INCH-POUND

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PERFORMANCE SPECIFICATION

FILTERS AND CAPACITORS, RADIO FREQUENCY INTERFERENCE, GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the general requirements for low-pass filters and capacitors used to suppress radio frequency/electromagnetic interference. Filters furnished to the requirements of this specification contain shunting capacitors and series inductors (FSC 5915). Capacitors furnished to the requirements of this specification contain shunting capacitors (FSC 5910). For the purposes of this specification, feed-thru capacitor types (C circuit configuration) are referred to herein as a filter. Passband power may be alternating current (ac) and/or direct current (dc) and the filter is used primarily in the reduction of broadband radio frequency interference.

1.2 Classification.

1.2.1 Part or identifying Number (PIN). Filters specified herein (see 3.1) are identified by a PIN which consists of the basic number of the specification sheet and a dash number. The PIN is in the following format:

M15733/01-	0001
Specification sheet	Dash number (See 1.2.1.1)

1.2.1.1 Dash number. The dash number is as specified in the individual specification sheet (see 3.1).

1.2.2 Style. The style (see 3.1) is identified by the two-letter designation “FL” followed by a two-digit number. The letters identify radio frequency interference suppression filters and the digits identify the general shape and mounting of the case.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 or 4 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to: Defense Supply Center Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or E-mailed to capacitorfilter@.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.daps.dla.mil.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL STANDARDS

FED-STD-H28	-	Screw-Thread Standards for Federal Services.

DEPARTMENT OF DEFENSE SPECIFICATIONS

(See supplement 1 for list of associated specifications.)

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202	-	Test Method for Electronic and Electrical Component Parts.
MIL-STD-220	-	Method of Insertion Loss Measurement.
MIL-STD-1285	-	Marking of Electrical and Electronic Parts.

(Copies of these documents are available online at https://assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents are those cited in the solicitation or contract.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/NCSL Z540.3	-	Requirements for the Calibration of Measuring and Test Equipment

(Copies of this document may be ordered online at www.ncsli.org or from NCSL International, 1800 30th Street, Suite 305, Boulder, CO 80701-1026)

AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

ASTM-B16/B16M	-	Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines. (DoD adopted)
ASTM-B36/B36M	-	Standard Specification for Brass Plate, Sheet, Strip, and Rolled Bar. (DoD adopted)
ASTM-B194	-	Standard Specification for Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar. (DoD adopted)
ASTM-B545	-	Standard Specification for Electrodeposited Coatings of Tin. (DoD adopted)
ASTM-D92	-	Standard Test Method for Flash and Fire Points by Cleveland Open Cup. (DoD adopted)

(Copies of these documents may be ordered online at www.astm.org or from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.)

INTERNATIONAL ORGANIZATION FOR STANDARDS (ISO)

ISO-10012	-	Measurement Management Systems – Requirements for Measurement Processes and Measuring Equipment

(Copies of this document may be ordered online at http://www.iso.org or from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036-0350)

THE INSTITUTE FOR INTERCONNECTING AND PACKAGING ELECTRONIC CIRCUITS INC. (IPC)

J-STD-006 - Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications.

(Copies of this document can be ordered online at www.ipc.org or from the Institute for Interconnecting and Packaging Electronic Circuits (IPC, INC.), 2215 Sanders Road, Suite 200 South, Northbrook, IL 60062.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE AMS2418 - Plating, Copper. (DoD adopted)

(Copies of this document may be ordered online at www.sae.org or from Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related associated specifications, specification sheets, or MS sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 Qualification. Filters furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.3).

3.3 Material (see 4.6.1). When a definite material is not specified, a material shall be used which will enable the filters to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.3.1 Impregnating and potting compounds. Compounds used in the impregnating and potting of filters shall be chemically inactive with respect to the filter unit and the case (see 3.4.1). The compound, either in the state of original application or as a result of having aged, shall have no adverse effect on the performance of the filter. For oil-filled filters, the same material shall be used for impregnating as is used for filling. The use of wax is prohibited in those filters qualified and supplied to the MIL-PRF-15733 specification sheets.

3.3.2 Pure tin prohibition. The use of pure tin is prohibited as an undercoat and final finish both internally and externally to the filter body and on all associated mounting hardware. The tin content of filter components, associated mounting hardware, and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.5). Lead-free tin alloy high temperature solders may be used where high temperature solder is necessary, with approval by the qualifying activity. The tin content of lead-free high temperature solders shall not exceed 97 percent, by mass.

3.4 Interface and physical dimensions. Filters shall meet the interface and physical dimensions specified (see 3.1).

3.4.1 Performance. Filter performance shall be such that none of the components of the filter are overstressed during operation as electrically and mechanically specified herein. No degradation, unless allowed for herein, shall occur during any inspection specified herein. The filter shall meet the specified electrical characteristics at all operating temperatures, voltages, currents, or any combinations thereof as specified herein.

3.4.2 Case. Filters shall be enclosed in a suitable case in order to pass the performance requirements of this specification. The case shall be hermetically sealed or nonhermetically sealed as specified (see 3.1). The case shall protect the filter components from damage under all test conditions specified and prevent leakage of impregnant or filling compound. All metallic surfaces shall be free from insulating finishes except as specified.

3.4.3 Finish. All exposed metallic surfaces (case, hardware, and terminals) shall be suitably protected against corrosion by plating, solder coating, or other means. The finish shall provide good electrical contact when used on a terminal or as a conductor (see 6.4); shall have uniform texture and appearance; shall be adherent; and shall be free from blisters, pinholes, and other defects that may affect the protective value of the coating. Pure tin plating is prohibited (see 3.3.2). When used, tin plating shall have a minimum lead content of 3 percent (see 3.3.2 and 6.5).

3.4.4 Threaded parts. Unless otherwise specified, all threaded parts shall be in accordance with FED-STD-H28.

3.4.5 Weight (when applicable). Filters shall not exceed the weight specified (see 3.1).

3.5 Seal (when specified; see 3.1).

3.5.1 Liquid-filled units. When filters are tested in accordance with 4.6.2.1, there shall be no evidence of liquid leakage.

3.5.2 All other units. When filters are tested in accordance with 4.6.2.2, there shall be no continuous stream of bubbles emanating from the filter, nor shall there be any evidence of leakage of compound from the body of the filter.

3.6 Capacitance to ground (when specified; see 3.1). When filters are tested in accordance with 4.6.3, the capacitance to ground shall be as specified.

