INTERNATIONAL STANDARD

IEC 60939-2-2

First edition
2004-11

Complete filter units for radio interference suppression –

Part 2-2: Blank detail specification – Passive filter units for electromagnetic interference suppression – Filters for which safety tests are required (safety tests only)

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMPLETE FILTER UNITS FOR RADIO INTERFERENCE SUPPRESSION –

Part 2-2: Blank detail specification – Passive filter units for electromagnetic interference suppression – Filters for which safety tests are required (safety tests only)

FOREWORD

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International Standard IEC 60939-2-2 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
40/1467/FDIS	40/1488/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 60939 consists of the following parts under the general title *Complete filter units for radio interference suppression:*

Part 1: Generic specification

Part 2: Sectional specification

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual version of this standard may be issued at a later date.

INTRODUCTION

This blank detail specification forms the basis for a uniform procedure for a common Safety Mark. It implements the approval schedule for the safety test described in IEC 60939-2, requires a declaration of design for parameters relevant to safety and prescribes conformance tests to be conducted on every lot prior to its release and requalification tests depending on changes to the declared design.

In comparison with IEC 60939-2-1, which provides quality conformance and safety tests this specification is restricted to safety tests only. The use of IEC 60939-2-1 may be more appropriate for components manufactured in mass production, whereas the employment of this specification may be necessary in those cases where approval and requalification tests contribute considerably to the costs of the product.

Blank detail specification

A blank detail specification is a supplementary document to the sectional specification and contains requirements for style and layout and minimum content of detail specifications. In the preparation of detail specifications the content of 1.4 of the sectional specification shall be taken into account.

Identification of the detail specification and of the component

The first page of the detail specification should have the layout recommended on the next page of this blank detail specification. The numbers between square brackets correspond to the following information which shall be inserted at the position indicated:

[1] The name of the National Standards Organization under whose authority the detail specification is published and, if applicable, the organization from which the detail specification is available.

[2] The IECQ symbol and the number allotted to the detail specification by the IECQ General Secretariat.

[3] The number and issue number of the IECQ generic or sectional specification as relevant; also national reference if different.

[4] If different from the IECQ number, the national number of the detail specification, date of issue and any further information required by the national system, together with any amendment numbers.

[5] A brief description of the component or range of components.

[6] Information on typical construction (when applicable).

For [5] and [6] the text to be given in the detail specification should be suitable for an entry in the IECQ Register of Approvals.

[7] Outline drawing with main dimensions which are of importance for interchangeability and/or reference to the appropriate national or international documents for outlines. Alternatively the drawing may be given in an annex to the detail specification, but [7] should always contain an illustration of the general outer appearance of the component.

[8] The level(s) of quality assessment covered by the detail specification, as appropriate.

[9] Reference data giving information on the most important properties of the component which allow comparison between the various component types intended for the same or similar applications.

<table>
<tr><td>[1]</td><td>IEC 60939-2-2-XXX [2]
QC XXXXXXXXX</td></tr>
<tr><td>ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH:
IEC 60939-1
IEC 60939-2
[3]</td><td>[4]</td></tr>
<tr><td rowspan="4">Outline and dimensions:
(... angle projection)

[7]

(Other shapes are permitted within the dimensions given, see Table 1.)</td><td>PASSIVE FILTER UNITS FOR ELECTROMAGNETIC INTERFERENCE SUPPRESSION AND FOR CONNECTION TO THE SUPPLY MAINS – FILTERS FOR WHICH SAFETY TESTS ARE REQUIRED (SAFETY TESTS ONLY) [5]</td></tr>
<tr><td>TYPICAL CONSTRUCTION:
[6]</td></tr>
<tr><td>Class or subclass of incorporated capacitors</td></tr>
<tr><td>[8]
Safety tests only</td></tr>
<tr><td colspan="2">NOTE For [1] to [9], see preceding page.</td></tr>
<tr><td colspan="2">REFERENCE DATA: Rated voltages, current range, climatic category, frequency range, insertion loss range, functional circuit diagram. [9]</td></tr>
</table>

Information on the availability of components qualified to this detail specification is given in IEC QC 001005.

COMPLETE FILTER UNITS FOR RADIO INTERFERENCE SUPPRESSION –

Part 2-2: Blank detail specification – Passive filter units for electromagnetic interference suppression – Filters for which safety tests are required (safety tests only)

1 General data

1.1 Dimensions

Table 1 – Dimensions related to case size

Case size reference	Dimensions mm							
	L	*W*	*H*	...	...	...	...	...

When there is no case size reference, Table 1 may be omitted and the dimensions shall be given in Table 2, which then becomes Table 1.

