacturer's voluntary discontinuation in the program.

1.7 The manufacturer shall begin qualification testing at any time within 12 months following certification. To begin this process, the manufacturer completes and submits to DSCC-VQP an Application/Authorization to Test (DSCC Form 19P).

a. For the most part, the DSCC Form 19P is self-explanatory. The manufacturer will complete Section I. One copy of the completed DSCC Form 19P, listing the product(s) to be tested, is to be submitted to DSCC-VQP. Both the military part or type number(s) and the manufacturer's part number(s) shall be listed on the form. Block 7 shall include the tests the manufacturer will perform to verify that the product is in compliance with the military specifications and standards. Upon receipt of the form, DSCC-VQP will complete Section II and return the signed original with any additional comments to the manufacturer. Any testing performed prior to receiving the DSCC-VQP approved, signed form is done at the manufacturer's risk.

b. Normally, a DSCC Form 19P should be submitted approximately one month before test samples will be ready for qualification testing. If any facility or test equipment must be audited for suitability status, then the form is to be submitted as soon as possible to permit DSCC-VQP to schedule the assessment.

c. If testing is to be done at more than one location, (either **approved** company in- plant laboratory or an **approved** commercial test laboratory) Block 7 of the application must show clearly which tests each test laboratory will perform. Please refer to the VQP POC for procedures and requirements for use of Non-Government Laboratories.

d. If the specification has a family sampling plan, where testing a few types will qualify additional types, the manufacturer shall identify those types to be tested. They should list in the additional information block on Form 19P, all types of the family for which they desire qualification.

e. Line item number 3 of DSCC Form 19P is a reminder that all test facilities must have been issued laboratory suitability by DSCC-VQP before being used in qualification testing. Failure to have laboratory suitability prior to testing is a common cause of rejection, or delay in, acceptance of a test report by DSCC-VQP.

f. The DSCC Form 19P must be signed by a company official who has the authority to commit the manufacturer of the product to the conditions stated on the form, in DoD 4120.3M, SD-6, and this document.

1.8 The following general provisions apply to qualification testing, or design and construction changes requiring re-testing. Failure to comply with these provisions may result in rejection of the test report.

a. For design and construction changes, the manufacturer develops the proposed test plan and sample size on DSCC Form 19P. Test samples must have been manufactured at the plant listed on the approved DSCC Form 19P.

b. Qualification testing shall not be started prior to submittal of the DSCC Form 19P. Testing initiated before receipt of the Authorization to Test letter is at the manufacturer's risk.

c. All tests must be performed at the laboratories specified on the DSCC Form 19P, using the flows, travelers, procedures, etc., which were approved during the DSCC audit. If it is necessary to change the laboratory specified for any test, the manufacturer shall inform DSCC prior to testing. DSCC-VQP will then revise or amend the DSCC Form 19P.

d. Samples must be subjected to all tests listed on the DSCC-VQP Form 19P and performed in the sequence required by the specification. Test procedures must be in accordance with the applicable specification test paragraph or MIL-STD Test Method, and approved by DSCC-VQP. If there are any questions on a test procedure, please contact DSCC-VQP before performing that test. If there

are disqualifying failures or problems, such as samples damaged in handling or improper testing, test equipment failure, marginal failures or unusual failure modes, DSCC-VQP must be notified before testing further.

e. All testing must be performed using test equipment approved by DSCC-VQP prior to testing.

1.9 Recording of Data - Test Data Sheets Data should be presented in sufficient detail to substantiate the test procedures used and the results obtained in the testing. Data shall be recorded in permanent ink. Failure to submit data in sufficient detail may be cause for rejection of the test report.

a. Standard DSCC data sheets, e.g. Form 36F, are available for some specifications and may be used to record qualification test data. All blocks at the top of every data sheet used must be filled-in. When standard DSCC data sheets are not used, the manufacturer can use their own forms, however, it is recommended that DSCC review them prior to use to ensure that they contain all required information.

b. **DATE** and **TIME** each test was started and finished shall be recorded on the data sheet so that the sequence of testing can be established.

c. All actual environmental, mechanical, and electrical test conditions existing at the time of the test shall be recorded by the test equipment operator. It is important that this data be recorded by the operator at the time of the test and not copied from the specification before testing or when the test report is being assembled.

d. All data in a qualification test report, such as test conditions and test results, must be the actual reading on each item in test. VARIABLES data is required for every measurement taken, where applicable.

