SLOVENSKI STANDARD
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Alarm systems - Part 1: General requirements - Section Three: Environmental testing

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Systèmes d'alarme. Première partie: Prescriptions générales. Section trois: Essais climatiques et mécaniques

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Alarm systems

Part 1:
General requirements
Section three – Environmental testing

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ALARM SYSTEMS

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FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by IEC Technical Committee No. 79: Alarm systems.

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

Six Months' Rule	Report on Voting
79(CO)9	79(CO)11

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

ALARM SYSTEMS

Part One: General Requirements

Section Three - Environmental testing

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1. Scope

This standard specifies environmental test methods to be used for testing system components of an alarm system.

This standard does not preclude the use of other environmental exposures having special characteristics suitable for the evaluation of special environmental conditions.

Requirements, performance criteria, test schedules, etc., are not covered by this standard, but are to be given in the specific standards for the particular alarm systems and/or components.

This standard shall be used in conjunction with the following IEC publications.

Publications:

839-1-1: Alarm systems, Part 1: General requirements. Section One - General. (Under consideration.)

801-1 (1984): Electromagnetic compatibility for industrial-process measurement and control equipment, Part 1: General introduction.

2. Object

The object of this standard is to provide a standard range of tests to determine the suitability of components and equipment for use, storage and transportation under various environmental conditions.

3. Reference documents

Publications:

68: Basic environmental testing procedures.

68-1 (1982): Part 1: General and guidance.

529 (1976): Classification of degrees of protection provided by enclosures.

654: Operating conditions for industrial-process measurement and control equipment.

721: Classification of environmental conditions.

801-2 (1984): Electromagnetic compatibility for industrial-process measurement and control equipment, Part 2: Electrostatic discharge requirements.

801-3 (1984): Part 3: Radiated electromagnetic field requirements.

4. General considerations

4.1 This standard contains a selection of environmental test methods taken from other standards including IEC Publication 68.

4.2 The selected test methods have been found suitable for testing components of an alarm system and have the necessary reproducibility and severities suitable for this field of application.

For general guidance on environmental testing, reference should be made to IEC Publication 68-1.

For specific guidance on the various environmental test methods used in this standard, reference should be made to the description of the relevant test.

4.3 *Classification of tests*

This standard specifies a range of test methods with a number of test severities in order to cover the need for relevant tests for each system component.

The aim of each test is characterized by allocation of the test to one of the following two test classes:

a) Class A - Operation tests

The object of a test in Class A is:

i) to demonstrate the ability of the specimen to operate correctly under the influence of the normal service environment and/or

ii) to demonstrate the immunity of the specimen to false alarm under the influence of a particular service environment.

The test specimen is exposed to an environment corresponding in its effects to the normal service environment.

b) Class B - Accelerated tests

The object of a test in Class B is to demonstrate the ability of the specimen to survive under the influence of an artificial environment more severe than the normal service environment.

The test specimen is subjected to exposures, which are intentionally more severe that the service environment, in order to give information about the long-term stability.

The specimen shall be switched off during all Test B exposures.

See Appendix B of IEC Publication 68-1.

4.4 *Identification of tests*

References in other parts of the standard to a specific environmental test in this part of the standard shall be identified as follows:

- *Example*: IEC 839-1-3/ A - 1/1

  This part
  Test class, for example A: Operation tests
  Test serial number
  Test severity, for example 1: 40 °C/2 h

  Reference "A-1/1" in this example identifies the relevant test method and severity in Test A-1 (see Sub-clause 5.2).

  A higher severity number does not necessarily mean a more severe test.

4.5 *Recommendations for basic requirements*
(to be incorporated in the specific standards)

Test	Method	Severity	
		Indoor	Outdoor
a)	Operation tests		
A- 1	Dry heat	3	5
A- 2	Cold	6	7
A- 3	Shock	1	1
A- 4	Vibration (sinusoidal)	2	2
A- 5	Random vibration	-	-
A- 6	Damp heat, steady state	2	2
A- 7	Damp heat, cyclic	1	2
A- 8	Variation in power supply	See Test A-8	
A- 9	Electrical spikes	6	
A-10	Electrical sparks	1	1
A-11	Electrostatic discharge (ESD)	4	4
A-12a	Short-time interruptions in a.c. mains voltage	4	4
A-13	Electromagnetic fields	4	4
A-14	Stray light	-	-
A-15	Insulation resistance	1	1
A-16	Impact	1	1
A-17	Air velocity	-	-
A-18	Free fall	3	3
A-19	Enclosure protection (liquids)	-	-
b)	Accelerated tests		
B-1	Dry heat	-	5
B-2	Damp heat, steady state	1	1
B-3	Damp heat, cyclic	1	2
B-4	Sinusoidal vibration	2	2
B-5	Random vibration	2	2
B-6	Corrosion, SO_2	6	6
B-7	Corrosion, H_2S	-	-
B-8	Dielectric strength	1	1

5. Requirements

5.1 *Environmental conditions*

Equipment for use in hostile environments such as cold stores, plating shops or corrosive atmospheres shall be to an appropriate specification or be provided with special protection to take account of the particular hazards.