3.7 Temperature rise. When filters are tested in accordance with 4.6.4, the maximum temperature rise shall be as specified (see 3.1).

3.8 Dielectric withstanding voltage. When filters are tested in accordance with 4.6.5, there shall be no breakdown, flashover, or impairment of any characteristic qualities sufficient to cause failure of the filter.

3.9 Barometric pressure (reduced). When filters are tested in accordance with 4.6.6, there shall be no breakdown, flashover, or impairment of any characteristic qualities sufficient to cause failure of the filter.

3.10 Insulation resistance (terminal to ground). When measured in accordance with 4.6.7, the insulation resistance of any filter section shall be not less than the applicable value shown on figure 1 or as specified (see 3.1). The value of insulation resistance varies with temperature, and it is necessary to apply a correction factor to measurements made at a temperature other than 25°C. Correction factors for measurements made at temperatures between 20°C and 35°C are given in table I. The required value of insulation resistance shall be multiplied by the correction factor to determine the new value required at the test temperature.

TABLE I. Insulation-resistance correction factors.

Degrees celsius	Correction factor		Degrees celsius	Correction factor
20	1.42		28	0.82
21	1.33		29	0.76
22	1.24		30	0.71
23	1.16		31	0.67
24	1.08		32	0.63
25	1.00		33	0.59
26	0.94		34	0.55
27	0.87		35	0.51

3.11 Voltage drop (when specified; see 3.1). When filters are tested in accordance with 4.6.8, the voltage drop shall be as specified (see 3.1).

3.12 Insertion loss. When filters are tested in accordance with 4.6.9, the insertion loss shall be as specified (see 3.1).

3.13 Overload. When filters are tested in accordance with 4.6.10, the insulation resistance and voltage drop shall meet initial requirements, unless otherwise specified (see 3.1). There shall be no physical damage to the filters.

3.14 Terminal strength. When filters are tested in accordance with 4.6.11, no part of the terminals shall loosen or rupture and no other damage shall result. Bends shall not be considered as damage unless an incipient break occurs.

3.15 Flashpoint of impregnant or potting compound (when specified; see 3.1). When measured in accordance with 4.6.12, the flashpoint of the impregnant or potting compound shall be not lower than specified in table II.

TABLE II. Flashpoint of impregnant or potting compound.

High-operating temperature	Minimum allowable flashpoint
°C	°C
85	145
125	165
200	240

3.16 Resistance to soldering heat (soldered terminals only). When filters are tested in accordance with 4.6.13, there shall be no damage to the filters or to the terminal insulators that will cause electrical failure of the filters, or which will cause hermetically sealed filters to leak. Chipping of terminal insulators alone shall not be cause for failure unless the chipping extends to the outer periphery.

3.17 Salt atmosphere (corrosion). When filters are tested in accordance with 4.6.14, there shall be no harmful or extensive corrosion, and at least 90 percent of any exposed metallic surfaces of the filter shall be protected by the finish. The marking shall remain legible. In addition, there shall be not more than 10 percent corrosion of the terminal hardware or mounting surface.

3.18 Thermal shock and immersion. When tested as specified in 4.6.15, filters shall meet the following requirements:

Dielectric withstanding voltage	As specified in 3.8.
Insulation resistance	Not less than 30 percent of the value specified in 3.10.
Insertion loss	Shall meet initial requirement, unless otherwise specified (see 3.1).
Visual examination	Corroded areas shall not exceed the limits specified in 3.17 and marking shall remain legible after the test.
Capacitance (when specified)	Change no more than the value specified (see 3.1) from the initial measured value.

3.19 Shock, specified pulse. When filters are tested in accordance with 4.6.16, there shall be no evidence of intermittent, open or short circuiting, and no mechanical damage to the filter.

3.20 Vibration. When filters are tested in accordance with 4.6.17, there shall be no intermittent open or short circuiting during vibration. The insertion loss shall meet initial requirement, unless otherwise specified (see 3.1). After the test, there shall be no evidence of physical damage to the filters.

3.21 Moisture resistance. When tested as specified in 4.6.18, filters shall meet the following requirements:

Dielectric withstanding voltage	As specified in 3.8.
Insulation resistance	Not less than 30 percent of the value specified in 3.10.
Insertion loss	Shall meet initial requirement, unless otherwise specified (see 3.1)
Visual examination	Corroded areas shall not exceed the limits specified in 3.17 and marking shall remain legible after the test.
Capacitance (when specified)	Change not more than the value specified (see 3.1) from the initial measured value.

3.22 Life. When tested as specified in 4.6.19, filters shall meet the following requirements:

Dielectric withstanding voltage	As specified in 3.8.
Insulation resistance	Not less than 30 percent of the value specified in 3.10.
Insertion loss	Shall meet initial requirement, unless otherwise specified (see 3.1).
Visual examination	There shall be no visible mechanical damage.
Capacitance (when specified)	Change not more than the value specified (see 3.1) from the initial measured value.

3.23 Resistance to solvents. When filters are tested as specified in 4.6.20, there shall be no evidence of mechanical damage and the marking shall remain legible.

3.24 Solderability.

3.24.1 Solderability of terminals (soldered terminals only). When filters are tested as specified in 4.6.21.1, the dipped surface of the leads shall be at least 95 percent covered with continuous solder coating. The remaining 5 percent of the lead surface may show only small pinholes or voids and these shall not be concentrated in one area. Bare base metal and areas where the solder dip fails to cover the original coating are indications of poor solderability, and shall be cause for rejection.

3.24.2 Solderability of mounting termination (when applicable). When filters are tested as specified in 4.6.21.2, the joint shall be at least 95 percent covered with continuous solder coating. There shall be no evidence of leaching (loss of metallization). After the test, filters shall meet the following requirements:

Insulation resistance (+25°C)	Shall meet initial requirements (see 3.1).
Capacitance	Shall meet initial requirements (see 3.1).

3.25 Marking (see 4.6.1).

3.25.1 Full marking. Each filter shall be marked in accordance with method I of MIL-STD-1285 with the following information:

	Example
a. Military part number.	M15733/74-0013
b. Manufacturer's CAGE.	12345
c. Manufacturing date code and lot symbol.	0211A
d. Voltage rating and maximum operating temperature.	600 V dc, 250 V ac at +125°C
e. Current rating.	5 Ampere
f. Terminal identification or circuit diagram. (Non-symmetrical filters only)	L1
g. Maximum operating power frequency (for ac rated filters).	400 Hz

3.25.2 Minimum marking. When the physical size of the filter precludes the marking of the information in 3.25.1, the minimum marking required shall be as specified in the specification sheet (see 3.1). In those cases where full marking requirements are not on the filter, the full marking shall be marked on the unit package.

