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Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-4: Specification of environmental tests; Stationary use at non-weatherprotected locations

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European Standard (Telecommunications series)

**Environmental Engineering (EE);
Environmental conditions and environmental tests
for telecommunications equipment;
Part 2-4: Specification of environmental tests;
Stationary use at non-weatherprotected locations**

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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Contents

Intellectual Property Rights	4
Foreword.....	4
1 Scope	5
2 References	5
3 Environmental test specifications.....	5
3.1 Specification T 4.1: Non-weatherprotected locations, climatic tests.....	6
3.2 Specification T 4.1E: Non-weatherprotected locations - extended, climatic tests.....	8
3.3 Specification T 4.2L: Non-weatherprotected locations – extremely cold, climatic tests.....	10
3.4 Specification T 4.2H: Non-weatherprotected locations – extremely warm dry, climatic tests.....	12
3.5 Specification T 4.1, 4.1E, 4.2L and 4.2H: Non-weatherprotected locations - mechanical tests.....	14
4 Earthquake test specification.....	15
4.1 Vibration response investigation	15
4.2 Test conditioning.....	15
5 Notes to tables	17
5.1 General note	17
5.2 Notes to tables 1 to 6.....	18
Annex A (informative): Bibliography.....	20
History	21

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Environmental Engineering (EE).

The present document is part 2, sub-part 4 of a multi-part deliverable covering the classification of environmental conditions and environmental tests for telecommunications equipment, as identified below:

Part 1: "Classification of environmental conditions"; (see note 1)

Part 2: "Specification of environmental tests"; (see note 2)

Sub-part 0: "Introduction";

Sub-part 1: "Storage";

Sub-part 2: "Transportation";

Sub-part 3: "Stationary use at weatherprotected locations";

Sub-part 4: "Stationary use at non-weatherprotected locations";

Sub-part 5: "Ground vehicle installations";

Sub-part 6: "Ship environments";

Sub-part 7: "Portable and non-stationary use";

Sub-part 8: "Stationary use at underground locations".

NOTE 1: Specifies different standardized environmental classes covering climatic and biological conditions, chemically and mechanically active substances and mechanical conditions during storage, transportation and in use.

NOTE 2: Specifies the recommended test severities and test methods for the different environmental classes.

National transposition dates

Date of adoption of this EN:	21 March 2003
Date of latest announcement of this EN (doa):	30 June 2003
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2003
Date of withdrawal of any conflicting National Standard (dow):	31 December 2003

1 Scope

The present document specifies test methods and severities for verification of the required resistibility of equipment according to the relevant environmental class.

The tests defined in Part 2-4 of this multi-part standard apply to stationary use of equipment at non-weatherprotected locations covering the environmental conditions stated in EN 300 019-1-4 [1].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] ETSI EN 300 019-1-4: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions; Stationary use at non-weatherprotected locations".
- [2] IEC 60068-2: "Environmental testing - Part 2: Tests".
- [3] ETSI EN 300 019-2-0: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-0: Specification of environmental tests; Introduction".
- [4] IEC 60721-3-4: "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 4: Stationary use at non-weatherprotected locations".
- [5] ANSI T1.329-2000: "Network Equipment Earthquake Resistance Standard".

3 Environmental test specifications

The detailed descriptions of the environmental conditions are given in clauses 4 and 5 of EN 300 019-1-4 [1].

EN 300 019-2-0 [3] forms a general overview of Part 2 of the present document.

The equipment under test is assumed to be in its operational state throughout the test conditions described in the present document unless otherwise stated. The required performance before, during and after the test need to be specified in the product specification. Input and load conditions of the equipment shall be chosen to obtain full utilization of the equipment under test. The heat dissipation shall be maximized, except for the steady state, low temperature test, where it shall be minimized.

3.1 Specification T 4.1: Non-weatherprotected locations, climatic tests

This specification applies to most of Europe as described in EN 300 019-1-4 [1] (see tables 1).

Table 1: Test specification T 4.1: Stationary use at non-weatherprotected locations-climatic tests

Environmental parameter			Environmental Class 4.1	Environmental test specification T4.1: Stationary use, Non-weatherprotected locations					
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes (see clause 5)	
Air temperature	Low	(°C)	-33	-33 or -45	16 h	IEC 60068-2-1 [2]	Ab/Ad: Cold	1	
	High	(°C)	+40	+40 or +55	16 h	IEC 60068-2-2 [2]	Bb/Bd: Dry heat	2	
	Change	(°C) (°C/min)	0,5	-10/+40 0,5	2 cycles t ₁ = 3 h	IEC 60068-2-14 [2]	Nb: Change of temperature	3	
Humidity	Relative	low	(%)	15	none			8	
		high	(%)	100	93	10 d	IEC 60068-2-56 [2]	Cb: Damp heat steady state	4
		condensation	(°C)	yes	+30				5
	Absolute	low	(g/m ³)	0,26	90-100	2 cycles	IEC 60068-2-30 [2]	Db: Damp heat, cyclic Variant 1	
high		(g/m ³)	25	+30				6	
Air	Pressure	low	(kPa)	70	none			7	
		high	(kPa)	106	none			7	
	Speed	(m/s)	50	none				8	
Water	Rain	intensity	6 mm/min	0,01 m ³ /min 90 kPa	3 min/m ² or 15 min	IEC 60068-2-18 [2]	Rb: Impacting water Method 2.2	9	
		low temperature	(°C)	+5	none				
	Other sources	splashing water						10	
	Icing & frosting		yes	none				8	
Radiation	Solar	(W/m ²)	1 120					11	
	Heat	(W/m ²)	negligible						