e. Dimensional measurements must include all dimensions on the applicable specification figure having a numerical value with a tolerance (including weight measurements). Dimensions identified as nominal or reference will not be measured. In many drawings, only one value (usually identified as "typical") is shown for such things as multiple mounting holes, several leads, or several pins. However, all holes, leads, or pins must be measured and their measurements recorded. When a specification does not specify the number of units for dimensional measurement, a random sample shall be selected as follows:

No. of Units in Test Lot	No. of Units to be Measured
1 - 10	All
11 - 110	10
111 - 180	15
181 & Above	20

f. Test data for environmental and mechanical test must include all test conditions. For example, vibration test data must include: vibration amplitude (inches or "g's"), frequency range, sweep-time, duration, and planes of vibration that were tested, as well as any electrical values applied and recorded during test. Results of electrical testing before and after vibration should be recorded. For tests involving time as a test condition (e.g., thermal shock test), the data should show the actual time that the test started and ended, and the actual temperature for each step of each cycle. This data can be recorded on an operating log sheet and is an acceptable data sheet for reporting test conditions.

g. For electrical tests, the data must include all applicable test conditions, i. e., voltage, current, frequency, etc., and the specified test characteristic. If the characteristic value is calculated, the data must include all readings, the characteristics measured, the formulas used for calculations, a sample calculation, and the calculated values. For example, when voltage and current readings are taken for wattage calculation, the values of the voltage and current measured must be recorded on

the data sheets along with the calculated wattage. A copy of any chart, table, or nomograph used instead of calculations must be included with the data.

h. Corrections on data sheets will be made by "lining out" the incorrect entries with a single line (maintaining legibility of original data) and inserting the correct entry immediately adjacent to the "lined out" entry. The operator making the change shall initial by the "lined out" entry. Erasures, mark-overs, and "white-out" are not permitted on any test data sheets.

NOTE: Qualification testing at all laboratories may be subject to monitoring by a Government Quality Assurance Representative (QAR) at DSCC-VQP's request.

1.10 Upon completion of qualification testing a test report shall be prepared and submitted to DSCC-VQP for review and approval. The details and format of the report are as follows:

a. The test laboratory will prepare a separate test report for each test report number assigned by DSCC-VQP on the DSCC Form 19P. The test laboratory will then submit the **original** test report to DSCC-VQP. If more than one test laboratory performs the tests, the manufacturer will combine the data from each laboratory into one report. Form 36F, page 3 should list all of the tests performed in the order listed on the specification test table. The laboratory performing the test can be shown in the remarks column. A separate page 4 of the Form 36F should be used for each laboratory.

b. All reports will be properly collated and bound, and pages numbered. The test report will consist of the following items:

1) A completed Form 36For equivalent. Do not omit any of the required information. Page 4 of Form 36F should list only the equipment used for these qualification tests. Form 36 is not an acceptable substitute for this page. The "date of calibration" column listed on page 4 should reflect the last date of calibration of the piece of equipment used during the actual test.

2) A Certification of Materials (if required by the specification or requested by DSCC).

3) Design and construction information (if required by the specification or requested by DSCC).

4) Photographs (if required by the specification or requested by DSCC).

5) Data sheets (in the same order as the listing in the qualification test table(s) of the applicable specification).

6) Other data or information, e.g., VSWR charts, X-rays, formulas, moisture resistance charts, etc., (if required by the specification or requested by DSCC.)

c. The original test data shall be submitted to DSCC and identified on the front cover as "DSCC-VQP Original Test Data." This differs from any duplicated copies as follows:

1) The DSCC-VQP original data report contains the original handwritten sheets in addition to typed and recopied sheets.

2) The DSCC-VQP "Original Test Data" report also contains:

(a) Original moisture charts. If, for example, the cold sub-cycle, MIL-STD-202, Method 106, step 7a, is performed in a different chamber, this must be stated on the chart. The chart must also include the following information:

1. The name and locations of the test laboratory used.

2. The date the chart was recorded.

3. The Military designation of the product(s) under test.

4. The test report number: (If several tests are performed simultaneously, all test report numbers should be included).

(b) Image reproductions of the moisture resistance charts will be accepted by DSCC-VQP if it is impractical to submit the original charts. (For example, tests may be performed for several reports simultaneously and it would be impossible to submit the original charts with each test report.) The reproduction must be of the same scale as the original charts and completely legible. (If the laboratory uses this option, the reason must be stated in the remarks section of the Form 36F and the reproduced charts annotated to show the test report number under which original charts were submitted.)