3.26 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.27 Workmanship (see 4.6.1). Filters shall be processed in such a manner as to be uniform in quality and shall be free from cold soldering, corrosion (see 3.17), pits, dents, cracks, rough edges, misalignments, and other defects that will affect life, serviceability, or appearance.

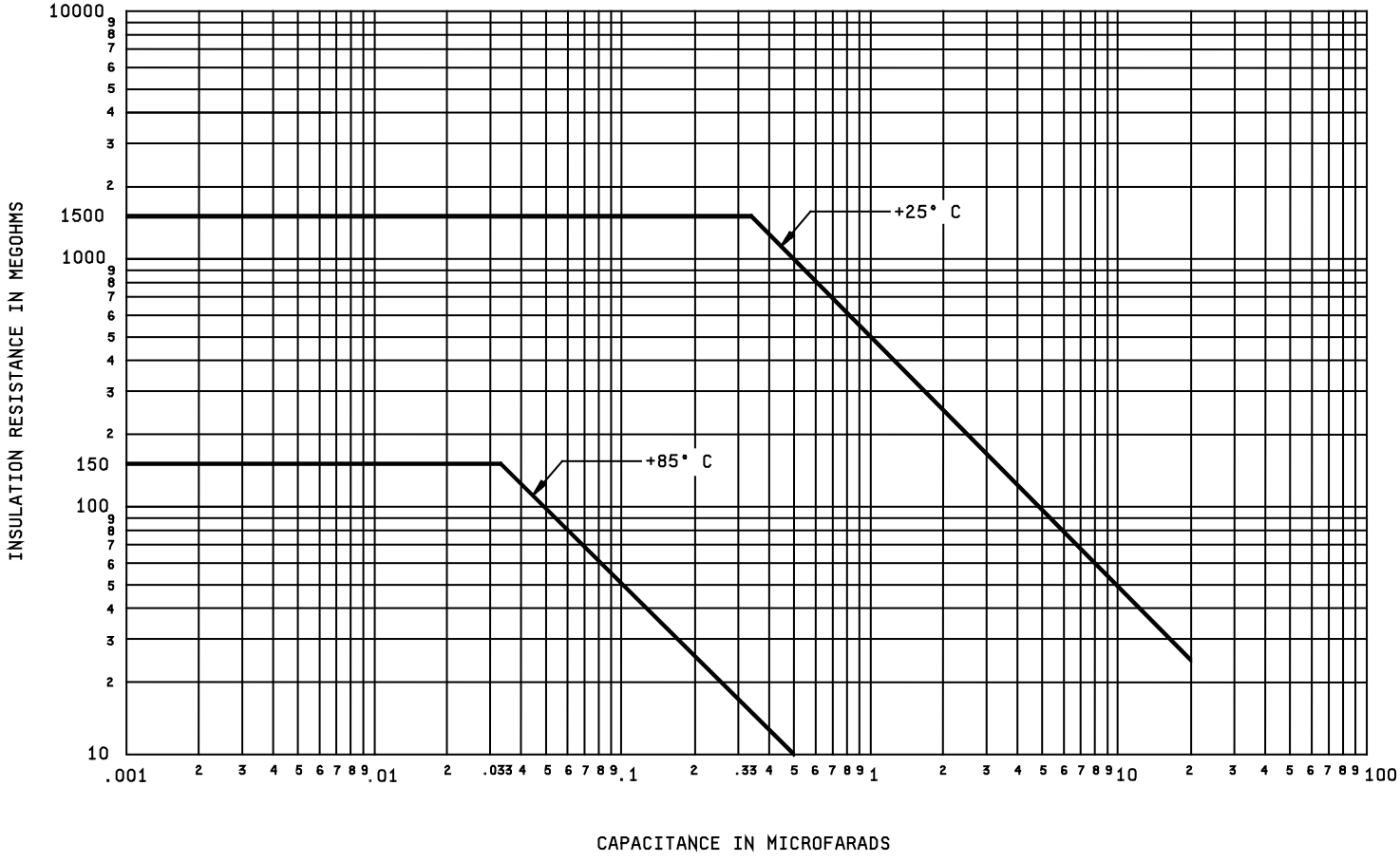

FIGURE 1. Graphical representation of insulation resistance requirements.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.4).
   (1) Verification of qualification (see 4.4.4)

b. Conformance inspection (see 4.5).
   (1) Group A inspection (see 4.5.1.2)
   (2) Periodic group C inspection (see 4.5.2.1)

4.2 Test equipment and inspection facilities. The supplier shall establish and maintain a calibration system in accordance with ANSI/NCSL Z540.3, ISO-10012, or equivalent.

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-202. Unless otherwise specified, the accuracy of all test voltages, currents, or resistances shall be within 2 percent of that specified.

4.4 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production.

4.4.1 Sample size. The number of filters to be subjected to qualification inspection shall be as specified in the appendix to this specification.

4.4.2 Inspection routine. Samples shall be subjected to the qualification inspection specified in table III, in the order shown. All specimens shall be subjected to the inspections of group I. The samples shall then be divided into three groups as specified in table III. The specimens shall then be subjected to the inspections for their particular group; for alternate-terminal-type submission, each type shall be equally represented in the group.

4.4.3 Failures. Failures in excess of those allowed in table III shall be cause for refusal to grant qualification.

4.4.4 Verification of qualification. Every 12 months, the manufacturer shall provide verification of qualification to the qualifying activity. The qualifying activity shall establish the initial reporting date. Continuation of qualification shall be based on meeting the following requirements:

a. Group A inspection requirements

b. Periodic group C inspection requirements

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during two consecutive reporting periods, there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit his qualified products to testing in accordance with the qualification inspection requirements.

4.5 Conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspection.

4.5.1.1 Inspection lot. An inspection lot, as far as practicable, shall consist of all the filters of the same style and current rating produced under essentially the same conditions and offered for inspection at one time.

4.5.1.2 Group A inspection. Group A inspection shall consist of the tests specified in table IV, performed in the order shown.

