IEC 60938-2-1

Edition 1.0 1999-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fixed inductors for electromagnetic interference suppression – Part 2-1: Blank detail specification – Inductors for which safety tests are required – Assessment level D

Inductances fixes d'antiparasitage – Partie 2-1: Spécification particulière cadre – Inductances nécessitant des essais de sécurité – Niveau d'évaluation D

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED INDUCTORS FOR ELECTROMAGNETIC INTERFERENCE SUPPRESSION –

Part 2-1: Blank detail specification – Inductors for which safety tests are required – Assessment level D

FOREWORD

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International Standard IEC 60938-2-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This bilingual version (2014-01) corresponds to the monolingual English version, published in 1999-10.

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

FDIS	Report on voting
40/1112/FDIS	40/1138/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.

The French version of this standard has not been voted upon.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The committee has decided that this publication remains valid until 2005.

At this date, in accordance with the committee's decision, the publication will be

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- withdrawn;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

FIXED INDUCTORS FOR ELECTROMAGNETIC INTERFERENCE SUPPRESSION –

Part 2-1: Blank detail specification – Inductors for which safety tests are required – Assessment level D

INTRODUCTION

Blank detail specification

A blank detail specification is a supplementary document to the sectional specification and contains requirements for style, layout and minimum content of detail specifications. Detail specifications not complying with these requirements may not be considered as being in accordance with IEC specifications nor shall they so be described.

In the preparation of detail specifications the content of 1.4 of the sectional specification shall be taken into account.

The numbers between square brackets on the first page of the detail specification correspond to the following information which shall be inserted in the position indicated.

Identification of the detail specification

[1] The "International Electrotechnical Commission" or the National Standards Organization under whose authority the detail specification is drafted.

[2] The IEC or National Standards number of the detail specification, date of issue and any further information required by the national system.

[3] The number and issue number of the IEC or national generic specification.

[4] The IEC number of the blank detail specification.

Identification of the inductor

[5] A short description of the type of inductor.

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

[7] Outline drawing with main dimensions which are of importance for interchangeability and/or reference to the national or international documents for outlines. Alternatively, this drawing may be given in an annex to the detail specification.

[8] Application or group of applications covered and/or assessment level.

[9] Reference data on the most important properties, to allow comparison between the various inductor types.

[1]	IEC 60938-2-1XX [2] QC XXXXXXXXXXXX
ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH: [3]	IEC 60938-2-1 [4] QC XXXXXX
	FIXED INDUCTORS FOR ELECTROMAGNETIC INTERFERENCE SUPPRESSION FOR WHICH SAFETY TESTS ARE REQUIRED [5]
Outline drawing: (see table 1) (... angle projection) [7] (Other shapes are permitted within the dimensions given)	[6]
	Assessment level: D [8]
NOTES [1] to [9] see page 3.	[9]

Information on the availability of components qualified to this detail specification is given in the Register of Approvals.

1 General data

1.1 **Recommended method(s) of mounting** (to be inserted)

(See 1.4.3 of IEC 60938-2.)

1.2 Dimensions

Table 1 – Dimensions related to case size

Case size reference or type	**Dimensions** mm						
	L	***W***	***H***				

NOTE 1 When there is no case size reference, the dimensions should be given per type designation.
NOTE 2 The dimensions should be given as maximum dimensions or as nominal dimensions with a tolerance.

1.3 Ratings and characteristics

Inductance range (see table 2)

Tolerance on rated inductance

Rated current (*I*) range (see table 2)

DC resistance (*R*) (see table 2)

Rated voltage

Rated temperature

Climatic category

Category of passive flammability

Table 2 – Type designation related to values of inductance, rated current and d.c. resistance

Type designation related to values of inductance, rated current and d.c. resistance	L_R per line mH	I_R A	R_{max} per line Ω

1.4 Related documents

Generic specification: IEC 60938-1:(1999), *Fixed inductors for electromagnetic interference suppression – Part 1: Generic specification*

Sectional specification: IEC 60938-2:(1999), *Fixed inductors for electromagnetic interference suppression – Part 2: Sectional specification*

1.5 Marking

The marking of the inductor and the package shall be in accordance with the requirements of 1.6 of IEC 60938-2.

The details of the marking of the component and packaging shall be given in full in the detail specification.

1.6 Ordering information

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

a) type designation;

b) rated inductance;

c) tolerance on rated inductance;

d) rated voltage;

e) rated current;

f) number and issue reference of the detail specification and style reference.

1.7 Certified records of released lots

Required/non required.

1.8 Additional information (not for inspection purposes)

1.9 Additional or increased severities or requirements to those specified in the generic or sectional specification

NOTE Additions 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

2.1.1 For qualification approval, the procedure shall be in accordance with 3.4 of IEC 60938-2.

2.1.2 For quality conformance inspection, the test schedule (table 4) includes sampling, periodicity, severities and requirements. The formation of inspection lots is covered by 3.5.1 of the sectional specification.

