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Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-5: Classification of environmental conditions; Ground vehicle installations

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European Standard (Telecommunications series)

**Environmental Engineering (EE);
Environmental conditions and environmental tests
for telecommunications equipment;
Part 1-5: Classification of environmental conditions;
Ground vehicle installations**

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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 1, sub-part 5 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";

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 2: "Specification of environmental tests".

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 1-0 forms a general overview of part 1.

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

National transposition dates	
Date of adoption of this EN:	19 April 2002
Date of latest announcement of this EN (doa):	31 July 2002
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2003
Date of withdrawal of any conflicting National Standard (dow):	31 January 2003

Annex A to the present document is normative.

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1 Scope

The present document defines the classes of environmental conditions and their severities to which equipment may be exposed in ground vehicles. Only severe conditions, which may be harmful to the equipment, are included. The severities specified are those which will have a low probability of being exceeded; generally less than 1 %.

The present document applies to equipment when in use and permanently or temporarily installed in ground vehicles.

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.

- [1] IEC 60721-3-5: "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 5: Ground vehicle installations".
- [2] IEC 60721-2-1: "Classification of environmental conditions. Part 2: Environmental conditions appearing in nature. Temperature and humidity".
- [3] IEC 60068-2-27: "Environmental testing. Part 2: Tests. Test Ea and guidance: Shock".

3 Definitions

For the purposes of the present document, the following terms and definitions apply:

absolute humidity: the mass of water vapour in grammes which is associated with one cubic metre of dry air in an air/water vapour mixture

externally mounted: equipment mounted on the outside of the vehicle, not protected from any external influences

internally mounted: equipment mounted internally in the vehicle in a compartment which affords some protection from the environment

NOTE: The protection ranges from complete isolation from external influences to protection only from precipitation when the vehicle is not moving.

relative humidity: ratio of the partial pressure of the water vapour in moist air at a given temperature, to the partial pressure of the water vapour in saturated air at the same temperature

weatherprotected location: location at which the vehicle is protected from direct weather influences

NOTE: The locality is assumed to be reasonably ventilated (at least natural flow).

4 Environmental classes

The classes shown in parentheses, e.g. (5S1), may be selected for special applications.

4.1 Class 5.1: Protected installation

This class is a combination of classes 5K2/5B2/5C2(5C3)/5F1(5F2)/5S2(5S1)/5M2 or 5M3 in IEC 60721-3-5 [1].

This class applies to equipment in vehicles used at weatherprotected and heated locations covered by world-wide open-air climates excluding extremely warm dry climates.

At non-weatherprotected locations this class applies to equipment in ventilated compartments and in the engine compartments of vehicles powered by electric motors in climatic conditions with normal rain intensities but excluding extremely cold, cold, cold temperate and extremely warm dry climates.

NOTE 1: For some environmental parameters (low air temperature, high air temperature) this class also covers externally mounted equipment.

NOTE 2: A survey of applications in different climates is given in Annex A. Climatic conditions for different areas are defined in IEC 60721-2-1 [2].

This class applies to:

- equipment subjected to heat from heating elements and solar radiation through windows. The vehicle may be moved between cold, non-weatherprotected and warm, weatherprotected conditions. The equipment may also be subjected to dripping water and conditions of wet mounting surfaces. Engine compartments may be subjected to the ingress of water and snow;
- areas and conditions where mould (growth and attacks by animals, except termites, may occur);
- equipment internally mounted in partly open compartments and in engine compartments which may be subjected to the ingress of road salts;
- locations with normal levels of contaminants experienced in urban areas with industrial activities scattered over the whole area and/or with heavy traffic;

NOTE 3: In areas with industrial sources emitting high quantities of chemical pollutants either special precautions must be taken or the special IEC chemical class 5C3 must be chosen.

- compartments where contaminating fluids are not expected;

NOTE 4: If the equipment is exposed to contaminating fluids either the special precautions must be taken or the special IEC class 5F2 must be chosen.

- equipment not protected from sand and dust on vehicles not used in desert areas.

NOTE 5: In a vehicle cab which is mainly protected from sand the special IEC class 5S1 may be chosen.

Class 5.1 also includes one of the following mechanical conditions as appropriate:

- Class 5M2: All types of road vehicles used in areas with well-developed road systems except tracked vehicles, motorcycles, scooters and other vehicles with low mass. The equipment can be mounted on surfaces which may be subjected to flying stones. The equipment may be mounted on passenger car instrument panels to which high frequency vibrations from the engine, or from other parts connected to the engine, may be transmitted. This class also applies to fork lift trucks and to trains with soft suspension and shock reducing buffers;
- Class 5M3: All types of road vehicles in areas without well-developed road system, tracked vehicles, self-propelled machines, overland vehicles, motorcycles, scooters and other vehicles with low mass. The equipment may be mounted on instrument panels to which high frequency vibrations from the engine, or from other parts connected to the engine, may be transmitted. This class also applies to trains with hard suspension. Externally mounted equipment may be directly hit by flying stones.

NOTE 6: The proper IEC class, 5M2 or 5M3, shall be chosen according to the expected installation and use of the equipment.