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Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-3: Specification of environmental tests; Stationary use at weatherprotected locations

Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-3: Specification of environmental tests; Stationary use at weatherprotected locations

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European Standard (Telecommunications series)

**Environmental Engineering (EE);
Environmental conditions and environmental tests
for telecommunications equipment;
Part 2-3: Specification of environmental tests;
Stationary use at weatherprotected locations**

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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 3 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 latest announcement of this EN (doa):	31 July 2003
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2004
Date of withdrawal of any conflicting National Standard (dow):	31 January 2004

1 Scope

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

The tests in Part 2-3 of this multi-part EN apply to stationary use of equipment at weatherprotected locations covering the environmental conditions stated in EN 300 019-1-3 [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 300 019-1-3: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions; Stationary use at 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 60721-3-3: "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 3: Stationary use at weatherprotected locations".
- [5] ETSI ETR 035: "Equipment Engineering (EE); Environmental engineering Guidance and terminology".

3 Environmental test specifications

The detailed descriptions of the environmental conditions are in clauses 4 and 5 of EN 300 019-1-3 [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 this part unless otherwise stated. The required performance before, during and after the test needs 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 Specifications T 3.1 and T 3.1E: Temperature-controlled locations

Specification T 3.1: Temperature-controlled locations - normal operating conditions.

This specification applies to permanently temperature-controlled enclosed locations where humidity is usually not controlled. See tables 1 and 2.

Table 1: Test specification T 3.1: Temperature-controlled locations - climatic tests

Environmental parameter			Environmental Class 3.1	Environmental test specification T3.1: In-use, Temperature-controlled locations					
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes	
Air temperature	Low	(°C)	+5	+5	16 h	IEC 60068-2-1 [2]	Ab/Ad: Cold	1	
	High	(°C)	+40	+40 or +50	16 h	IEC 60068-2-2 [2]	Bb/Bd: Dry heat	2	
	Change	(°C) (°C/min)	0,5	+25/+40 0,5	half cycle t ₁ = 3 h	IEC 60068-2-14 [2]	Nb: Change of temperature	3	
Humidity	Relative	low	(%)	5	none			4	
		high	(%)	85	85	4 d	IEC 60068-2-56 [2]	Cb: Damp heat steady state	5
		condensation		no					
	Absolute	low	(g/m ²)	1	none				4
		high	(g/m ²)	25					7
Air	Pressure	low	(kPa)	70	none			8	
		high	(kPa)	106	none			8	
	Speed	(m/s)	5,0	none				4	
Water	Rain	intensity		no					
		low temperature		no					
	Other sources			no					
	Icing & frosting			no					
Radiation	Solar	(W/m ²)	700					10	
	Heat	(W/m ²)	600					11	

Environmental parameter			Environmental Class 3.1	Environmental test specification T3.1: In-use, Temperature-controlled 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 (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))	1,5	none				12	
		suspension (mg/m ³)	0,2	none				13	
	Sand (mg/m ³)	30	none					13	
Flora and fauna	Micro organisms		negligible						
	Rodents, insects		negligible						

NOTE 1: no = this condition does not occur in this class.
NOTE 2: none = verification is required only in special cases.
NOTE 3: n = number of note, see clause 5.

Table 2: Test specification T 3.1: Temperature-controlled locations - mechanical tests

Environmental parameter			Environmental Class 3.1	Environmental test specification T 3.1: In-use, Temperature-controlled locations				
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes
Vibration	Sinusoidal	displacement (mm) acceleration (m/s ²) frequency range (Hz) axes of vibration	0,3 1,0 2-9 9-200	none				15
Shocks	Shocks	shock spectrum duration (ms) acceleration (m/s ²) number of shocks direction of shocks	Type L 22 40	half sine 11 30 6		IEC 60068-2-27 [2]	Ea: Shock	18

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

Specification T 3.1E: Temperature-controlled locations - exceptional operating conditions.

This specification applies to permanently temperature-controlled locations where humidity is usually not controlled. The reference class is the same as for T 3.1, but the test specification relates to reduced performance requirements. See table 3.

Table 3: Test specification T 3.1E: Temperature-controlled locations, exceptional operating conditions - climatic tests

Environmental parameter			Environmental Condition 3.1E	Environmental test specification T 3.1E: In-use, Temperature-controlled locations - Exceptional.				
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes
Air temperature	Low	(°C)	-5	-5	16 h	IEC 60068-2-1 [2]	Ab/Ad: Cold	1
	High	(°C)	+45	+45 or +55	16 h	IEC 60068-2-2 [2]	Bb/Bd: Dry heat	2
	Change	(°C) (°C/min)	0,5	+25/+45 0,5	half cycle t ₁ = 3 h	IEC 60068-2-14 [2]	Nb: Change of temperature	3
Humidity	Relative	low (%)	5	none				4
		high (%)	90	93	4 d	IEC 60068-2-56 [2]	Cb: Damp heat steady state	5
		condensation	no					
	Absolute	low (g/m ³)	1	none				4
		high (g/m ³)	25					7
Radiation	Solar	(W/m ²)	700					10
	Heat	(W/m ²)	600					11

NOTE 1: no = this condition does not occur in this class.
NOTE 2: none = verification is required only in special cases.
NOTE 3: n = number of note, see clause 5.

3.2 Specification T 3.2: Partly temperature-controlled locations

This specification applies to enclosed locations having neither temperature nor humidity control, but where heating may be used to avoid low temperatures. The building construction avoids extremely high temperatures. See tables 4 and 5.

Table 4: Test specification T 3.2: Partly temperature-controlled locations - climatic tests

Environmental parameter			Environmental Class 3.2	Environmental test specification T3.2: In-use, Partly temperature-controlled locations				
Type	Parameter	Detail parameter	Characteristic severity	Test severity	Duration	Reference	Method	Notes
Air temperature	Low	(°C)	-5	-5	16 h	IEC 60068-2-1 [2]	Ab/Ad: Cold	1
	High	(°C)	+45	+45 or +55	16 h	IEC 60068-2-2 [2]	Bb/Bd: Dry heat	2
	Change	(°C) (°C/min)	0,5	+25/+55 or +25/+45 0,5	half cycle $t_1 = 3$ h	IEC 60068-2-14 [2]	Nb: Change of temperature	3
Humidity	Relative	low (%)	5	none				4
		high (%)	95	93	4 d steady state	IEC 60068-2-56 [2]	Cb: Damp heat	5
		condensation (°C) (%)	yes	+30° 90-100	1 cycle	IEC 60068-2-30 [2]	Db: Damp heat cyclic Variant 1	6
	Absolute	low (g/m ³)	1	none				4
		high (g/m ³)	29					7
Air	Pressure	low (kPa)	70	none				8
		high (kPa)	106	none				8
	Speed	(m/s)	5,0	none				4
Water	Rain	intensity	no					
		low temperature	no					
	Other sources Icing & frosting		yes					4
Radiation	Solar	(W/m ²)	700					10
	Heat	(W/m ²)	600					11

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Environmental parameter			Environmental Class 3.2	Environmental test specification T3.2: In-use, Partly temperature-controlled 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)	0,5/5,0	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))	15					13
		suspension (mg/m ³)	0,4					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: no = this condition does not occur in this class. NOTE 2: none = verification is required only in special cases. NOTE 3: n = number of note, see clause 5.								

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