(c) A photograph or other depiction of the shock wave when required by the DSCC Form 19P should include:

1. The axis of the illustration must be properly labeled showing the unit of measure and scale, and

2. The photograph should be fastened to a page containing the following information:

A. Name and address of the laboratory conducting the shock test.

B. Date of the test.

C. Test report number.

D. Identification of the test sample, type, number, etc.

E. Overlays and computations demonstrating compliance.

F. Other photos, diagrams, etc., required by the applicable specification or required by DSCC-VQP.

(d) Other photos, diagrams, etc., required by the applicable specification or required by DSCC-VQP.

d. If qualification testing is initiated and then discontinued for any reason, DSCC-VQP is to be notified within 10 working days. If testing is not resumed, a test report covering all testing performed prior to discontinuance must be submitted. Failure to notify DSCC-VQP, or to submit this test report by the agreed date is cause for rejection of future applications for qualification testing and may result in loss of laboratory suitability status. If a report covering product failure is submitted and the manufacturer wants to retest, they must submit a new DSCC Form 19P and their proposed corrective action. DSCC-VQP will evaluate the proposed corrective action, and if acceptable, will issue a new authorization and assign a new test report number.

f. All Qualification and Retention testing data and samples shall be retained by the manufacturer for a minimum of 5 years, or unless otherwise specified by the Qualifying Activity.

2.0 Certification and Qualification in a Country Outside the U.S.

2.1 In countries outside the U.S. in which there is **no** International Standardization Agreement (ISA), the provisions are the same as in Section 1 above with the following exceptions:

a. The manufacturer requesting certification is must reimburse DSCC for all expenses associated with the audit(s) for both initial qualification and retention of qualification. These costs will be actual expenses based on the Federal Joint Travel Regulation. The manufacturer must agree to pay these costs before the audit can take place. In some cases, the manufacturer will be asked to pay for airfare and lodging directly. If the foreign manufacturer does not wish to pay for the actual costs of the audit, they will be precluded from the qualification program.

b. The length of time required to schedule and complete the audit will be somewhat longer due to the time required by DSCC auditors to request and obtain proper clearances to visit and work in another country. This paperwork takes approximately 60-120 days to complete.

c. Audits are scheduled on a first-come basis. DSCC is limited to the number of audits it will perform each fiscal year, so requesting an audit as early as possible will increase the chances of the audit being included on the schedule.

All other provisions are the same as for certification/qualification within the U.S. All letters, forms, paperwork, correspondence, etc., will take place directly between the manufacturer and the VQP point of contact.

2.2 In countries outside the U.S. in which there **is** an ISA, the provisions stated in this section shall apply. Currently, the countries that have an ISA are: Canada, Australia, Ireland, Israel and all NATO countries. Countries involved in ISAs may be added or deleted over time so it is important to discuss this issue with the appropriate VQP point of contact.

a. The manufacturer requesting certification is must reimburse DSCC for all expenses associated with the audit(s) for both initial qualification and retention of qualification. These costs will be actual expenses based on the Federal Joint Travel Regulation. The manufacturer must agree to pay these costs before the audit can take place. In some cases, the manufacturer will be asked to pay for airfare and lodging directly. If the foreign manufacturer does not wish to pay for the actual costs of the audit, they will be precluded from the qualification program.

b. For each of the countries for which an ISA is in place, DSCC-VQ has established a Memorandum of Understanding (MOU) which details the working relationship between the government organizations in each country, and explains the role of each. The exact details vary for each MOU, so it is important to discuss this issue with the VQP point of contact prior to beginning the certification/qualification process. In general, the process is as described in paragraph b. below.

c. Under the ISAs, the government of the foreign country has agreed to participate in the certification/qualification process. Their role will vary, but will usually be very similar to that of DSCC-VQ. Initially, VQP will conduct the audits, process the forms, and evaluate the test reports. As the working relationship between the two government organizations becomes better

established, the foreign government takes a larger role while VQP's role diminishes until, eventually, VQP will only monitor the process to assure consistency of application between U.S. and foreign manufacturers. DSCC-VQP will do all initial audits and periodic follow-up audits as needed, but not all audits will be conducted by DSCC-VQP personnel. Those that are, however, are done at the manufacturer's expense as detailed in 2.1 above.

