

Environmental testing —

Part 2: Tests — Test Ka: Salt mist

The European Standard EN 60068-2-11:1999 has the status of a
British Standard

ICS 19.040

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee GEL/104, Environmental conditions, classification and testing, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 6, an inside back cover and a back cover.

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Environmental testing
Part 2: Tests - Test Ka: Salt mist
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Essais d'environnement
Partie 2: Essais
Essai Ka: Brouillard salin
(CEI 60068-2-11:1981)

Umweltprüfungen
Teil 2: Prüfungen
Prüfung Ka: Salznebel
(IEC 60068-2-11:1981)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 60068-2-11:1981, prepared by SC 50B (transformed into IEC TC 104 "Environmental conditions, classification and methods of test), was approved by CENELEC as HD 323.2.11 S1 on 1985-06-27.

This Harmonization Document was submitted to the formal vote for conversion into a European Standard and was approved by CENELEC as EN 60068-2-11 on 1999-04-01.

The following date was fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement

(dop) 2000-04-01

Endorsement notice

The text of the International Standard IEC 60068-2-11:1981 was approved by CENELEC as a European Standard without any modification.

BASIC ENVIRONMENTAL TESTING PROCEDURES**Part 2: Tests — Test Ka: Salt mist****1. Object**

The object of this test is to compare the resistance to deterioration from salt mist of specimens of similar construction.

It is useful for evaluating the quality and the uniformity of protective coatings.

2. General

The following restrictions shall be taken into account:

- a) the test is unsuitable as a general salt corrosion test;
- b) it is also considered to be unsuitable for the evaluation of individual specimens intended for use in salt-laden atmospheres.

For equipment and components, Test Kb is considered to provide more realistic conditions and to provide means of assessment of individual items. If however, for particular circumstances, the relevant specification requires this test (Ka) to be applied to individual specimens for qualification purposes, then the specimens should be tested as part of the overall assembly or equipment in which they are to be used and be complete with any protection devices (cases, covers, shields, etc.), as in practice.

3. Test apparatus**3.1 Test chamber**

The chamber for this test shall be constructed of such materials that will not influence the corrosive effects of the salt mist.

The detailed construction of the chamber, including the method of producing the mist, is optional provided that:

- a) the conditions in the chamber are within the limits specified;
- b) a sufficiently large volume with constant, homogeneous conditions (not affected by turbulence) is available; these conditions should not be influenced by the specimens under test;
- c) no direct spray impinges upon the specimens under test;
- d) drops of liquid accumulating on the ceiling, the walls or other parts cannot drip on the specimens;
- e) the chamber shall be properly vented to prevent pressure build-up and allow uniform distribution of salt fog. The discharge end of the vent shall be protected from squalls which can cause strong air currents in the chamber.

3.2 Atomizer(s)

The atomizer(s) used shall be of such a design and construction as to produce a finely divided, wet, dense mist. The atomizer(s) shall be made of material that is non-reactive to the salt solution.

4. Salt mist

4.1 Salt solution

4.1.1 Concentration

The salt used for the test shall be high quality sodium chloride (NaCl) containing, when dry, not more than 0.1% sodium iodide and not more than 0.3% of total impurities.

The salt solution concentration shall be $5 \pm 1\%$ by weight.

The solution shall be prepared by dissolving 5 ± 1 parts by weight of salt in 95 parts by weight of distilled or demineralized water.

4.1.2 pH value

The pH value of the solution shall be between 6.5 and 7.2, at a temperature of 35 ± 2 °C.

The pH value shall be maintained within this range during conditioning; for this purpose, diluted hydrochloric acid or sodium hydroxide may be used to adjust the pH value provided that the concentrations of NaCl remains within the prescribed limits.

The pH shall be measured when preparing each new batch of solution.

The pH value may need to be adjusted, within the limits specified above, to meet the requirements of Clause 7.

4.1.3 The sprayed solution shall not be re-used.

4.2 Air supply

The compressed air entering the atomizer(s) shall be essentially free from all impurities, such as oil and dust.

Means shall be provided to humidify and warm the compressed air as required to meet the operating conditions. The air pressure shall be suitable to produce a finely divided dense mist with the atomizer(s) used.