4.5.1.2.1 Sampling plan. A sample of parts shall be randomly selected in accordance with table V. If one or more defects are found, the lot shall be 100 percent screened for those quality characteristics found defective in the sample and defects removed. If the total number of seal test defectives exceeds 10 percent of the lot, the lot shall be rejected and shall not be supplied to this specification. If the total number of seal test defectives is less than 10 percent of the lot, these defectives may be reworked to correct the defects. Visual and mechanical defectives may be

reworked to correct the defects. After screening and removal of defects, or rework as applicable, a new sample of parts shall be randomly selected in accordance with table V and subjected to the group A inspection. Such lots shall be clearly identified as re-inspected lots. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

TABLE III. Qualification inspection.

Inspection	Requirement Paragraph	Test method paragraph	Number of sample units to be inspected	Number of defectives allowed 1/
Flashpoint of impregnant or potting compound	3.15	4.6.12	---	0
Group I Visual and mechanical examination: Material, design, construction, marking 2/, and workmanship Seal Capacitance to ground (when specified) Temperature rise Dielectric withstanding voltage Barometric pressure (reduced) Insulation resistance (terminal to ground) Voltage drop Insertion loss Overload Terminal strength	3.1, 3.3 to 3.4.5 incl, 3.25 and 3.27 3.5 3.6 3.7 3.8 3.9 3.10 3.11 3.12 3.13 3.14	4.6.1 4.6.2 4.6.3 4.6.4 4.6.5 4.6.6 4.6.7 4.6.8 4.6.9 4.6.10 4.6.11	3/ 24	1
Group II Resistance to soldering heat (soldered terminals only) Resistance to solvents Salt atmosphere (corrosion) Thermal shock and immersion	3.16 3.23 3.17 3.18	4.6.13 4.6.20 4.6.14 4.6.15	4	1
Group III Shock, specified pulse Vibration Moisture resistance	3.19 3.20 3.21	4.6.16 4.6.17 4.6.18	4	1
Group IV Life	3.22	4.6.19	10	1
Group V Solderability	3.24	4.6.21	5	0

1/ A sample unit having one or more defects will be charged as a single defective.
2/ Marking will be considered a defect only if it becomes illegible as a result of the inspection.
3/ One additional sample unit is included in each sample of 24 to permit substitution for the allowable defective in group I.

TABLE IV. Group A inspection.

Inspection	Requirement paragraph	Test paragraph	Sampling procedure
Visual and mechanical inspection: 1/		4.6.1	See table V
Material	3.3 and 3.3.1		
Body dimensions	3.4		
Design and construction (other than body dimensions)	3.4 to 3.4.5 inclusive		
Marking	3.25		
Workmanship	3.27		
Seal	3.5	4.6.2	
Capacitance to ground (when specified)	3.6	4.6.3	
Dielectric withstanding voltage	3.8	4.6.5	
Insulation resistance (terminal to ground)	3.10	4.6.7	
DC voltage drop (when specified)	3.11	4.6.8	
Insertion loss (25°C)	3.12	4.6.9	

1/ Visual and mechanical examination may be performed before or after the units are sealed, whichever is applicable.

TABLE V. Group A sampling plan.

Lot size	Sample size
2 to 13	100 percent
14 to 150	13
151 to 280	20
281 to 500	29
501 to 1,200	34
1,201 to 3,200	42
3,201 to 10,000	50

4.5.2 Periodic inspection. Periodic inspection shall consist of group C inspection. Except where the results of these inspections show noncompliance with the applicable requirements (see 4.5.2.5), delivery of products which have passed group A shall not be delayed pending the results of these periodic inspections.

4.5.2.1 Group C inspection. Group C inspection shall consist of the inspections specified in table VI, in the order shown. Group C inspection shall be made on sample units selected from inspection lots that have passed group A inspection.

4.5.2.2 Sampling plan.

4.5.2.2.1 Quarterly. Every 3 months, 10 sample units shall be subjected to the test of subgroup 4 of table VI and 5 sample units shall be subjected to the test of subgroup 5. Samples shall be selected according to style.

4.5.2.2.2 Semiannually. Every 6 months, 12 sample units (4 units for each subgroup) shall be subjected to the tests of subgroups 1, 2, and 3 specified in table VI. Samples shall be selected according to style.

4.5.2.3 Defectives. If the number of defectives exceed the number allowed in table VI, the sample shall be considered to have failed.

4.5.2.4 Disposition of sample units. Sample units that have been subjected to group C inspection shall not be delivered on the contract.

TABLE VI. Group C inspection.

Test	Requirement paragraph	Method paragraph	Number of sample units to be inspected	Number of defectives allowed
Subgroup 1				
AC voltage drop (when specified)	3.11	4.6.8		
Insertion loss	3.12	4.6.9		
Barometric pressure (reduced)	3.9	4.6.6	4	
Temperature rise	3.7	4.6.4		
Overload	3.13	4.6.10		
Salt atmosphere (corrosion)	3.17	4.6.14		
Subgroup 2				
Shock, specified pulse	3.19	4.6.16		
Vibration	3.20	4.6.17	4	1
Moisture resistance	3.21	4.6.18		
Subgroup 3				
Terminal strength	3.14	4.6.11		
Resistance to soldering heat (soldered terminal only)	3.16	4.6.13	4	
Resistance to solvents	3.23	4.6.20		
Thermal shock and immersion	3.18	4.6.15		
Subgroup 4				
Life	3.22	4.6.19	10	1
Subgroup 5				
Solderability	3.24	4.6.21	5	0

4.5.2.5 Noncompliance. If a sample fails to pass group C inspection: The manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted and on all units of product that can be corrected and that were manufactured under essentially the same conditions, with essentially the same materials, processes, etc, and that are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, (acceptable to the qualifying activity), has been taken. After the corrective action has been taken, group C inspection shall be repeated on additional sample units (all inspections, or the inspection that the original sample failed, at the option of the qualifying activity). Group A inspection may be re-instituted; however, final acceptance and shipment shall be withheld until the group C inspection has shown that the corrective action was successful. In the event of failure after re-inspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

4.6 Methods of inspection.

4.6.1 Visual and mechanical examination. Filters shall be examined to verify that the materials, design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements. (see 3.1, 3.3 to 3.4.5, incl., 3.25 and 3.27)

4.6.2 Seal. (when specified; see 3.1).

4.6.2.1 Liquid-filled units (see 3.5.1). Liquid-filled filters shall be heated in an oven at the maximum operating temperature (see 3.1) for not less than three hours for filters weighing 20 pounds or less, and for not less than six hours for filters weighing over 20 pounds.

