ETSI EN 300 019-2-6 V3.1.1 (2023-10)

Environmental Engineering (EE);
Environmental conditions and environmental tests for telecommunications equipment;
Part 2: Specification of environmental tests;
Sub-part 6: Ship environments

Reference
REN/EE-017011

Keywords
environment, maritime, testing

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Foreword

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

The present document is part 2, sub-part 6 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.

Part 2-0 [i.1] forms a general overview of part 2. The present document deals with ship environments.

National transposition dates	
Date of adoption of this EN:	24 October 2023
Date of latest announcement of this EN (doa):	31 January 2024
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 July 2024
Date of withdrawal of any conflicting National Standard (dow):	31 July 2024

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

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 defined in the present document apply to the use of telecommunication equipment installed permanently or temporarily in ships and cover the environments and the vessels stated in ETSI EN 300 019-1-6 [1].

2 References

2.1 Normative 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 referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://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.

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

[1] ETSI EN 300 019-1-6: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-6: Classification of environmental conditions; Ship environments".

[2] IEC 60068-2-1 (03-2007): "Environmental testing - Part 2-1: Tests - Test A: Cold".

[3] IEC 60068-2-2 (07-2007): "Environmental testing - Part 2-2: Tests - Test B: Dry heat".

[4] IEC 60068-2-78 (10-2012): "Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state".

[5] IEC 60068-2-14 (01-2009): "Environmental testing - Part 2-14: Tests - Test N: Change of temperature".

[6] IEC 60068-2-30 (08-2005): "Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)".

[7] IEC 60068-2-18 (03-2017): "Environmental testing - Part 2-18: Tests - Test R and guidance: Water".

[8] IEC 60068-2-6 (12-2007): "Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)".

[9] IEC 60068-2-27 (02-2008): "Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock".

2.2 Informative 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 referenced document (including any amendments) applies.

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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: Specification of environmental tests; Sub-part 0: Introduction".

[i.2] IEC 60068-2 (all parts): "Environmental testing - Part 2: Tests".

[i.3] ETSI EN 300 019-1-0: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-0: Classification of environmental conditions; Introduction".

[i.4] IEC 60068-2-52:2017: "Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)".

[i.5] IEC 60068-2-68:1994: "Environmental testing - Part 2-68: Tests - Test L: Dust and sand".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI EN 300 019-1-0 [i.3] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI EN 300 019-1-0 [i.3] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 300 019-1-0 [i.3] apply.

4 Environmental test specification

4.0 General

The equipment shall be tested in its operational state throughout the test conditions described in the present document. The detailed descriptions of the environmental conditions shall refer to clauses 4 and 5 of ETSI EN 300 019-1-6 [1].

ETSI EN 300 019-2-0 [i.1] forms a general overview of part 2 of this multi-part deliverable.

4.1 Equipment setup and configuration

The equipment shall be tested in its operational state throughout the test conditions described in the present document unless otherwise stated. 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.

4.2 Performance criteria

The following performance criteria shall apply in the tests defined by the present document.

Performance criterion A:

The equipment shall function according to the manufacturer specifications before, during and after the tests. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer when the equipment is used as intended. If the minimum performance level is not specified by the manufacturer, then this may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Performance criterion B:

The equipment shall function according to the manufacturer specifications before and after the tests. During the test it is not required to monitor the equipment functionality. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer when the equipment is used as intended. If the minimum performance level is not specified by the manufacturer, then this may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Performance criterion C:

The equipment shall function according to the manufacturer specifications before and after the tests. No degradation of performance or loss of function is allowed below the performance level specified by the manufacturer when the equipment is used as intended. If the minimum performance level is not specified by the manufacturer, then this may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

During the application of the test, temporary loss of function is allowed but after the test the equipment shall restore to the normal functionality without replacement of components, manual rebooting or human intervention.

The equipment shall sustain the test without permanent structural or mechanical damage.

Performance criterion D:

This performance criterion applies to the enclosure of the equipment. No corrosion traces (e.g. rust) or deterioration of the enclosure shall occur at the end of the test.

4.3 Specification T 6.1: Totally weatherprotected locations

The tests specifications T 6.1 of the present document shall apply to equipment, depending on the selected IEC mechanical class, installed in totally weatherprotected, heated and ventilated locations following warm-up on board engine-powered vessels but excluding refrigerated cargo spaces, machinery spaces and locations containing equipment dissipating considerable amounts of heat. This class does not cover Warm Damp and Warm Damp Equable climates. See tables 1 and 4.

4.4 Specification T 6.2: Partly weatherprotected locations

The tests specifications T 6.2 of the present document shall apply to equipment, depending on the selected IEC the mechanical class chosen, to equipment installed in any location on board engine-powered vessels - excluding refrigerated cargo spaces. The class applies in all climates with the exception of Cold climates and areas with abnormal rain intensities and hurricanes. The equipment may occasionally be subjected to heavy seas, See tables 2, 4 and 5.

4.5 Specification T 6.3: Non-weatherprotected locations

The tests specifications T 6.3 of the present document shall apply to equipment to equipment installed in any location on board engine-powered vessels, including refrigerated cargo spaces. This class applies in all climates including areas with abnormal rain intensities and hurricanes. The equipment may also be subjected to heavy seas, depending on the selected IEC mechanical class, see tables 3, 4 and 5.

4.6 Specification T 6.1: Totally weatherprotected locations climatic test

This specification in table 1 shall apply to a totally weatherprotected use in ships excluding described in ETSI EN 300 019-1-6 [1]. Warm Damp and Warm Damp Equable climates, see tables 1 and 4.

Table 1: Test specification T 6.1: Totally weatherprotected locations - climatic tests

Environmental parameter			Environmental Class 6.1	Environmental test specification T6.1: Ship, totally weatherprotected locations					
Type	**Parameter**	**Detail parameter**	**Characteristic severity**	**Test severity**	**Duration**	**Reference**	**Method**	**Performance Criterion**	**Notes**
Air temperature	low	(°C)	+5	+5	16 h	IEC 60068-2-1 [2]	Ab/Ad/Ae: Cold	A	1
	high	(°C)	+40	+40	16 h	IEC 60068-2-2 [3]	Bb/Bd/Be: Dry heat	A	2
	change	air/water (°C)	no						
	surface	high (°C)	no						
Humidity	relative	low (%)	10	none					3
		high; (%) slow temperature change (°C)	95 +30	93 +30	96 h	IEC 60068-2-78 [4]	Cb: Damp heat steady state	A	4
		high; (%) rapid temperature change (°C)	no						
	absolute	high; (g/m^3) rapid temperature change (°C)	no						
Air	speed	(m/s)	no						
Water	temperature	high (°C)	+30	none					3
		low (°C)	no						
	rain	intensity (mm/min) volume (m^3/min) pressure (kPa)	no						
	other sources	velocity (m/s)	no						
	wetness		no						
Radiation	solar	(W/m^2)	no						
	heat	(W/m^2)	no						
Chemically active substances	sulphur	SO_2 (mg/m^3)	0,1	none					5
		H_2S (mg/m^3)	0,01	none					5
	chlorine	sea salts	negligible						
		HCl (mg/m^3)	0,1	none					5
	nitrogen	NO_x (mg/m^3)	0,1	none					5
		NH_3 (mg/m^3)	0,3	none					5
	hydrogen fluoride	HF (mg/m^3)	0,003	none					5
	ozone	O_3 (mg/m^3)	0,01	none					5