To ensure against clogging of the atomizer by salt deposition, it is recommended that the air have a relative humidity of at least 85% at the point of release from the nozzle. A satisfactory method is to pass the air in very fine bubbles through a tower containing heated water which shall be automatically maintained at a constant level. The temperature of this water should be at least 35 °C.

The permissible water temperature increases with increasing volume of air and with decreasing heat insulation of the chamber and the surroundings of the chamber.

The temperature should not exceed a value above which an excess of moisture is introduced into the chamber or a value which makes it impossible to meet the requirements for operating temperature.

5. Initial measurements

The test specimens shall be visually examined and, if necessary, electrically and mechanically checked as required by the relevant specification.

6. Pre-conditioning

The relevant specification shall prescribe the cleaning procedure to be applied immediately before the test; it shall also state whether temporary protective coatings shall be removed.

Note. — The cleaning method used shall not interfere with the effect of the salt mist on the test specimen, nor introduce any secondary corrosion.

Touching of the test surfaces by hand should be avoided as far as possible before the test.

7. Conditioning

7.1 The specimens shall be tested in their normal operating positions according to the relevant specification. They shall therefore be divided into lots, and each lot shall be tested in one of the operating positions.

The specimens shall not be in contact with each other or with other metal parts, and shall be so arranged as to exclude any influence of one part upon another.

Note. — The position of the specimen in the test chamber (i.e. the inclination of its surface to the vertical) is of prime importance, and small differences in position might lead to large differences in effect, depending on the shape of the specimen.

7.2 The temperature of the test chamber shall be maintained at 35 ± 2 °C.

7.3 The salt mist conditions shall be maintained in all parts of the exposure zone, such that a clean collecting receptacle with a horizontal collecting area of 80 cm², placed at any point in the exposure zone, shall collect between 1.0 ml and 2.0 ml of solution per hour averaged over a minimum period of 16 h. A minimum of two receptacles shall be used. The receptacles shall be placed such that they are not shielded by the test specimens and so that no condensate from any source will be collected. The contents of the receptacles may be combined, if necessary, for the measurements of pH values and concentration.

Collection of the solution shall be made either before or during the test, as specified in Sub-clause 7.5.

7.4 The solution as collected in Sub-clause 7.3 shall, when measured at 35 ± 2 °C, have concentration and pH as specified in Sub-clauses 4.1.1 and 4.1.2 respectively.

7.5 The measurement of both concentration and pH shall be made at the following times:

a) For chambers in continuous use, measurements shall be made following each test, on the solution collected during the test.

b) For chambers not used continuously, a trial run between 16 and 24 h shall be made before the tests are performed. The measurements shall be made immediately following the trial run and before exposing the specimens to be tested. Measurements as detailed in Item *a)* above will also be made to ensure constant test conditions.

7.6 The relevant specification shall prescribe one of the following conditioning durations: 16 h, 24 h, 48 h (2 days), 96 h (4 days), 168 h (1 week), 336 h (2 weeks), 672 h (4 weeks).

8. Recovery

At the completion of the test, small specimens, unless otherwise specified by the relevant specification, shall be washed in running tap water for 5 min, rinsed in distilled or demineralized water then shaken by hand or subjected to air blast to remove droplets of water.

The temperature of the water used for washing shall not exceed 35 °C.

If necessary, the relevant specification shall detail the methods to be used for washing and drying larger specimens.

The specimens shall then be stored under standard recovery conditions for not less than 1 h and not more than 2 h.

9. Final measurements

The specimens shall be visually inspected and, if necessary, electrically and mechanically checked as required by the relevant specification.

The results shall be recorded.

Note. — Precautions should be taken to ensure that remains of salt deposit do not impair the reproducibility of the measurements.

10. Test reports

Reports on this test shall include information necessary to compare the specimens tested. In addition, the duration of the exposure and the orientation in the test chamber shall be given.

The measurement of concentration and pH shall also be included in the report.

11. Information to be given in the relevant specification

<i>a)</i> Initial measurements	Clause 5
<i>b)</i> Pre-conditioning	Clause 6
<i>c)</i> Position of the specimens during the test	Sub-clause 7.1
<i>d)</i> Test duration	Sub-clause 7.6
<i>e)</i> Recovery	Clause 8
<i>f)</i> Final measurements	Clause 9

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