The dimensions shall be given as maximum dimensions or as nominal dimensions with a tolerance.

1.2 Ratings and characteristics

Rated voltages (see Table 2)

Category voltage (if applicable) (see Table 2)

Rated current (see Table 2)

DC line resistance or d.c. voltage drop at rated current

Maximum current at upper category temperature and derating curve (if applicable)

Maximum internal and external temperatures for temperature rise test (if applicable)

Climatic category

Rated temperature

Insertion loss (see Table 2)

Insulation resistance

Category of passive flammability (if applicable)

Discharge resistance (if applicable)

Table 2 – Insertion loss at no load

Case size or type designation	Rated voltage	Category voltage	Rated current	Minimum insertion loss dB						
				kHz	kHz	MHz	MHz	MHz	GHz	GHz

1.3 Normative references

IEC 60939-1, *Complete filter units for radio interference suppression – Part 1: Generic specification* [1]

IEC 60939-2, *Complete filter units for radio interference suppression – Part 1: Sectional specification* [2]

IEC 60939-2-1, *Complete filter units for radio interference suppression – Part 2-1: Blank detail specification: Passive filter units for electromagnetic interference suppression – Filters for which safety tests are required (Assessment level D / DZ)*

1.4 Marking

The information given in the marking is normally selected from the following list; the relative importance of each item being indicated by its position in the list:

a) manufacturer's name or trademark;

b) manufacturer's type designation;

c) recognized approval mark;

d) rated voltage and rated frequency, identification of terminations and/or circuit diagram;

f) rated current;

g) rated temperature;

h) climatic category, followed by a letter indicating the category of the passive flammability[2];

i) year and month (or week) of manufacture[3].

The filter shall be clearly marked with a), b) and c) above, and with as many as possible of the remaining items as is considered necessary. Any duplication of information in the marking on the filter should be avoided.

---

1 To be published.

2 If applicable.

3 May be indicated by the code given in IEC 60062:1992, *Marking codes for resistors and capacitors*, a new edition of which is shortly to be published.

1.5 Ordering information

Orders for filters covered by this specification shall contain, in clear or in coded form, the following information:

a) type designation;

b) rated voltage.

1.6 Additional information (not for inspection purposes)

1.7 Additional or increased severities or requirements to those specified in the generic and/or sectional specification

NOTE Additional or increased requirements should be specified only when essential.

Table 3 – Other characteristics

This table is to be used for defining characteristics which are additional to or more severe than those given in the sectional specification

2 Inspection requirements

2.1 Procedures

For Qualification Approval the procedures shall be in accordance with 3.4.1 and 3.4.3 of the sectional specification, as applicable.

2.2 Test schedules

2.2.1 Initial approval

See Annex A of this specification.

2.2.2 Requalification

See Annex B of this specification in association with Annex C of this specification.

Annex A
(normative)

Initial approval test schedule for safety tests only

Clause number and test [1]		Conditions of test [1]	*n* and *c* [2]	Performance requirements [1]
Group 0		**Non destructive**	See Table 2	
4.2	Visual examination			No visible damage Legible marking and as specified in the detail specification
4.5	DC line resistance or voltage drop			See detail specification
4.6	Insertion loss (no load)			See Table 2 of this specification
4.3	Voltage proof [5]	Method: ... [7]		No permanent breakdown or flashover
4.4	Insulation resistance[5]	Method: ... [7]		See Table 8
4.7	Discharge resistance [4], [5]	Method: ... [7]		Within specified tolerances
Group 1A		**Destructive**	See Table 2	
4.2.1	Creepage distances and clearances			See Table 6
4.8	Robustness of terminations	Severity: ... [7]		No visible damage
4.9	Resistance to soldering heat [4]	No pre-drying Method: ... [7]		
4.24	Solvent resistance of the marking [3]			The marking shall remain legible
		Recovery: 1 h to 26 h		
4.16.7	Final inspection and measurements	Visual examination		No visible damage Marking legible
		Voltage proof at 66 % of value in Table 7		No permanent breakdown or flashover
		Insulation resistance		> 50 % of limit in Table 8
		DC line resistance or voltage drop		As in Group 0
Group 2		**Destructive**	See Table 2	
4.17	Damp heat, steady state [6]			
4.17.1	Test conditions	Specify if applied voltage is required. If so far half the sample U_R applied, for other half no voltage applied		
		Recovery 18 h to 26 h		
4.17.2	Final inspection	Visual examination		No visible damage Marking legible
		Voltage proof at 66 % of value in Table 7		No permanent breakdown or flashover
		Insulation resistance		≥ 3,5 MΩ
		DC resistance or voltage drop		As in Group 0
		Insertion loss (no load)		See Table 2 of this specification