4.6.2.2 All other units (see 3.5.2). Filters shall be tested in accordance with method 112 of MIL-STD-202, and as follows:

a. For filters having a maximum operating temperature rating of +125°C: Test condition A or D.

b. For filters having a maximum operating temperature rating of +85°C: Test condition A or D except that the bath temperature shall be +85°C +3°, -0°C.

4.6.3 Capacitance to ground (when specified; see 3.1) (see 3.6). Capacitance to ground shall be measured in accordance with method 305 of MIL-STD-202. The following details shall apply:

a. Test frequency: 1,000 ±100 Hz.

b. Limit of accuracy: Within ±2 percent.

4.6.4 Temperature rise (see 3.7). Filters shall be suspended by their terminals and shall be energized with rated current at maximum rated frequency in still air (see 3.1). Lead wires shall be of copper, 6 inches (162.40 mm) long, and of the size specified in table VII. After thermal stability has been reached and while the filter is still energized, the maximum hotspot on the filter case shall be determined by the use of thermocouples. Lead wires specified in accordance with table VII, shall be the smaller of the wire specified per table VII or the actual wire size of the filter terminal.

TABLE VII. Maximum lead wire size.

Rated current of filters	Wire size
Amperes	AWG
Up to 3	24
3+ to 5	22
5+ to 11	20
11+ to 16	18
16+ to 22	16
22+ to 32	14
32+ to 41	12
41+ to 55	10
55+ to 73	8
73+ to 101	6
101+ to 135	4
135+ to 181	2
181+ to 211	1

4.6.5 Dielectric withstanding voltage (see 3.8). Filters shall be tested in accordance with method 301 of MIL-STD-202. The following details and exceptions shall apply:

a. Test voltage - Unless otherwise specified (see 3.1), the test voltage shall be dc and shall be as follows:

(1) DC rated only: 2.5X rated voltage.

(2) For filters with ac and dc ratings: 2.5X rated dc voltage.

(3) AC rated only: 2.8X rated rms voltage.

b. Duration of application of test voltage: 5 seconds minimum, 1 minute maximum.

c. Points of application of the test voltage: The test voltage shall be applied between the case (ground) and all live (not grounded) terminals of the same circuit connected together.

d. Charging current: 50 mA maximum.

e. The sensitivity of the breakdown test equipment shall be sufficient to indicate breakdown when at least 0.5 milliamperes of leakage current flows through the filter under test.

4.6.6 Barometric pressure (reduced) (see 3.9). Filters shall be tested in accordance with method 105 of MIL-STD-202. The following details shall apply:

a. Method of mounting: Securely fastened by normal mounting means.

b. Test condition letter: B.

c. Test during subjection to reduced pressure: Dielectric withstanding voltage as specified, except that the dc test voltage shall be 125 percent of the rated dc voltage, or 210 percent of the rated ac (rms) voltage if filter is only ac rated.

d. Examination after test: Filters shall be examined for evidence of flashover, breakdown, or impairment that would cause failure.

4.6.7 Insulation resistance (terminal to ground) (see 3.10). Filters shall be tested in accordance with method 302 of MIL-STD-202. The following details shall apply:

a. Test condition letter: A.

b. Special preparations or conditions: Measurements shall be carefully made to prevent damage to the filter seal. When filters fail this test due to ambient relative humidity in excess of 50 percent, they may be retested at any relative humidity from 20 to 50 percent.

c. Points of measurements: Between the case (ground) and all live (not grounded) terminals of the same circuit connected together.

d. Maximum charging current: 50 mA.

e. At the manufacturer's option, measurements can be made of the dc leakage current at the specified test voltage. The equivalent insulation resistance can then be calculated.

4.6.8 Voltage drop (when specified; see 3.1) (see 3.11).

4.6.8.1 For filters rated ac only (see 3.1). The voltage drop is the difference between the input voltage to the filter and the output voltage of the filter when the filter is carrying rated current at rated voltage, with a resistive load at maximum rated frequency. The method of voltage measurement is shown on figure 2. Measurements shall be made by using expanded scale-type meters which will enable voltage differences of less than 1 volt to be read.

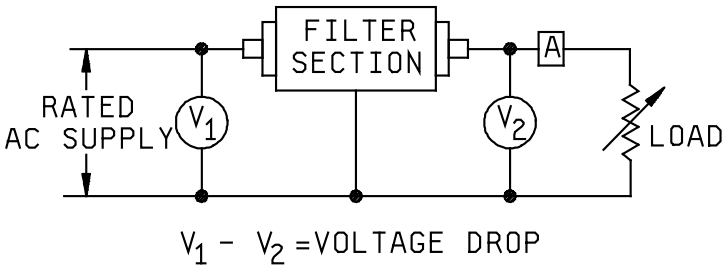

FIGURE 2. AC filters; measurements of voltage drop.

4.6.8.2 For filters rated dc only (see 3.1). The voltage drop shall be determined in accordance with figure 3. Measurements shall be made by using a dc reading meter when the filter is carrying rated current and rated voltage. At the manufacturer's option, the dc resistance can be measured in accordance with method 303 of MIL-STD-202. The equivalent dc voltage drop can then be calculated.

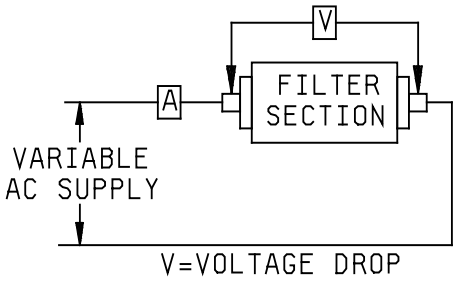

FIGURE 3. DC filters; measurements of series-element voltage drop at rated current.

4.6.8.3 For filters rated ac and dc (see 3.1). The voltage drop shall be measured as specified in 4.6.8.1 and 4.6.8.2, respectively. Both measurements must be taken for filters rated ac and dc.

4.6.9 Insertion loss (see 3.12).

4.6.9.1 Insertion loss (at +25°C). Filters shall be tested in accordance with MIL-STD-220 or to an approved equivalent at load and no-load as specified (see 3.1). With only the 10 dB pads, adapters, and fixture in the circuit, 0 dB reference shall have no more than ±1 dB error and the measurements shall be accurate to within ±3 dB over the specified frequency to 1 GHz.