3.0 QPL Listing Once a manufacturer has completed and passed all required qualification testing, the products listed on the approved Form 19P will be listed on the applicable QPL. This listing will remain in effect for as long as the product continues to demonstrate compliance with the specification requirements. Compliance includes successful demonstration of the product's ability to meet the latest specification performance requirements, successful completion of revalidations, proper submittal of all required documentation, as well as demonstrating continued effectiveness of the quality system, etc. In the event that compliance cannot be effectively demonstrated, the manufacturer will be suspended from shipping QPL product until the non-compliance is corrected. The listing may be removed from the QPL if the manufacturer fails to meet the provisions for qualification listed in DoD 4120.24-M, SD-6, or if the product fails to meet the performance requirements of the specification.

Products can only be produced in the plant location or test laboratory qualified during the audit using the approved procedures, equipment, flowcharts, etc. The Qualifying Activity, DSCC, must be immediately notified on any changes to the approved plant location, approved procedures, equipment or flowcharts. Some type of requalification may be required depending on the extent of the move and/or program change.

Any product processed with deviations to MIL-STD-790, or any applicable specification and/or standard, shall not be marked, advertised, or claimed as compliant product in any manner.

In order to provide QPL product the manufacturer shall be on the QPL before the date specified for award on the contract.

3.1 Reaudit of Manufacturer's Quality Program. Manufacturers will be required to demonstrate that their quality system continues to meet the requirements of MIL-STD 790 and the product specification on a periodic basis. This includes a reaudit of the manufacturer's site visit. This normally will occur at a two- year interval for high reliability (MIL-STD-790) specifications and five-year intervals (or after all companies have been visited) for general specifications, but the Qualifying Activity may increase or decrease this cycle as needed.

3.2 Testing Laboratories All testing performed for qualification, requalification, retention of qualification, or product evaluation purposes must be performed using DSCC approved procedures that conform fully to the applicable specification's test paragraph and/or MIL-STD-test method. Only laboratories listed in the "List of Commercial Laboratories Suitable for Testing Military Devices" booklet may be used. This booklet can be found on the DSCC website (reference page 2). The laboratory may be part of the manufacturer's facility or a commercial test laboratory. Other laboratories can be added to the list by request.

3.3 Subcontractors The use of subcontractors is permitted, but all subcontractors must be approved and controlled as part of the applicable manufacturer's quality system. All subcontractor's operations must be documented (flow chart, traveler, etc.), certified and approved by the Qualifying Activity prior to their use. Depending on the nature of the product and the type of activity performed by the subcontractors, all or parts of MIL-STD-790 and the product specification may be applicable to the subcontractor, including reaudits. Manufacturers using subcontractors are responsible for the operations performed by the subcontractor, as well as for the compliance of the end product. Approval for the use of subcontractors may be withdrawn for cause by the Qualifying Activity.

3.4 Change Control An effective change control program shall be developed and implemented to assure compliance with the specified requirements. The change control program shall assure, as a minimum, the following:

a. The form, fit, and function of the product is not altered from the originally qualified product.

b. That the Qualifying Activity (DSCC-VQ) is notified of any changes as specified in the applicable specification and standards. Requalification plans shall be determined by the Qualifying Activity.

c. That the latest revisions of specifications and standards are fully implemented by the required implementation date.

4.0 Distributors The use of distributors is authorized for manufacturers validated to MIL-STD-790. There are three categories of distributors. The identification of category, authorized functions to perform, and responsibility for conformance relies on the manufacture. However, in all cases the Qualifying Activity reserves the right to perform a validation.

4.1 Category A This category is authorized to store, pack, handle and distribute qualified products.

4.2 Category B This category includes category A responsibilities and is authorized to perform additional operations, test, and inspections. Special markings shall be added in addition to the manufacturer's marking.

4.3 Category C This category includes category B responsibilities and is authorized to perform assembly operations. Category C distributors shall include the QPL system elements of MIL-STD-790 (see Section III of this booklet).

SECTION II
QPL Program Elements for MIL-STD-790 Compliance

This section will describe the 17 elements detailed in MIL-STD-790 (some of which have been slightly paraphrased for clarity) and explain what is necessary for compliance. Examples are training, traceability, self-audit, calibration, etc. This section has a short introduction to explain the elements required for qualification and subsequent listing on the applicable QPL. Each manufacturer is required to demonstrate how the elements will be met by their company.

