



**Environmental Engineering (EE);
Environmental conditions and environmental tests
for telecommunications equipment;
Part 2-1: Specification of environmental tests;
Storage**

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Foreword

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

The present document is part 2, sub-part 1 of a multi-part deliverable covering the environmental conditions and environmental tests for telecommunications equipment, as identified below:

Part 1: "Classification of environmental conditions";

Part 2: "Specification of environmental tests":

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".

Part 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.

Part 2 specifies the recommended test severities and test methods for the different environmental classes.

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 severities and methods for verification of the required resistibility of equipment according to the relevant environmental class.

The tests defined in the present document apply to storage of equipment covering the environmental conditions stated in EN 300 019-1-1 [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.

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

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

2.1 Normative references

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

- [1] ETSI EN 300 019-1-1 (2013): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-1: Classification of environmental conditions; Storage".
- [2] Void.
- [3] Void.
- [4] IEC 60068-2-1:2007: "Environmental testing - Part 2-1: Tests - Test A: Cold".
- [5] IEC 60068-2-2:2007: "Environmental testing - Part 2-2: Tests - Test B: Dry heat".
- [6] IEC 60068-2-6:2007: "Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)".
- [7] IEC 60068-2-14:2009: "Environmental testing - Part 2-14: Tests - Test N: Change of temperature".
- [8] IEC 60068-2-18:2000: "Environmental testing - Part 2-18: Tests - Test R and guidance: Water".
- [9] IEC 60068-2-27:2008: "Environmental testing. Part 2-27: Tests - Test Ea and guidance: Shock".
- [10] IEC 60068-2-30:2005: "Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 + 12 hour cycle)".
- [11] IEC 60068-2-78:2012: "Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state".
- [12] IEC 60068-2-64:2008: "Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance".

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 (2003): "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-0: Specification of environmental tests; Introduction".
- [i.2] IEC 60068-2-68:1994: "Environmental testing - Part 2: Tests - Test L: Dust and sand".
- [i.3] IEC 60068-2: "Environmental testing - Part 2: Tests".

3 Environmental test specifications

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

EN 300 019-2-0 [i.1] forms a general overview of part 2 of the present document.

If the equipment is normally stored in a packed state then it shall be tested in its packaging.

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3.1 Specification T 1.1: Weatherprotected, partly temperature-controlled storage locations

This specification shall apply to weatherprotected or partially weather-controlled storage locations having partially temperature or humidity control. See tables 1 and 2.

Table 1: Test specification T 1.1: Weatherprotected, partly temperature-controlled storage locations - climatic tests

Environmental parameter			Environmental Class 1.1	Environmental test specification T1.1: Weatherprotected, partly temperature-controlled storage locations					
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes	
Air temperature	low	(°C)	-5	-5	72 h	IEC 60068-2-1 [4]	Ab: Cold		
	high	(°C)	+45	+45 or +55	72 h	IEC 60068-2-2 [5]	Bb: Dry heat	2	
	change	(°C/min)	0,5	none				3	
Humidity	relative	low	(%)	5	none			10	
		high	(%)	95	93	96 h	IEC 60068-2-78 [11]	Cab: Damp heat steady state	5
	absolute	condensation		yes	none				6
		low	(g/m ³)	1	none				10
		high	(g/m ³)	29					8
Air	pressure	low	(kPa)	70	none			9	
		high	(kPa)	106	none			9	
	speed	(m/s)	1	none				10	
Water	rain	intensity		no					
		low temperature		no					
	other sources		no						
	icing & frosting		yes					10	
Radiation	solar	(W/m ²)	700					13	
	heat	(W/m ²)	600					13	

Environmental parameter			Environmental Class 1.1	Environmental test specification T1.1: Weatherprotected, partly temperature-controlled storage 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				14
		H ₂ S (mg/m ³)	0,1/0,5	none				14
	chlorine	salts	sea and road salt mist	none				14
		Cl ₂ (mg/m ³)	0,1/0,3	none				14
		HCl (mg/m ³)	0,1/0,5	none				14
	nitrogen	NO _x (mg/m ³)	0,5/1,0	none				14
		NH ₃ (mg/m ³)	1,0/3,0	none				14
	hydrogen fluoride	HF (mg/m ³)	0,01/0,03	none				14
ozone	O ₃ (mg/m ³)	0,05/0,1	none				14	
Mechanically active substances	dust	Sedimentation (mg/(m ² h))	1,5	none				15
		suspension (mg/m ³)	0,2	none				15
	sand	(mg/m ³)	30	none				15
Flora and Fauna	micro organisms		negligible					
	rodents, insects		negligible					
no = this condition does not occur in this class.								
NOTE: (n = number of note), see clause 4.2.								

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Table 2: Test specification T 1.1: Weatherprotected, partly temperature-controlled storage locations - mechanical tests

Environmental parameter			Environmental Class 1.1	Environmental test specification T 1.1: Weatherprotected, partly temperature-controlled storage locations					
Type	Parameter	Detail parameter	Characteristic severity	Test severity		Duration	Reference	Method	Notes
Vibration	sinusoidal	velocity (mm/s)	1,5	5	2	3 x 5 sweep cycles	IEC 60068-2-6 [6]	Fc: Vibration (sinusoidal)	17
		displacement (mm)							
		acceleration (m/s ²)	2-9	9-200					
		frequency range (Hz)							
		axes of vibration							
	random	ASD (m ² /s ³)			0,02		IEC 60068-2-64 [12]	Fh: Vibration, broad-band random (digital control)	18
		(dB/oct)			+12	-12			
		frequency range (Hz)			5-10	10-50	50-100		
		axes of vibration							
Shocks	shocks	shock spectrum	Type L		none				19a
		duration (ms)	22						
		acceleration (m/s ²)	40						
		number of shocks							
		directions of shocks							
Load	static load	(kPa)	5		none				20

no = this condition does not occur in this class.
NOTE: (n = number of note), see clause 4.2.

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3.2 Specification T 1.2: Weatherprotected, not temperature-controlled storage locations

This specification shall apply to weatherprotected or partially weatherprotected storage locations having neither temperature nor humidity control. See tables 3 and 4.

Table 3: Test specification T 1.2: Weatherprotected, not temperature-controlled storage locations - climatic tests

Environmental parameter			Environmental Class 1.2	Environmental test specification T1.2: Weatherprotected, not temperature-controlled storage locations					
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes	
Air temperature	low	(°C)	-25	-25	72 h	IEC 60068-2-1 [4]	Ab: Cold		
	high	(°C)	+55	+55 or +70	72 h	IEC 60068-2-2 [5]	Bb: Dry heat	2	
	change	(°C/min)	0,5	none				3	
Humidity	relative	low	(%)	10	none			10	
		high	(%)	100	93	96 h	IEC 60068-2-78 [11]	Cab: Damp heat steady state	5
		condensation	(°C)	yes	+30				7
	absolute	low	(g/m ³)	0,5	90-100	2 cycles	IEC 60068-2-30 [10]	Db: Damp heat cyclic Variant 1	
		high	(g/m ³)	29	+30				10
Air	pressure	low	(kPa)	70	none			9	
		high	(kPa)	106	none			9	
	speed	(m/s)	30	none				10	
Water	rain	intensity		no					
		low temperature		no					
	other sources icing & frosting			dripping water yes				8 10	
Radiation	solar	(W/m ²)	1 120					13	
	heat	(W/m ²)	600					13	