4.6.9.2 Insertion loss (at temperature). This test may be conducted in conjunction with the capacitance measurement (temperature and voltage) provided the insertion loss is read before the dc bias is applied at each temperature. Filters shall be tested as follows:

a. The filters shall be located with an appropriate adaptor in a temperature chamber.

b. Load and no-load measurements shall be made at -55°C, +25°C, and +125°C. Measurements shall be made at a sufficient number of frequencies to plot a curve of insertion loss versus frequency over the specified frequency range for each temperature. Alternatively, photographs of the display of a spectrum analyzer or chart recordings may be used.

4.6.10 Overload (see 3.13). Filters shall be suspended by their conductors in free air at an ambient temperature of 20°C minimum. A current equal to 140 percent of rated current at maximum rated frequency shall then be applied for 15 minutes. After the filter has returned to room temperature, the insulation resistance and voltage drop shall be measured as specified in 4.6.7 and 4.6.8, respectively. Filters will be visually examined for evidence of physical damage.

4.6.11 Terminal strength (see 3.14). Filters shall be tested in accordance with method 211 of MIL-STD-202. Test condition A, B, or E shall apply as specified in the individual specification sheet.

4.6.11.1 Pull. A force of the specified magnitude shall be applied to the terminal at the point where the lead from the external circuit connects to it. The force may be applied in any direction, including the weakest, and shall be increased gradually to the specified magnitude and held at that value for at least 30 seconds (see 3.1).

4.6.11.2 Bend (applicable only to solder-lug terminals). Any terminal that shows visible bending in the terminal-pull test (see 4.6.11.1) shall be bent back and forth five times to an angle of 45° each side of center (terminal bend through an arc of 90°).

4.6.11.3 Torque. Terminals with external screw threads shall be subjected to the torque specified in table VIII.

4.6.12 Flashpoint of impregnant or potting compound (when specified; see 3.1) (see 3.15). The flashpoint of the impregnant or potting compound shall be measured as specified in ASTM-D92-78. However, the paragraphs covering firepoint and precision do not apply to this test.

4.6.13 Resistance to soldering heat (soldered terminals only) (see 3.16). Filters shall be tested in accordance with method 210 of MIL-STD-202. The following details shall apply:

a. Depth of immersion in the molten solder shall be to a point .062 ± .031 inch (1.59 ± .79 mm) from the insulation.

b. Test condition letter: B.

c. Cooling time prior to final examinations and measurements: Sufficient time shall be allowed to stabilize the filters at room ambient temperature. Filters shall then be physically examined for evidence of physical damage and capacitance to ground and coil continuity shall be checked.

TABLE VIII. Terminal torque

Screw size	Torque
	lb-in
6-32	9
8-32	14
10-32	18
1/4-20	30
5/16-24	50
3/8-24	100
7/16-20	150
1/2-20	250
1/2-28	200
12-28	23
1/4-28	40

4.6.14 Salt atmosphere (corrosion) (see 3.17). Filters shall be tested in accordance with method 101 of MIL-STD-202. The following details and exception shall apply:

a. Test condition letter: As specified (see 3.1).

b. Measurements after exposure: Not applicable.

c. Visual examination: After the test, filters shall be visually examined for corrosion and obliteration of marking.

4.6.15 Thermal shock and immersion (see 3.18).

4.6.15.1 Thermal shock. Filters shall be tested in accordance with method 107 of MIL-STD-202. The following details and exceptions shall apply:

a. Test condition letter: A, except the temperature at step 3 shall be the maximum operating temperature of the filter.

b. Measurements before and after cycling: Not applicable.

4.6.15.2 Immersion cycling. Following thermal shock, filters shall be tested in accordance with method 104 of MIL-STD-202. The following details shall apply:

a. Test condition letter: A.

b. Measurements after final cycle: Dielectric withstanding voltage with 90 percent of the voltage specified in 4.6.5, applied for 5 ±1 seconds, insulation resistance, and insertion loss, shall be measured as specified in 4.6.5, 4.6.7, and 4.6.9, respectively.

c. Visual examination: After the test, filters shall be visually examined for corrosion and obliteration of marking.

4.6.16 Shock, specified pulse (see 3.19). Filters shall be tested in accordance with method 213 of MIL-STD-202. The following details shall apply:

a. Mounting: Securely fastened by normal mounting means. When applicable, leads and connecting wires must be supported to prevent damage to the filter.

b. Test condition letter: As specified (see 3.1).

c. Electrical load during shock: During test, a potential of 100 percent of rated voltage shall be applied between terminals and case.

d. Examination after test: Filters shall be visually examined for evidence of physical damage.

4.6.17 Vibration (see 3.20).

4.6.17.1 Low-frequency (when specified; see 3.1). Filters shall be tested in accordance with method 201 of MIL-STD-202. The following details and exception shall apply:

a. Tests and measurements prior to vibration: Not applicable.

b. Method of mounting: Securely fastened by normal mounting means.

c. Duration of vibration: Three hours (1 hour in each direction).

d. Electrical-load conditions: Rated voltage and rated current shall be applied continuously during vibration.

e. Tests during vibration: Attached instrumentation shall be such as to indicate intermittent open- or short-circuiting.

f. Examination after test: Filters shall be visually examined for evidence of physical damage and shall be subjected to the insertion loss test as specified in 4.6.9.

4.6.17.2 High frequency (when specified; see 3.1). Filters shall be tested in accordance with method 204 of MIL-STD-202. The following details and exceptions shall apply:

a. Mounting of specimens: Filters shall be rigidly mounted by the body.

b. Electrical-load conditions: As specified in 4.6.17.1d.

c. Test condition letter: As specified (see 3.1).

d. Tests during vibration: During the last cycle in each direction, an electrical measurement shall be made to determine intermittent open- or short-circuiting.

e. Examination after test: As specified in 4.6.17.1f.

4.6.18 Moisture resistance (see 3.21). Filters shall be subjected to thermal shock as specified in 4.6.15.1. Filters shall then be tested in accordance with method 106 of MIL-STD-202. The following details and exceptions shall apply:

a. Mounting: Securely fastened by normal mounting means.

b. Initial measurements: Not applicable.

c. Polarization voltage: During steps 1 to 6, inclusive, a dc potential of 100 volts or rated dc volts, whichever is less, shall be applied between the terminals and case. The potential applied to the terminals shall be positive with respect to the case.

d. Final measurements: Following the 24-hour conditioning period, dielectric withstanding voltage with 90 percent of the voltage specified in 4.6.5 applied for 5 ±1 second, insulation resistance, and insertion loss shall be measured as specified in 4.6.7 and 4.6.9, respectively.

e. Visual examination: After the test, filters shall be visually examined for corrosion (see 3.17) and obliteration of marking.