Program Plan The manufacturer shall document a product assurance plan in a manner adequate to demonstrate compliance with section 5 of MIL-STD-790. One program plan shall be required by **each** manufacturing facility. The program plan shall include the manufacturer's interpretation of how each requirement of section 5 of MIL-STD-790 will be implemented. Where distributors are authorized by the manufacturer, a supplemental plan shall be prepared which describes the functions performed by the distributor and how the manufacturer ensures distributor's compliance to military standard and military specification requirements.

The following is a list of items that would typically be verified during the normal course of an audit of the manufacturer's facility. This list will verify the compliance of the manufacturer's program plan in accordance with section 5 of MIL-STD-790.

1. **Training**

   a. A training program exists and is documented covering all areas of section 5 of MIL-STD-790.

   b. All personnel involved in the design, production, and testing of military qualified products are properly trained.

   c. Training records are established and maintained, including types of training, dates of training, test results, and certifications issued.

   d. Training program includes re-evaluation periods for all personnel requiring training and corrective action is taken when personnel are found to be deficient in performing their current duties.

   e. Training addresses how personnel are retrained for amendments/revisions of applicable specifications and/or MIL-STD test methods.

2. **Calibration**

   a. The manufacturer maintains a calibration system in accordance with ANSI/NCSL Z540-1, ISO 10012-1, or equivalent (e.g., latest revision of MIL-STD-45662).

   b. Calibration records include descriptions of items to be calibrated, calibration intervals, accuracy, date of calibration, due date for next calibration, calibration status, calibration procedures (in-house), certification numbers (off-site calibration lab) and whether calibration is performed in-house or at an outside calibration lab.

   c. All equipment used for acceptance testing is calibrated.

   d. All calibrated equipment is labeled and the label on equipment is complete.

   e. Equipment not requiring calibration is labeled as such.

   f. The calibration label is consistent with calibration record.
   g. If calibrated interval is extended, data is available to support this action.

h. Calibration system includes procedures for corrective actions for equipment that exceeds due date or is out of calibration.

i. Records indicate equipment is consistently calibrated within due dates.

j. All calibration records are traceable to NIST standards or known physical constants.

k. Measurement standards are stored properly when not in use.

3. Proprietary Processes and Procedures

No additional information needed (see 5.2.3 of MIL-STD-790).

4. Failure and Defect Analysis System and Corrective Action

a. Verify that the manufacturer documents all customer returns.

b. All returned material should have adequate information outlining reason for return.

c. Manufacturer has a documented procedure for failure analysis.

d. Personnel are experienced in performing the required analysis.

e. Manufacturer documents all QPL field failures and notifies the Qualifying Activity immediately of such failures.

f. Manufacturer documents all QPL testing failures which exceed the allowable acceptance number (C number) and notifies the Qualifying Activity immediately of such failures.

g. Corrective actions are verified for effectiveness.

5. Clean Rooms

a. Map of clean room identifying locations where particle counts are taken.

b. Frequency of particle count measurements.

c. Number of readings per location.

d. Actions to be taken if particle counts are outside of control/absolute limits.

e. General clean room procedures are followed by all personnel entering the clean room.

6. Description of Production Processes and Controls

a. Operators follow operations listed on the travelers in the order shown and sign-off after each operation is completed.

b. Operators follow written production and test procedures.

c. Operators are trained and working to the most current written production and test procedures.

d. Travelers list all operations to be performed.
e. Any test equipment used for acceptance testing is calibrated.

f. Travelers indicate production lot codes and quantities.

g. QCI tests are performed in accordance with the most recent revision of the applicable specification.

h. All adhesives, chemicals, gases, etc., used in production and testing are handled properly.

i. Operators follow clean room and ESD control procedures.

7. Acquisition and Production Control System

Verify that manufacturer understands what is needed and effectively communicates that need to supplier.

8. Statistical Process Control (SPC)

a. All critical operations are identified.

b. Operators involved in the SPC program are properly trained.

c. Appropriate charts are utilized.

d. Data is recorded properly.

e. Capability studies have been performed.

f. Appropriate personnel are evaluating recorded data.

g. SPC program is documented and includes periodic reviews with all appropriate personnel.

h. Verify procedures for traceability, recovery and disposition of products manufactured since last successful test.

9. Acceptance Criteria for Incoming Materials and Work In-Process

Verify manufacturer's ability to verify that correct material/product is received from supplier.

10. Handling and Packaging Procedures

a. Material awaiting incoming inspection is stored in a controlled area.

b. All ESD procedures are followed when applicable.

c. Partially assembled parts are protected during in-process inspection.

d. Operators/inspectors are exercising care during quality assurance inspections.

e. Parts are protected from damage in storage areas.

f. Parts are properly packed for shipping to customers.

