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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Environmental testing – Part 2-17: Tests – Test Q: Sealing

Essais d'environnement – Partie 2-17: Essais – Essai Q: Etanchéité



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INTERNATIONAL STANDARD

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Environmental testing – Part 2-17: Tests – Test Q: Sealing

Essais d'environnement – Partie 2-17: Essais – Essai Q: Etanchéité

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ENVIRONMENTAL TESTING –

Part 2-17: Tests – Test Q: Sealing

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IEC 60068-2-17 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 1994. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) "Survey of sealing tests" has been deleted and the relevant content moved to a new Clause 4 "General";
b) the Scope has been revised;
c) the figures have been updated for clarification purposes;
d) all non-SI units have been removed;
e) the information to be given in the relevant specification has been revised.

The text of this International Standard is based on the following documents:

Draft	Report on voting
104/984/FDIS	104/1000/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 60068 series, published under the general title *Environmental testing*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

ENVIRONMENTAL TESTING –

Part 2-17: Tests – Test Q: Sealing

1 Scope

This part of IEC 60068 deals with seal tests applicable to the external and internal detection in container sealing of gross leaks and fine leaks to determine the effectiveness of seals of specimens. For further tests to verify the ability of enclosures, covers and seals to maintain components and equipment in good working order, IEC 60068-2-18 can be helpful.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
leak rate
quantity of a dry gas at a given temperature that flows through a leak per unit of time and for a known difference of pressure across the leak

3.2
standard leak rate
leak rate under standard conditions of temperature and pressure difference of 25 °C and 10^5 Pa

3.3
measured leak rate
R
leak rate of a given device as measured under specified conditions and employing a specified test gas

Note 1 to entry: Measured leak rates are often determined with helium employed as the test gas under a pressure difference of 10^5 Pa at 25 °C. For the purpose of comparison with leak rates determined by other methods of testing, the leak rates should be converted to equivalent standard leak rates.

3.4
equivalent standard leak rate
L
standard leak rate of a given device with air as the test gas

Note 1 to entry: The equivalent standard leak rate is expressed in Pa · cm^3/s.

3.5
time constant
θ
<of leak> time required for equalization of the partial pressure difference across a leak if the initial rate of change of that pressure difference were maintained

Note 1 to entry: For the purpose of Test Q, the time constant is equal to the quotient of the internal volume of the specimen and the equivalent standard leak rate.

3.6
gross leak
any leak with an equivalent standard leak rate greater than 1 Pa · cm^3/s

3.7
fine leak
any leak with an equivalent standard leak rate smaller than 1 Pa · cm^3/s

3.8
virtual leak
semblance of a leak caused by slow release of absorbed, adsorbed or occluded gas

3.9
leak meter
<in Test Qm> apparatus consisting of a hand probe for taking a sample of gas mixture and a meter providing a graduated display of the concentration of a predetermined type of gas in the sample

3.10
volume of measurement
V_m
<in Test Qm> volume contained between the gastight sheath collecting the leak and the specimen

3.11
leak detector
<in Test Qm> apparatus consisting of a hand probe for taking a sample of gas mixture and a device sensitive to the presence of a predetermined type of gas and emitting a signal, either acoustic or visual, when the concentration of a predetermined type of gas reaches a pre-set threshold level

3.12
probing
DEPRECATED: sniffing
<in Test Qm> action of slowly moving the probe of a leak detector along a specimen to locate the leaks

4 General

Test Q: Sealing includes several tests which use different conditioning procedures appropriate for different applications.

NOTE Other tests of this category are rain and water tests which are described in IEC 60068-2-18.

The family tree of all sealing tests is shown in Figure 1.

