

# EMI/RFI Filter and Capacitor Performance Testing

The resin sealed and hermetically sealed filters shown in this section have been designed to meet the requirements of this test plan as applicable. Group I tests are typically performed on most product. Groups II, III and IV tests are performed per specification requirements.

The information shown can be used as a basis for filter specifications. (Contact factory for additional details if necessary.)

Test Group	Order of Test	Examination or Test	Test Method	Post Test Requirements
I	*1	Visual and Mechanical Examination		In accordance with applicable requirements.
	*2	Materials, Designs, Construction and Workmanship		
	*3	Physical Dimensions and Marking		
	*4	Seal	Method 112 <sup>†</sup> , Condition A	No leaks. Not applicable to resin sealed or solder-in products.
	*5	Capacitance	Method 305 <sup>†</sup> , 1KHz. 2.5 VRMS Max. 25°C	Within specified tolerance.
	*6	Dielectric Withstanding Voltage	Method 301 <sup>†</sup> , 2.5 times, DCWV, 5 seconds, 50 Ma max. charging current	No evidence of damage or breakdown.
	*7	Insulation Resistance	Method 302 <sup>†</sup> at DCWV, at 2 minutes 50 ma charging current	Greater than 1000 megohms or 100 ohm farads, whichever is less.
	*8	Voltage Drop	MIL-F-15733, Paragraph 4.6.8	Per applicable requirements.
	*9	Insertion Loss	MIL-STD-220, 3pc, sample only	Per applicable requirements.
II	1	Temperature Rise	MIL-F-15733, Paragraph 4.6.4	Per applicable requirements.
	2	Overload	MIL-F-15733, Paragraph 4.6.10	Per applicable requirements.
	3	Barometric Pressure	Method 105 <sup>†</sup> , Test Condition B hi-pot, (per method 301 <sup>†</sup> ) at 1.25 times DCWV	No evidence of damage or breakdown.
	4	Shock	Method 213 <sup>†</sup> , Test Condition I	No mechanical damage, Insulation resistance greater than 500 ohm farads, whichever is less.
	5	Vibration	Method 204 <sup>†</sup> , Test Condition B for Glass Seal, Condition D for Resin	No mechanical damage, Insulation resistance greater than 500 megohms or 50 ohm farads, whichever is less.
	6	Moisture Resistance	Method 106 <sup>†</sup>	Insulation resistance greater than 500 megohms or 50 ohm farads whichever is less.
III	1	Terminal Strength	Method 211 <sup>†</sup> , Test Condition A, 5 lbs.	No evidence of loosening or rupturing of terminal.
	2	Resistance to Soldering Heat	Method 210 <sup>†</sup> , Test Condition B, Depth of immersion 1/16 plus or minus 1/32	Insulation resistance greater than 500 megohms or 50 ohm farads whichever is less.
	3	Thermal Shock	Method 107 <sup>†</sup> Test Condition A -55°C to +125°C	Insulation resistance greater than 500 megohms or 50 ohm farads whichever is less.
	4	Immersion Cycling	Method 104 <sup>†</sup> Test Condition A	Insulation resistance greater than 500 megohms or 50 ohm farads whichever is less.
IV	1	Solderability (5pcs only)	Method 208 <sup>†</sup>	Per applicable requirements.
	2	Life	Method 108 <sup>†</sup> , Test Condition D with 125% rated voltage at maximum operating temperature	Filters shall meet all initial requirements except insulation resistance shall not be less than 50% of initial guaranteed value.

\* Acceptance tests typically performed on most products.

† Methods are from MIL-STD-202

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## Reliability Levels

### Class B

Class B is outlined in MIL-F-28861 and is prescribed for most military/aerospace requirements. It is more stringent than MIL-F-15733 requiring 100% screening that includes thermal shock, voltage conditioning and x-ray.

Periodic Group B testing is performed on units selected at random from production lots.

### Class B Test Sequence Summary

Inspection	Class B
<b>Group I</b>	
AC voltage drop (when applicable)	X
Voltage and temperature limits of capacitance	X
Insertion loss (at temperature)	X
Barometric pressure (reduced)	X
Temperature rise	X
Current overload	X
Terminal strength	X
Thermal shock and immersion	X
<b>Group II</b>	
Subgroup 1	
Life	X
Subgroup 2	
Resistance to soldering heat	X
Salt spray (corrosion)	X
Radiographic inspection	X
Subgroup 3	
Resistance to solvents	X
<b>Group III</b>	
Shock (specified pulse)	X
Vibration (high frequency)	X
Moisture resistance	X
Seal (when applicable)	X
Radiographic inspection	X

### “R” level testing

“R” level screening is performed by Spectrum Control’s Hi-Rel Laboratory as detailed below. Customers requiring special tests may order to their own specifications or simply order to level R and then note additions or deviations.

### “R” level test sequence

(100% testing unless otherwise specified)

- Thermal Shock: 5 cycles from -55°C to +125°C in accordance with MIL-STD-202, Method 107D, Condition A.
- Burn-in: 100 hours at 1.4x rated DC voltage, 125°C.
- Seal Test: MIL-STD-202, Method 112, Test Condition A. Hermetic seal parts only.
- Capacitance and Dissipation Factor: MIL-STD-202, Method 305, frequency 1kHz.
- Dielectric Withstanding Voltage: 2.5 times the rated DC voltage for 5 ± 1 second at 25°C, with 50 mA maximum charging current.
- Insulation Resistance: MIL-STD-202, Method 302, 125°C at rated DC voltage and room temperature (25°C). The 125°C requirement shall be 10% of the specified catalog IR at 25°C.
- DC Resistance: MIL-STD-202, Method 303.
- Insertion Loss Test — Sample per MIL-F-15733. At full rated load in accordance with MIL-STD-220. The minimum insertion loss shall be defined in the filter catalog.
- Visual and Mechanical: in accordance with MIL-F-15733.
- Marking: All filters which have successfully completed the test sequence shall be marked with an “R” in the second part of the number. For example, a standard SCI-2130-004 becomes SCI-R2130-004 and 9051-100-0000 becomes 9051-R100-0000, and 51-719-011 becomes 51-R719-011 after completion of the Hi-Rel Level “R” Test Sequence.