11. Materials

No additional information needed (see 5.2.12 of MIL-STD-790).

12. Product Traceability

No additional information needed (see 5.2.13 of MIL-STD-790).

13. Controlled Storage Area

No additional information needed (see 5.2.14 of MIL-STD-790).

14. Quality Assurance Operations

a. Verify all quality assurance operations are documented (e.g., quality manual).

b. Verify quality assurance personnel inspect all quality assurance operations as determined by the manufacturer's documentation and the applicable military specifications and standards and proper records are kept for these inspections.

15. Manufacturer's Self Assessment System

a. Self-audit program is documented.

b. Self-audit reports are reviewed to ensure all areas called out by MIL-STD-790 are included in the assessment.

c. All self-audits are conducted in accordance with the manufacturer's written procedures and all applicable military specifications.

d. All applicable areas are audited annually as a minimum.

e. All auditors are trained.

f. Self -audit reports should include date of audit, area audited, deficiencies found, due date for corrective actions, responsibility for deficiency, corrective action response, and verification of corrective action.

g. Corrective actions are reviewed to ensure they correct all deficiencies found during the assessment.

h. Records of self-audits and the associated corrective actions are retained by the manufacturer for a minimum of 5 years.

SECTION III
Retention of Qualification

1. Retention of Qualification Groups A & B (Lot Acceptance) **summary** reports shall state, as a minimum, the number of lots which have passed and the number of failures that have occurred during the retention period. Lots which have failed shall be identified and reasons given for these failures. Disposition of these lots shall be addressed in the summary report.

2. Retention of Qualification Group C/periodic test reports shall comply with the requirements of the initial qualification report except:

a. DSCC Form 19P is not required.

b. DSCC Form 36F is not required.

c. DD Form 1718 is required.

In general, all test reports shall meet the same conditions in Section II of this document, unless otherwise specified by the Qualifying Activity. This includes submitting original test data, original humidity charts (or equivalent), shock photographs, detailed calculations, etc.

3. Retention of Qualification reports are to be received by this Center no later than 30 days from the end of the reporting period, unless otherwise specified by the military specification or as specified by the Qualifying Activity.

SECTION IV
Technical Review Board (TRB)

1. Overview A TRB is a structured body organization that has responsibility for implementation and maintenance of the quality assurance system. This includes maintenance of all certified processes/products, process change control, reliability data analysis, failure analysis, corrective actions, and product recall procedures. The degree of authority of the TRB in these matters will be phased in as the TRB demonstrates its capability in each area.

2. TRB Duties The TRB will keep the Qualifying Activity informed of the status of the certified processes and products. The TRB will maintain records that are available for review by the Qualifying Activity. These records shall address all activities of the TRB with respect to qualified military processes/products.

3. Establishment of TRB The establishment and use of a TRB is not mandatory. If the manufacturer chooses to use the TRB option, the provisions of Appendix B of MIL-STD-790 apply.

a. The manufacturer must request approval of the Qualifying Activity prior to instituting a TRB. The request shall state the degree of oversight that the TRB is to have, and the program elements over which the TRB will exercise control.

b. There is no format for the structure of a TRB, however, care must be taken to assure that all necessary organizations within the manufacturers system are represented and aware of TRB responsibility and decisions.

c. The manufacturer shall demonstrate how the TRB functions, and ensure the Qualifying Activity that the TRB system will function as proposed. Initially, the Qualifying Activity may choose to limit the scope of authority of the TRB until satisfied that the TRB operates as planned. Approval of the TRB may be withdrawn by the Qualifying Activity at any time.

SECTION V
List of Acronyms

DoD - Department of Defense

DSCC - Defense Supply Center, Columbus

DSCC-VQP - Passive Devices Team

* DD Form 1718 - Certification of Qualified Products

* DSCC Form 19P - Application/Authorization to Conduct Qualification Test

* DSCC Form 36 - List of Qualification Test Facilities or List of Quality Conformance Test Facilities

* DSCC Form 36F - Qualification Test Report at a Non-Government Test Laboratory

HTML - Hypertext Mark-up Language

ISA - International Standardization Agreement

MOU - Memorandum of Understanding

NATO - North Atlantic Treaty Organization

POC - Point of Contact

QA - Quality Assurance

QPL - Qualified Products List

SPC - Statistical Process Control

TRB - Technical Review Board

* These forms can be obtained from a separate booklet, or by visiting the VQ web site (see Section I, page 2)

SECTION VI
COMMON AUDIT FINDINGS

This listing of audit findings has been prepared to emphasize some of the most common problems found during manufacturer audits conducted by the Passive Devices Team (DSCC-VQP) of the Sourcing and Qualifications Unit.

