Confederation of European Environmental Engineering Societies

News from IEC Standardization of Environmental Conditions and Tests

Technical Advisory Board Meeting
Climatic and Atmospheric Pollution Effects on Materials and Equipment
Rue des Petits Carmes, 20 1000 Brussels

Hermann Ruoss
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Seite: 1
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Welcome to the World of IEC.
A natural passion.
News from IEC Standardization of Environmental Conditions and Tests
IEC TC104
“Environmental Conditions, Classification and Methods of Test“

Chairman: Hermann Ruoss
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Scope TC104

1. Standardization of environmental condition classes which represent the conditions to which products are most likely to be subjected whilst being:

- transported,
- stored,
- installed and
- used.

The classification shall use validated environmental parameters and provide guidance in the selection and use of those classes intended for the preparation of relevant specifications.

2. Standardization of environmental test methods intended for the preparation of relevant specifications and to provide guidance in the selection and use of those methods.

3. The correlation and transformation of environmental condition classes to environmental tests.

4. Provision of the Horizontal Safety Function for:
- methods for climatic tests
- methods for testing mechanical robustness.

5. Excluded from the scope of this committee are those matters which are within the scope of other IEC Committees, such as Electromagnetic Compatibility (TC 77 and CISPR), Safety (TC 62, TC 66 and TC 74), Fire Hazard (TC 89), Ionizing Radiation (TC 45), Explosive Atmospheres (TC 31) and Dependability (TC 56). Internal liaisons are maintained with those IEC committees which are specifically excluded from the scope.
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TC104

- MT16 Climatic conditions and tests
- MT17 Dynamic conditions and tests
- MT18 Special cases
- WG 14 Climatic field data including validation
- WG 15 Dynamic field data including validation
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ETS 300 019-1 Classification of environmental conditions
ETS 300 019-2 Specification of environmental tests

The purpose of environmental testing is to demonstrate that an equipment under defined environmental conditions can survive without irreversible failures and perform according requirements

- Storage
- Transportation
- In use
  - weather protected, stationary use
  - non weather protected, stationary use
  - mobile use in ground vehicles
  - mobile use in ships
  - portable and non stationary use
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- Storage
  - Class 1
- Transportation
  - Class 2
- In use
  - Class 3-7
    - Stationary use
      - Class 3+4
    - Weatherprotected
      - Class 3.1 Temperature controlled locations
      - Class 3.2 Party temp. controlled locations
      - Class 3.3 Non-temp. controlled locations
    - Non-weatherprotected
      - Class 4.1 Non-weather protected locations
      - Class 4.1E See 4.1 extended
    - Mobile use
      - Class 5+6
      - Ground vehicle
        - Class 5
      - Ship environment
        - Class 6
        - Weather protected locations
  - Portable and non-stationary use
    - Class 7
    - Class 7.1 Temperature controlled locations
    - Class 7.2 Party temp. controlled locations
    - Class 7.3 Party weather + non-weather protected
    - Class 7.3E See 7.3 extended
- Class 1.1 Partly temp. controlled storage
- Class 1.2 Non-temp. controlled storage
- Class 1.3 Non-weather protected storage
- Class 1.3E See 1.3 extended
- Class 2.1 Very careful Transportation
- Class 2.2 Careful transportation
- Class 2.3 Public transportation
- Class 3.4 Sites with heat-trap
- Class 3.5 Sheltered locations
## News from IEC Standardization of Environmental Conditions and Tests

### IEC 60068-2-53 Combined tests

<table>
<thead>
<tr>
<th>Dynamic tests</th>
<th>Shock</th>
<th>Vibration (sinusoidal)</th>
<th>Vibration (broad band random)</th>
<th>Vibration (mixed mode)</th>
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<tbody>
<tr>
<td></td>
<td>IEC 60068-2-27</td>
<td>IEC 60068-2-6</td>
<td>IEC 60068-2-64</td>
<td>IEC 60068-2-80</td>
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<tr>
<td>Climatic tests</td>
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<tr>
<td>Cold</td>
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<td>IEC 60068-2-2</td>
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<td>Change of temperature</td>
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<tr>
<td>IEC 60068-2-14</td>
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<tr>
<td>Damp heat, cyclic</td>
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<tr>
<td>Damp heat, constant</td>
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<tr>
<td>IEC 60068-2-78</td>
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</tr>
</tbody>
</table>
Changes in Basic Safety Tests

• „Free convection“ and „forced air circulation“ is now „low and high air velocity“
• Emission factor of the walls is not more required
• Temperature change rate for temperature tests now with 10 and 15 K/min
• Measurement uncertainty for temperature and humidity is given in IEC60068-3-11
IEC60068-2-14 Test N Change of Temperature

Temperature of the specimen

$T_B$

$T_A$

$\Delta$

$t_s$

$t_1$

A = Anfang des ersten Zyklusses

B = Ende des ersten Zyklusses und Beginn des zweiten Zyklusses

ANMERKUNG Die gepunktete Kurve ist in 1.3.1.5 erklärt.
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Dew-Test required from BMW

Legende:

1) Trocknung bei 75 °C  Feuchte nicht definiert
2) Prüfling muß trocken sein  Wasserbadtemp. ± 1 K
Vorbehandlungsphase  Prüfraumtemp. ± 3 K
in diesem Bereich Feuchteregulation ausgeschaltet  Feuchtebeanspruchung
100 % - 2 % r. F.
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ISO 16750-4
Dew test
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ISO 20653  ISO TC22 SC3 WG13
IEC60529 IP-degrees
IEC TC70 in Germany DKE K212 Schutzarten

Jet-distance 150 mm, waterpressure 80 bar, watertemperature 80°C:
left „Lechler“, right „Kärcher“
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IEC TC 70  IP-Code IEC 60529

a) Set-up for measuring the impact force of the water jet

Key:
1  fan jet; pressure (100 ± 5) bar; volume (15 ± 1) l/min
2  cover plate
3  impact plate 2 x 30 mm
   (2 mm in direction of movement)
4  force absorber
5  working width

b) Distribution of impact force
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List of actual program work:

IEC 60068-1 General and Guidance
IEC 60068-2-1 Test A: Cold
IEC 60068-2-2 Test B: Dry Heat
IEC 60068-2-5 Test Sa: Solar radiation
IEC 60068-2-6 Test Fc: Vibration (sinusoidal)
IEC 60068-2-9 Test Sa: Guidance for solar
IEC 60068-2-10 Test J: Mould growth
IEC 60068-2-11 Test Ka: Salt mist
IEC 60068-2-14 Test N: Change of temperature
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List of actual work program

IEC 60068-2-17: Test Q: Sealing
IEC 60068-2-18: Test R: Water
IEC 60068-2-27: Test Ea: Shock
IEC 60068-2-30: Test Db: Damp heat, cyclic
IEC 60068-2-31: Test Ec: Rough handling shocks
IEC 60068-2-38: Test ZAD: Temperature/Humidity
IEC 60068-2-50/51/53: Combined Tests
IEC 60068-2-57: Test Ff: Vibration, time history
IEC 60068-2-64: Test Fh: Vibration, random
IEC 60068-2-65: Test Fg: Vibration, acoustic
List of actual work program:

IEC 60068-2-75: Test: Hammer Test
IEC 60068-3-11: Measurement uncertainty

IEC 60721-1: Environmental parameters and their severities
IEC 60721-2: Environmental conditions appearing in nature
IEC 60721-3: Classification of parameters and their severities
IEC 60721-4: Correlation of environmental conditions to tests
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Thanks for your attention