Clause number and test [1]		Conditions of test [1]	*n* and *c* [2]	Performance requirements [1]
Group 3A		**Destructive**	See Table 2	
4.18	Temperature rise	For filters with rated current > 0,5 A		
4.18.2	Final measurements	Internal and external temperatures		As in 4.18.2
4.20.1	Endurance	For filters with rated current ≤ 0,5 A Duration: 1 000 h Current and temperature: see 4.20.1		
Group 3B		**Destructive**	See Table 2	
4.19	Impulse voltage	3 impulses, full wave Crest voltage: see Tables 1a and 1b		See 4.19.3
4.20.2	Endurance, voltage, line terminations to case	Duration: 1 000 h Voltage and temperature: see 4.20.2		
Group 3C		**Destructive**	See Table 2	
4.19	Impulse voltage	3 impulses, full wave Crest voltage: see Tables 1a and 1b		See 4.19.3
4.20.3	Endurance voltage, between line terminations	Duration: 1 000 h Voltage, temperature		
4.20.4	Endurance, combined voltage/current [3]	Duration: 1 000 h Voltage, temperature and current : see 4.20.4		
Group 3		**Destructive**	See Table 2	
		Recovery: 1 h to 26 h		
4.20.5	Final inspection	Visual examination Insertion loss (no load)		No visible damage See Table 2 of this specification
	and measurements	Voltage proof at 66 % of value in Table 7		No permanent breakdown or flashover
	For all endurance tests	Insulation resistance		> 50 % of limit in Table 8
		DC line resistance or voltage drop		As in Group 0
Group 7		**Destructive**	See Table 2	
4.22	Passive flammability [3], [4]			See 4.22; according to specified category
Group 9		**Destructive**	See Table 2	
4.26	Active flammability [3], [4]			See 4.26

[1] Clause numbers of test and performance requirements refer to Clause 4 of IEC 60939-2.

[2] *n* = sample size, *c* = acceptance criterion (number of non-conforming items) in accordance with Table 2 of IEC 60939-2.

[3] If required by the detail specification.

[4] If applicable.

[5] Discharge resistors shall be disconnected if they are not capable of enduring specified voltage/period. If the resistor cannot be disconnected without the filter being destroyed, the entire sample shall consist of filters specially made without resistors.

[6] Test to be conducted with discharge resistors disconnected. See also Note 5.

[7] To be required in the detail specification.

See Note 11 to Table 2 in IEC 60939-2 for the applicability of Groups 3B and 3C.

Annex B
(normative)

Conformance test

B.1 Lot-by-lot

Clause number and test [1]		Conditions of test [1]	Sample size	Performance requirements [1]
		Non destructive		
4.2	Visual examination		100 % [2]	Any marking on the filter shall be legible and correct
4.3	Voltage proof Tests A, B and C [3]	Method for Test C: … [4]		No permanent breakdown or flashover

[1] Clause numbers of test and conditions/requirements refer to Clause 4 of IEC 60939-2.

[2] May be carried out as end-of-line-testing.

[3] B or C as applicable.

[4] To be required in the detail specification.

B.2 Requalification

Requalification tests according to Annex A may be required by the Certification Body when a change of the declared design as given in Annex C is intended.

The Certification Body will be informed about the intended change(s) and decide whether requalification tests have to be performed.

As a maximum a complete requalification according to Annex A may be necessary. (See also the Introduction.)

Annex C
(normative)

Declaration of design

(Confidential to the manufacturer and the Certification Body)

The purpose of this description is to register essential data and the basic design of the filters for which approval is sought. The completed form shall be submitted to the relevant Certification Body prior to any approval testings; its circulation to the other parties is left to the decision of the manufacturer.

Changes of the declared design are permitted only after notifying the Certification Body in writing.

In this case, the Certifying Body will decide on the necessary steps to be taken. As a maximum a complete requalification may be required.

Registration number:

(to be allocated by the Certifying Body)

1 Applicant:

2 Manufacturer:

3 Manufacturing site:

4 Type designation:

5 Circuit diagram:

6 Identification of incorporated components

6.1 Capacitor(s):

6.2 Inductor(s):

6.3 Discharge resistor(s):

6.4 Varistor(s):

7 Identification of materials

7.1 Case:

7.2 Lid:

7.3 Filler:

8 Constructional details:

_____	_____	_____	_____
Location	Date	Name	Signature

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other .....

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both English and French texts ❑

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