Where high levels of interference from other equipment or external sources such as lightning or power supply transients are likely, special care shall be taken in the design and installation of the alarm equipment to reduce the possibility of interference signals affecting the normal operation of the system.

For other details refer to the specific rules for the devices and to the test mentioned in this standard.

5.2 *Operation tests*

Test:	A-1
Test method:	Dry heat.
Reference to standard:	IEC Publication 68-2-2, fourth edition (1974), Part 2: Tests - Test Bd: Dry heat, for heat-dissipating specimen with gradual change of temperature.
Object of the test:	To determine the suitability of components, equipment and other articles for operation under conditions of high temperature. Background information concerning the dry heat test is given in IEC Publication 68-3-1, first edition (1974), Part 3: Background information. Section One - Cold and dry heat tests.
Test procedure in brief:	The test consists of exposure to the specified high temperature under "free air" conditions for the time specified. The time shall be long enough for the specimen to achieve temperature stability. Special preconditioning may be specified. The rate of change of temperature shall not exceed 1 °C/min. The humidity content of the test atmosphere shall not exceed 20 g/m³.
Detail specification:	For full test details, reference should be made to the IEC publication stated above and the detail specification of this test in the relevant part of the standard.
Test severities:	The following severities can be specified:

Severity	1	2	3	4	5	6	7	8	9
Temperature (°C)	40	55	40	55	70	*			
Duration (h) **	2	2	16	16	2	2			

* To be given in the specific standards for the particular alarm systems and/or components.

** After temperature stability is reached.

Test: A-2

Test method: Cold.

Reference to standard: IEC Publication 68-2-1, fourth edition (1974), Part 2: Tests - Test Ad: Cold for heat-dissipating specimen with gradual change of temperature.

Object of the test: To determine the suitability of components, equipment and other articles for operation under conditions of low temperature.

Background information concerning the cold test is given in IEC Publication 68-3-1, first edition (1974), Part 3: Background information. Section One - Cold and dry heat tests.

Test procedure in brief: The test consists of exposure to the specified low temperature under "free air" conditions for the time specified. The time shall be long enough for the specimen to achieve temperature stability.

Special preconditioning may be specified. The rate of change of temperature shall not exceed 1 °C/min to avoid temperature shock.

Detail specification: For full test details, reference should be made to the IEC publication stated above and the detail specification of this test in the relevant part of the standard.

Test severities: The following severities can be specified:

Severity	1	2	3	4	5	6	7	8	9	10
Temperature (°C)	+5	+5	0	0	-10	-10	-25	-25	-40	-40
Duration (h) *	2	16	2	16	2	16	2	16	2	16

* After temperature stability is reached.

Test: A-3

Test method: Shock.

Reference to standard: IEC Publication 68-2-27, second edition (1972), Part 2: Tests - Test Ea: Shock.

Object of the test: To determine the suitability of components, equipment and other articles for operation under conditions of mechanical shock.

Test procedure in brief: The test consists of exposure to a number of shocks with a fixed peak acceleration and time duration.

The shock pulse has a half-sine time response. The specimen shall, in turn, be subjected to shocks in both directions of each of three mutually perpendicular axes. The specimen shall be mounted on a stiff fixture by its normal mounting means. The specimen shall be switched on during the test.

Detail specification: For full test details, reference should be made to the IEC publication stated above, and the detail specification of this test in the relevant part of the standard.

Test severities: The following severities can be specified:

Severity	1	2
Shock impulse	Half sine	Half sine
Level ($m.s^{-2}$) (g)	500 (50)	1 000 (100)
Duration (ms)	11	6
Number of shocks per direction	3	3
Number of directions	6	6

Test: A-4

Test method: Vibration (sinusoidal).

Reference to standard: IEC Publication 68-2-6, fifth edition (1982), Part 2: Tests - Test Fc and guidance: Vibration (sinusoidal).

Object of the test: To determine the suitability of components, equipment and other articles for use and operation under conditions of vibration.

Test procedure in brief: The test consists of exposure to the vibration level for a time long enough for testing the various functions of the specimen during the exposure. The specimen shall, in turn, be tested in three mutually perpendicular axes mounted on a rigid fixture by its normal mounting means. The specimen shall be switched on during the test.

The equipment shall normally be mounted so that the gravitational force acts in the same direction as it would in normal use. Where the effect of gravitational force is not important, the equipment may be mounted in any attitude.

Detail specification: For full test details, reference should be made to the IEC publication stated above, and the detail specification of this test in the relevant part of the standard.

Test severities: The following severities can be specified:

Severity	1	2	3	4
Frequency (Hz)	10 to 55	10 to 55	10 to 150	10 to 150
Level ($m.s^{-2}$) (g)	0.981 (0.1)	9.81 (1)	0.981 (0.1)	9.81 (1)
Number of axes	3	3	3	3
Number of sweep cycles per axis	One sweep cycle in each functional mode as defined in the specific standards for alarm systems and/or components			