



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

Final draft (Standard) ETSI EN 300 019-2-4 V2.3.1 (2013-06)
https://standards.iteh.ai/catalog/standards/si/2ce33d1-74e8-4815-8373-e1c65583b73d/etsi-en-300-019-2-4-v2-3-1-2013-06

Reference

REN/EE-01049

Keywords

environment, testing

ETSI

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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Foreword

This final draft European Standard (EN) has been produced by ETSI Technical Committee Environmental Engineering (EE), and is now submitted for the Vote phase of the ETSI standards EN Approval Procedure.

The present document is part 2, sub-part 4 of a multi-part deliverable. Full details of the entire series can be found in part 2, sub-part 0 [i.1].

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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 the present document apply to stationary use of equipment at non-weatherprotected locations covering the environmental conditions stated in EN 300 019-1-4 [1].

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [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 60068-2-1 (03-2007): "Environmental testing, Part 2-1: Tests - Test A: Cold".
- [3] Void.
- [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 T1.0600329 (2008): "Network Equipment - Earthquake Resistance Standard".
- [6] Void.
- [7] IEC 60068-2-2 (07-2007): "Environmental testing, Part 2-2: Tests - Test B: Dry heat".
- [8] IEC 60068-2-14 (01-2009): "Environmental testing - Part 2-14: Tests - Test N: Change of temperature".
- [9] IEC 60068-2-30 (08-2005): "Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)".
- [10] IEC 60068-2-64 (04-2008): "Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance".
- [11] IEC 60068-2-27 (02-2008): "Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock".
- [12] IEC 60068-2-6 (12-2007): "Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)".
- [13] IEC 60068-2-57 (11-1999): "Environmental testing - Part 2-57: Tests - Test Ff: Vibration - Time-history method".
- [14] Void.

- [15] IEC 60068-2-18 (10-2000): "Environmental testing - Part 2-18: Tests - Test R and guidance: Water".
- [16] IEC 60068-2-78 (08-2001): "Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] 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".
- [i.2] IEC 60068-2-68 (8-1994): "Environmental testing - Part 2: Tests - Test L: Dust and sand".

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 [i.1] forms a general overview of part 2 of this multipart deliverable.

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.

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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 table 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 T 4.1: Stationary use, Non-weatherprotected locations				
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes
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 [7]	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 [8]	Nb: Change of temperature	3
Humidity	Relative	Low (%)	15	none				8
		high (%)	100	93	10 d	IEC 60068-2-78 [16]	Cab: Damp heat steady state	4
		condensation (°C)	yes	+30				
	Absolute	(%)		90-100	2 cycles	IEC 60068-2-30 [9]	Db: Damp heat, cyclic Variant 1	5
		(°C)		+30				
Air	Pressure	Low (g/m ³)	0,26	none				
		high (g/m ³)	25					6
	Speed	(kPa)	70	none				7
Water	Rain	high (kPa)	106	none				7
		(m/s)	50	none				8
	Intensity	6 mm/min	0,01 m ³ /min 90 kPa	3 min/m ² or 15 min	IEC 60068-2-18 [15]	Rb: Impacting water Method 1	9	
Other sources	low temperature (°C)	+5	none					
Icing & frosting		splashing water						10
Radiation	Solar		yes	none				8
		(W/m ²)	1 120					11
Heat	(W/m ²)	negligible						

Environmental parameter			Environmental Class 4.1	Environmental test specification T 4.1: Stationary use, Non-weatherprotected locations				
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes
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 (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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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 table 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 T 4.1E: Stationary use Non-weatherprotected locations - extended				
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes
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 [7]	Bb/Bd: Dry heat	2
	Change	(°C) (°C/min)	0,5	-10/+45 0,5	2 cycles t1 = 3 h	IEC 60068-2-14 [8]	Nb: Change of temperature	3
Humidity	Relative	low (%)	8	none				8
		high (%)	100	93	10 d	IEC 60068-2-78 [16]	Cab: Damp heat steady state	4
		condensation (°C)	yes	+30	2 cycles	IEC 60068-2-30 [9]	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 [15]	Rb: Impacting water, method 1	9
		low temperature (°C)	+5	none				
	Other sources Icing & frosting		splashing water yes	none				10 8
Radiation	Solar	(W/m ²)	1 120					11
	Heat	(W/m ²)	negligible					

Environmental parameter			Environmental Class 4.1E	Environmental test specification T 4.1E: Stationary use Non-weatherprotected locations – extended					
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes	
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 (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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