These audit findings are intended to help manufacturers become aware of common audit problems discovered by auditors, and to aid the manufacturer in planning and conducting self-audits.

CAUTION: This list is not intended to give detailed problem scenarios or provide a technical course of action for problems, but rather, contain a broad categorization of the problems. Further, it is published to assist manufacturer's self audit teams.

EXAMPLES OF VARIOUS FINDINGS

FINDING # 1: Incorrect change of data

Any obliteration of data, use of white out, pencil, tape, erasers, etc., for changing data is not acceptable on any records, including lot-travelers, calibration records, C of C, etc. The only acceptable method to change data is to line out the incorrect entry, add the new information, add date of change and add initials of personnel making the change.

FINDING #2: Compliance to requirements

The manufacturer must establish a quality assurance program that ensures full compliance to all military specification requirements. The Quality Assurance system must include a documentation system (e.g., detailed travelers, routing cards) that can clearly and objectively verify that all required processing and testing requirements are met. The manufacturer must also perform scheduled, routine self-audits to verify compliance to all military requirements. CAUTION: Any specification requirement that may be considered technically unwarranted or deemed otherwise unnecessary shall not, under any circumstances, be arbitrarily ignored, deleted or modified by any of the manufacturer's personnel. These specification requirements should be brought to the attention of appropriate government personnel. The Qualifying Activity will provide a contact point if you do not know how to submit a proposed change.

FINDING #3: Reporting of failures (Qualification, Group B, Group C)

All failures shall be reported in writing to DSCC-VQP, as they occur, for resolution. Under no circumstances may the manufacturer choose not to report failures.

FINDING #4: Communication within the engineering and production departments needs to be improved.

a. Process specifications have not been revised to reflect latest manufacturing operations performed.

b. Process specifications are not available.

c. Manufacturing flow charts are incomplete (e.g., manufacturing process, inspection, testing, and document control numbers are not completely identified on the flow).

d. Manufacturing router is incomplete or incorrect (e.g., missing manufacturing processes or more than one manufacturing process included in one operation step).

e. Manufacturing routers specify incorrect process specification.

f. Operators are not performing required operations.

g. Assembly personnel are not verifying completion of assembly steps.
h. Obsolete or cancelled process specifications were observed in manufacturing areas.

i. Oven cure times and temperatures cannot be verified or are being performed incorrectly.

j. Tools and fixtures used in manufacturing are not identified or available (e.g., load fixture is not identified for each specification sheet; and one load fixture is used for a specific spec-sheet when two or more load fixtures are needed).

FINDING #5: Calibration system is not maintained properly

a. System evaluating out of tolerance calibration condition is not properly identified, and interval of calibration is not reduced when past calibration history shows equipment out of tolerance.

b. Chamber/oven profile is not available or is done incorrectly.

c. Equipment is not recalibrated within the required calibration schedule (e.g., leak detector is not calibrated every working shift and calibration log is not utilized.)

d. There is no segregation of equipment that is past the calibration due date or out-of-tolerance from equipment that is within tolerance.

e. There is no certification or traceability to National Standards.

FINDING #6: ESD control procedure is not documented properly

a. Wrist strap continuity test record is incomplete; work-stations and wrist straps are not identified.

b. Extended frequency of wrist strap continuity test is not justified.

c. The procedure for handling suspect parts between previously successful continuity test and unsatisfactory continuity test is not specified.

FINDING #7: Material/production traceability is not documented properly.

The conforming materials identification throughout the production process is incomplete.

FINDING #8: Required Incoming Materials Inspection could not be verified

a. The purity of gas (e.g. helium) is not verified.

b. An inspection check-list is not used or shows incomplete inspection steps.

c. Materials requiring measurement data are accepted without supporting data.

FINDING #9: Controlled storage area not maintained for complete stock.

a. QPL materials and finished components are stored with the accepted materials for commercial-use only and commercial-finished devices.

b. Ink, epoxy, RTV, etc., exceed recommended storage life requirements.