Environmental parameter			Environmental Class 4.1	Environmental test specification T4.1: Stationary use, Non-weatherprotected locations				
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes (see clause 5)
Chemically active substances	Sulphur	SO ₂ (mg/m ³)	0,3/1,0	none				12
		H ₂ S (mg/m ³)	0,1/0,5	none				12
	Chlorine	salt mist	sea and road salt	none				12
		Cl ₂ (mg/m ³)	0,1/0,3	none				12
		HCl (mg/m ³)	0,1/0,5	none				12
	Nitrogen	NO _x (mg/m ³)	0,5/1,0	none				12
		NH ₃ (mg/m ³)	1,0/3,0	none				12
	Hydrogen fluoride HF	(mg/m ³)	0,01/0,03	none				12
Ozone O ₃	(mg/m ³)	0,05/0,1	none				12	
Mechanically active substances	Dust	Sedimentation (mg/(m ² h))	20					13
		suspension (mg/m ³)	5					13
	Sand	(mg/m ³)	300					13
Flora and fauna	Micro organisms		mould, fungus, etc.	none				14
	Rodents, insects		rodents, etc.	none				14

NOTE 1: none = verification is required only in special cases.
NOTE 2: n = number of note, see clause 5.

3.2 Specification T 4.1E: Non-weatherprotected locations - extended, climatic tests

This specification covers most of Europe as described in EN 300 019-1-4 [1] (see tables 2).

Table 2: Test specification T 4.1E: Stationary use at non-weatherprotected locations, extended - climatic tests

Environmental parameter			Environmental Class 4.1E	Environmental test specification T4.1E: Stationary use Non-weatherprotected locations - extended				
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes (see clause 5)
Air temperature	Low	(°C)	-45	-45 or -55	16 h	IEC 60068-2-1 [2]	Ab/Ad: Cold	1
	High	(°C)	+45	+45 or +60	16 h	IEC 60068-2-2 [2]	Bb/Bd: Dry heat	2
	Change	(°C) (°C/min)	0,5	-10/+45 0,5	2 cycles t1 = 3 h	IEC 60068-2-14 [2]	Nb: Change of temperature	3
Humidity	Relative	low (%)	8	none				8
		high (%)	100	93	10 d	IEC 60068-2-56 [2]	Cb: Damp heat steady state	4
		condensation (°C)	yes	+30	2 cycles	IEC 60068-2-30 [2]	Db: Damp heat cyclic Variant 1	5
	Absolute	low (g/m ³)	0,03	90-100 +30				6
		high (g/m ³)	30					
Air	Pressure	low (kPa)	70	none				7
		high (kPa)	106	none				7
	Speed	(m/s)	50	none				8
Water	Rain	intensity	15 mm/min	0,01 m ³ /min 90 kPa	6 min/m ² or 30 min	IEC 60068-2-18 [2]	Rb: Impacting water Method 2.2	9
		low temperature (°C)	+5	none				
	Other sources Icing & frosting		splashing water yes	none				10 8
Radiation	Solar	(W/m ²)	1120					11
	Heat	(W/m ²)	negligible					

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Environmental parameter			Environmental Class 4.1E			Environmental test specification T4.1E: Stationary use Non-weatherprotected locations - extended		
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes (see clause 5)
Chemically active substances	Sulphur	SO ₂ (mg/m ³)	0,3/1,0	none				12
		H ₂ S (mg/m ³)	0,1/0,5	none				12
	Chlorine	salt mist	sea and road salt	none				12
		Cl ₂ (mg/m ³)	0,1/0,3	none				12
		HCl (mg/m ³)	0,1/0,5	none				12
	Nitrogen	NO _x (mg/m ³)	0,5/1,0	none				12
		NH ₃ (mg/m ³)	1,0/3,0	none				12
	Hydrogen fluoride HF	(mg/m ³)	0,01/0,03	none				12
Ozone O ₃	(mg/m ³)	0,05/0,1	none				12	
Mechanically active substances	Dust	Sedimentation (mg/(m ² h))	20					13
		Suspension (mg/m ³)	5					13
	Sand	(mg/m ³)	300					13
Flora and fauna	Micro organisms	mould, fungus, etc.	none					14
	Rodents, insects	rodents, etc.	none					14

NOTE 1: none = verification is required only in special cases.

NOTE 2: n = number of note, see clause 5.

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