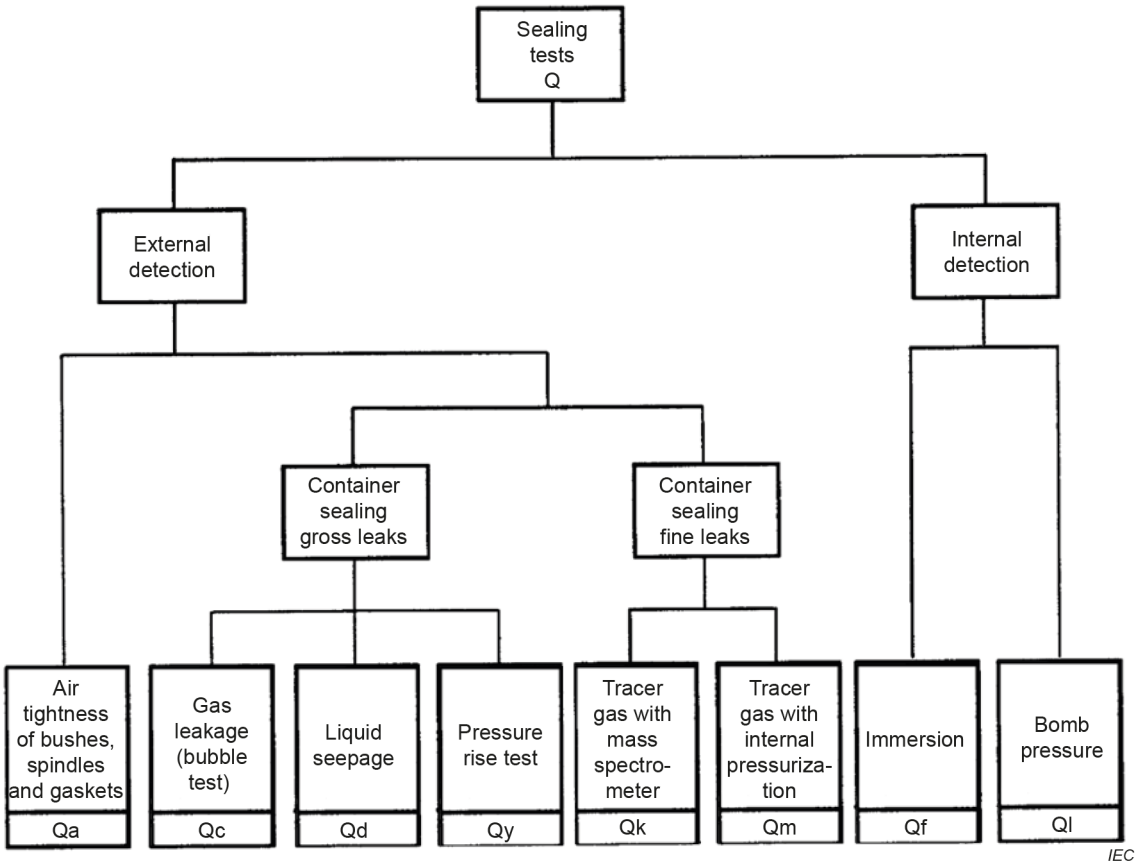


Figure 1 – Family tree of all sealing tests

Test Q can be subdivided in the following two subgroups, distinguished by their detection methods:

– internal detection, which measures changes of electrical characteristics produced by the test medium (liquid or gas) introduced into the specimens through the leak;

– external detection, whereby the escape of the test medium through the leak is observed.

The two tests for internal detection Qf and Ql are very similar. They are very effective for certain components, for example plastic-foil capacitors; they are not recommended, however, for components in which electrical changes become effective only after a long time (for instance, after the test is terminated).

The tests for external detection are further subdivided according to their application. Test Qa is a bubble test which is used to determine the airtightness of bushes, spindles and gaskets. The other tests, Qc, Qd, Qk and Qm, are used to determine leaks in containers (metallic cases, housings, etc.).

Test Qc is a bubble test again including three methods with different sensitivities (leaks not less than 1 Pa · cm^3/s). Test Qd is a liquid seepage test which may be applied to specimens filled during manufacture with a liquid or a product becoming liquid at the test temperature.

Tests Qk and Qm are the most sensitive of this series. Their sensitivity ranges from 1 Pa · cm^3/s to about 10^{-6} Pa · cm^3/s.