FINDING #10: Quality Conformance Inspection (QCI) Requirements could not be verified.

a. Improper selection of samples for test (test samples should represent sales and should be selected randomly).

b. There is no positive system for verifying QCI completion prior to product shipment.

c. **FINDING #11:** Self Audit Program is not administered properly.

d. Incomplete or non-existent self-audit program for each area.

e. Corrective actions are not reported to upper management or to the Qualifying Activity.

f. Follow-up on corrective actions is not performed.

g. Self-audit not taken seriously; insufficient training of auditors; inadequate auditor training records; inadequate resourcing.

h. Auditor checklists are not maintained (evaluated for changes) based on audit findings or specific needs.

i. Reliance on DSCC to determine compliance to the requirements and identify problems instead of depending on the manufacturer's self-audit program. Some manufacturers think their continuous QC program meets the self-audit requirements. Self-audits should be as comprehensive as DSCC audits; should be performed in a 1 or 2 week period per facility; and should be in addition to the ongoing QC function. Survey/audits by other customers does not meet the self-audit requirements.

j. Meaningful self-audit summaries are lacking; for example:

   1) areas audited

   2) number of deficiencies for each area and total number of deficiencies

   3) classification of deficiencies (major, minor, repetitive)

   4) trend analysis (current self-audit to previous self-audit and DSCC audit

   5) corrective actions for each discrepancy identified and implemented in a timely manner (in most cases 30 days).

NOTE: A well documented self-audit program will in many cases find, correct, and follow-up deficiencies. This complements DSCC audits, allowing our office to consider extending the interval between DSCC audits.

IMPACT: The certified process can easily change or drift to the point where quality/reliability is questionable. In addition, certification and qualification may be removed if there is no existing self-audit program or if there is an ineffective self-audit program. This could require more frequent DSCC audits.

FINDING #12: Lack of Procedures and Document Control

a. Process specifications have not been revised to reflect the manufacturing operations being performed. Manufacturing personnel have performed operations out of sequence when they have determined that the assembly would be less complicated.

b. QCI procedures could not be located at the inspection station.
c. Manufacturing personnel did not have the latest process specification at their assembly area.

d. Manufacturing routers specify incorrect process specifications causing manufacturing flow charts to be inaccurate.

e. Process specifications are identified on manufacturing routers, yet these specifications have not been released to manufacturing.

FINDING #13: Test Equipment Discrepancies

a. Tools and fixtures used in manufacturing are not identified.

b. Test equipment used in QCI has not been recalibrated, yet is being used for testing of product.

c. Test equipment that is out of calibration has not been segregated.

d. Certifications of calibration records could not be located. (See Finding #3).

e. Correlation between test equipment is nonexistent or inadequate.

FINDING # 14: Discrepancies in Manufacturing Processes and Procedures

a. Operators do not write oven cure times on logs or manufacturing routers.

b. Personnel are not stamping-off the completion of performed operations.

c. Personnel are not performing operations and inspections required by the routers or military specification.

d. Testing is not done in accordance with military standard.

e. Log books are not kept up to date.

f. Controlled storage area is not available for completed product.

FINDING #15: Test Equipment Problems

Assuming that failures are caused by test equipment malfunction is not an acceptable practice. All indicated failures must be reported to DSCC-VQP and an analysis of the problem and a course of action will be decided. Assuming test equipment malfunction without verification is not a valid failure analysis.

FINDING #16: Selection of QCI Samples

Samples used for retention testing (Groups B, C, and D) must be representative of production that occurred during the retention period. Producing lots specifically for retention testing is not an acceptable practice. Samples shall represent part numbers, styles, processes, equipment, operators, materials, and all Group A lots produced during that period.

IMPACT: Items such as out of date process specifications, failure to verify QCI, incorrect routers, calibration discrepancies, etc. could easily affect product quality. These types of discrepancies can go unnoticed until it is too late and a major quality problem appears. Regular DSCC audits and manufacturer self-audits will find and correct these problems quickly, and help keep manufacturers aware of the areas that should be more frequently monitored.

FINDING #17 Statistical Process Control (SPC) Programs

a. Many manufacturers have not yet taken the SPC requirements seriously as a tool that can be used to accelerate continual process improvements into the manufacturing operations and products.

b. Many manufacturers have not yet established comprehensive SPC plans with realistic and achievable milestones.

c. DSCC realizes that military specifications are in various stages of including SPC. However, all manufacturers should be reviewing their product line and manufacturing operations in order to develop SPC plans that will foster continual improvements.

FINDING #18: Training Program

a. There are no training records for all personnel involved in the manufacture and testing of military product.

b. No re-evaluation of training is established.