4.6.19 Life (see 3.22). Filters shall be tested in accordance with method 108 of MIL-STD-202. The following details and exceptions shall apply:

a. The filters shall be separated from each other by a distance of not less than 1 inch (25.4 mm) during measurements.

b. The filters shall be operated at maximum operating temperature.

c. Filters shall be suspended by their terminals during the test.

d. Test condition letter: as specified (see 3.1).

e. Filters shall be energized with rated current at maximum rated frequency.

f. During the test, radiant shields may be placed between units so that overheating of one unit will not affect a nearby unit.

g. When both ac and dc voltage ratings are given, the ac voltage shall be used. The life test voltage shall be 1.2 times the rated ac voltage. Filters with only dc ratings shall be tested at 1.4 times the rated dc voltage.

h. After the life test, dielectric withstanding voltage with 90 percent of the specified voltage applied for 5 ± 1 seconds, and insulation resistance, and insertion loss shall be measured as specified in 4.6.5, 4.6.7, and 4.6.9, respectively.

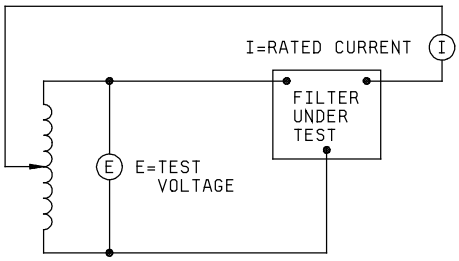

FIGURE 4. Typical life test circuit.

4.6.20 Resistance to solvents (see 3.23). Filters shall be tested in accordance with method 215 of MIL-STD-202. The following details shall apply:

a. The marked portion of the filter body shall be brushed.

b. Filters shall be visually examined for evidence of mechanical damage and legibility of marking.

4.6.21 Solderability (see 3.24).

4.6.21.1 Solderability of terminals (soldered terminals only). Filters shall be tested in accordance with method 208 of MIL-STD-202. The following details and exceptions shall apply:

a. Number of terminations to be tested: 2.

b. Special preparations of terminations: None.

4.6.21.2 Solderability of mounting termination (when applicable). Filters shall be tested as follows: (Note: The terminal solderability test (see 4.6.21.1) should be done with the filters already soldered to the test coupon; however, if the size of the solder pot or variations in the terminal preclude this sequence, the terminal solderability may be done first).

a. Filters shall be soldered to the test coupon shown on figure 5. The filters shall be soldered with an iron at 253°C ± 7°C using PB36AWB6 or PB36AWB7solder in accordance with J-STD-006. The test coupon shall be preheated to 100°C ± 7°C. Heat should be applied to the coupon first in the immediate vicinity of the filter. The tip of the iron should then be moved so that it comes in contact with the edge of the filter for no more than 5 seconds or until a smooth solder fillet has been established around the filter. This sequence will be repeated with each filter.

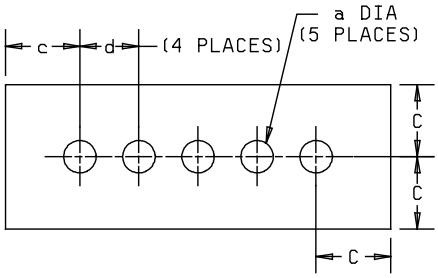

FIGURE 5. Test coupon for solderability of mounting terminations.

b. Test coupon: Shall be in accordance with figure 5 and as follows:

(1) Material: Beryllium copper in accordance with ASTM-B194, Copper Alloy UNS No. C17000, 0.014 ± 0.002 inch (0.36 ± 0.05 mm) thick. Also acceptable is brass in accordance with ASTM-B16/B16M, Copper Alloy UNS No. C36000, 1/2 hard or brass in accordance with ASTM-B36/B36M, Copper Alloy UNS No. C26000, 1/2 hard; 0.014 ± 0.002.

(2) Finish: Copper plate in accordance with SAE-AMS2418 and tin plate in accordance with ASTM-B545, class B.

(3) Dimensions: In accordance with figure 5 and as follows:

"a" = recommended mounting hole diameter as specified in the specification sheets.

"b" = 2 x the maximum filter body diameter.

"c" = "b" but not less than 0.50 inch (12.70 mm).

c. Measurements after test: Insulation resistance (25°C) and capacitance shall be measured as specified in 4.6.7 and 4.6.3 while the filters are on the test coupon.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of material is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Filters described herein are intended for use in the reduction of broadband radio frequency interference. Filters covered by this specification are unique due to the necessity to operate satisfactorily in military systems under separate or a combination of demanding environmental conditions including high frequency vibration, high levels of shock, moisture and humidity, and temperature extremes.

6.1.1 Insertion loss. The test method specified in MIL-STD-220 for measuring insertion loss provides data that is valid if the actual source and load impedance are both 50 ohms resistive. Power-line filters are normally used under conditions where source and load impedance are independent of each other and can vary widely as a function of frequency. In addition the power source impedance generally varies from line-to-line. Therefore, MIL-STD-220 insertion loss results should not be assumed to be entirely valid in a particular application; in fact, ringing or filter gain may occur under certain conditions of mismatch.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. Title, number, and date of the applicable specification sheet, and the complete military PIN (see 3.1).

c. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from the Defense Supply Center Columbus (DSCC-VQP), Post Office Box 3990, Columbus, OH 43218-3990 or by E-mail at vqp.chief@dla.mil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at https://assist.daps.mil.

6.4 Solder coating. It is intended that solder coatings on terminals withstand extended storage without deterioration of soldering qualities or appreciable increase in resistance.

6.5 Tin whisker growth. Pure tin plating is prohibited (see 3.3.2 and 3.4.3) since it may result in tin whisker growth. The use of alloys with tin content greater than 97 percent may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. Tin whisker growth could adversely affect the operation of electronic equipment systems. For additional information on this matter, refer to ASTM-B545 (Standard Specification for Electrodeposited Coating of Tin).