Table 4 – Test schedule for quality conformance inspection

Subclause number and test (see note 1)	D or ND (see note 3)	Conditions of test (see note 1)	IL (see note 2)	AQL	Performance requirements (see note 1)
GROUP A INSPECTION (lot-by-lot)					
Subgroup A1	ND		S-4	2,5 %	As in 4.1
4.1 Visual examination					Legible marking and as specified in 1.5 of this specification
4.1 Marking					
4.1 Dimensions (gauging)					See table 1 of this specification
Subgroup A2	ND		II	1,0 %	
4.5 DC line resistance					See 1.3 of this specification
4.4 Inductance					
4.2 Voltage proof					Within specified tolerance
4.3 Insulation resistance (test A only)					See table 2 of this specification
GROUP B INSPECTION (lot-by-lot)					
Subgroup B1	D		S-3	2,5 %	
4.8 Solderability		Method: ... Specify ageing if none or other than 16 h 155 °C dry heat			
4.8.2 Final measurements		Visual examination			Good tinning as evidenced by free flowing of the solder with wetting of the terminations, or solder shall flow within 3 s, as applicable

Subclause number and test (see note 1)	D or ND (see note 3)	Conditions of test (see note 1)	Sample size and acceptance criterion (see note 3)			Performance requirements (see note 1)
			p	n (see note 4)	c	
GROUP C INSPECTION (periodic)						
Subgroup C1A	D		6	5/3/1/1	0/0/0/0	
4.1.2 Dimensions (detail)						Table 1 of this specification
4.1.2 Creepage distances and clearances		For method and severity see detail specification				Table 1 of this specification and 4.1.2
4.6 Robustness of terminations		For method and severity: see detail specification				No visible damage
4.7 Resistance to soldering heat (if applicable)		See detail specification for the method (1A or 1B) For method 1A: Immersion time: 10 s, unless otherwise specified in the detail specification				
4.20 Component solvent resistance (if applicable)						
4.7.2 Final measurements		Visual examination DC line resistance				No visible damage See 1.3 of this specification
Subgroup C1B	D		6	9/6/4/1	0/0/0/0	
4.21 Solvent resistance of the marking (if applicable)						Legible marking
4.9 Rapid change of temperature		θ_A = Lower category temperature θ_B = Upper category temperature Five cycles Duration t = ... h, see 4.9.1				
		Visual examination				No visible damage
4.10 Vibration		For mounting method, see detail specification Frequency range: from ... Hz to ... Hz Total number of sweep cycles: ...				
4.10.2 Intermediate inspection		Visual examination				No visible damage
4.11 Bump (or shock, see 4.12)		For mounting method, see detail specification Number of bumps: ... Acceleration: ... m/s^2 Duration of pulse: ... ms				
		Visual examination				No visible damage

Subclause number and test (see note 1)	D or ND (see note 3)	Conditions of test (see note 1)	Sample size and acceptance criterion (see note 3)			Performance requirements (see note 1)
			p	n (see note 4)	c	
4.12 Shock (or bump, see 4.11)		For mounting method, see detail specification Acceleration: ... m/s^2 Duration of pulse: ... ms				
4.11.2 Final measurements or 4.12.3		Visual examination DC line resistance				No visible damage See 1.3 of this specification
Subgroup C1	D		4	14/9/4/2	1/1/0/0	
4.4 Inductance						For reference
4.13 Container sealing (if required in the detail specification)		Test Qc or Qd as prescribed in the detail specification				No leakage
4.14 Climatic sequence						
4.14.2 Dry heat		Temperature: upper category temperature Duration: 16 h				
4.14.3 Damp heat, cyclic, test Db, first cycle						
4.14.4 Cold		Temperature: lower category temperature Duration: 2 h				
4.14.5 Low air pressure (if required in the detail specification)		Air pressure 8,0 kPa unless otherwise stated in the detail specification Duration: 1 h Visual examination				 No permanent breakdown, flashover, harmful deformation of the case
4.14.6 Damp heat, cyclic, test Db, remaining cycles		Recovery: 1 h to 26 h				
4.14.7 Final measurements		Visual examination DC line resistance Inductance Voltage proof Voltage: 66 % of voltage applied in group 0 Insulation resistance				No visible damage Legible marking See 1.3 of this specification Within –5 %/+10 % of value measured in group 0 No breakdown or flashover ≥50 % of values in 4.3
Subgroup C2	D		12	8/5/4/2	0/0/0/0	
4.4 Inductance						For reference
4.15 Damp heat, steady state		Recovery: 1 h to 26 h				