6.6 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the date of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals is available on their website at http://www.epa.gov/osw/hazard/wastemin/priority.htm.

6.7 Previous classification information. This information is provided to maintain a cross-reference to the former classification coding system.

6.7.1 Type designation. The type designation shall be in the following form and as specified :

FL22	D	D	1E	A	1
Style (6.7.1.1)	Current rating (6.7.1.2)	Insertion-loss characteristic (6.7.1.3)	Terminal identification (6.7.1.4)	Operating temperature range (6.7.1.5)	Grade (6.7.1.6)

6.7.1.1 Style. The style is identified by the two-letter symbol “FL” followed by a two digit number. The letters identify radio frequency interference filters; the digits identify the general shape and mounting of the case.

6.7.1.2 Current rating. The current rating, at maximum operating temperature; is identified by a single letter, in accordance with table X.

TABLE X. Current rating.

Symbol	Rated current	Symbol	Rated current
	Amperes		Amperes
A	0.1	H	15.0
B	0.3	J	20.0
C	0.5	L	30.0
D	1.0	N	55.0
X	1.5	P	70.0
Y	2.0	R	100.0
E	3.0	S	150.0
F	5.0	T	200.0
Z	7.0	U	300.0
G	10.0	V	500.0
		W	As specified

6.7.1.3 Insertion-loss characteristic. The insertion-loss characteristic is identified by a single letter; in accordance with table XI.

TABLE XI. Minimum insertion loss under full load.

Symbol	Frequency in megahertz shown as column head and insertion loss shown in column 1/									
	0.15	0.3	0.6	1	10	20	40	100	500	1,000
	dB	dB	dB	dB	dB	dB	dB	dB	dB	dB
A	85	85	85	80	60	60	60	45	20	20
B	40	50	60	60	60	60	60	60	60	60
C	50	60	60	60	60	60	60	---	---	---
D	50	60	60	60	60	60	60	60	60	60
E	30	45	60	75	55	50	45	30	20	---
F	40	40	40	40	40	40	40	---	---	---
G	45	60	80	80	80	80	75	70	70	70
H	50	50	60	60	60	60	60	60	50	50
J	60	70	80	80	80	80	80	80	80	80
K	40	50	60	60	60	60	60	60	60	60
L	70	70	70	70	60	60	60	60	60	60
M	50	70	80	80	75	70	65	60	55	50
W	As specified 2/									

1/ Full load insertion loss measurements shall be made from .15 to 20 MHz. Above 20 MHz, insertion loss measurements shall be made under no-load.
2/ W may also be used to indicate minimum insertion loss under no load .

6.7.1.4 Terminal identification. Terminals are identified by a number and a letter in accordance with table XII. The number identifies the type of material and the letter identifies the thread (or other dimensions).

TABLE XII. Terminal types and dimensions.

Symbol	Type of terminal	Thread or dimension
1E	Solder lug	---
2G	Radially tapped permanent stud	.164-32 UNC-2B
2H	Radially tapped permanent stud	.190-32 UNF-2B
3F	Threaded stud	.112-40 UNC-2A
3L	Threaded stud	.138-32 UNC-2A
3J	Threaded stud	.164-32 UNC-2A
3K	Threaded stud	.190-32 UNF-2A
3M	Threaded stud	.250-28 UNF-2A
3UN	Threaded stud	.3125-24 UNF-2A
3P	Threaded stud	.216-28 UNF-2A

6.7.1.5 Operating temperature range. The operating temperature range is identified by a single letter in accordance with table XIII.

TABLE XIII. Operating temperature range.

Symbol	Temperature range
	°C
A	-65 to +85, incl
B	-65 to +125, incl
C	-65 to +200, incl
D	-55 to +125, incl
E	-55 to +85, incl
W	(As specified)

6.7.1.6 Grade. The grade is identified by a single digit in accordance with table XIV.

TABLE XIV. Grade.

Symbol	Vibration condition
	Hz
1	10 to 55, incl
2	10 to 500, incl
3	10 to 2,000 incl

6.8 Subject term (key word) listing.

EMI
Feed-through, filter
Insertion loss
Low pass, filter
RFI

6.9 Changes from previous issue. The margins of this specification are marked to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

APPENDIX A

PROCEDURE FOR QUALIFICATION INSPECTION

A.1 SCOPE

A.1.1 Scope. This appendix details the procedure for submission of samples for qualification inspection of filters covered by this specification. The procedure for extending qualification is also outlined herein. This appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

A.2 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

A.3 SUBMISSION

A.3.1 Sample. A sample consisting of 24 specimens of each filter for which qualification is sought shall be submitted. Each sample shall be accompanied with the following information:

a. Attenuation curve in accordance with MIL-STD-220.

b. Certification as to the flashpoint of the impregnant or potting compound based on the Cleveland-cup process (see 4.6.12).

c. Schematic diagram of the filter, including nominal values of the components.

A.4 EXTENT OF QUALIFICATION

A.4.1 Extent of qualification. Extent of qualification shall only be applicable for filters covered by the same specification sheet. Qualification for one filter may be the basis for qualification of another filter as indicated below:

a. Voltage rating: Extent of qualification shall be restricted to filters of the same voltage rating.

b. Current rating: Qualification of the lowest current rating and highest current rating for a given specification sheet and circuit diagram will extend qualification for all intermediate current ratings.

c. Circuit diagram: As indicated in table A-I.

TABLE A-I. Extent of qualification for circuit diagram.

Qualification of circuit diagram	Will qualify circuit diagram
C	C
T	T, L1, L2
L1	L1, L2, C
L2	L1, L2, C
Pi	Pi, L1, L2, C
2L1	2L1, 2L2, Pi L1, L2, T, C
2L2	2L1, 2L2, Pi L1, L2, T, C

d. Capacitance: Capacitance range qualification for a given specification sheet, mounting thread series, and circuit diagram will be restricted to values equal to and less than the capacitance value submitted (for example qualification of a 5000 pF GMV filter will extend qualification to the 1000 pF GMV filter on the same specification sheet, with the same mounting thread series, and the same circuit diagram).

As a requisite for extension of qualification, the product involved must be manufactured using the same facilities, processes, and materials as the product originally submitted for qualification.

Custodians:
Army - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:
DLA-CC

(Project 59GP-2010-003)

Review activities:
Army - AR, AT, AV, MI
Navy - AS, MC, OS, SH, YD
Air Force - 19, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.daps.dla.mil.