TightVent Webinar
Determination of durability of adhesive tapes and adhesive masses for the establishment of airtight layers
New standardisation project

Structure
- Principles of standardisation work
- Example for a national product standard – DIN 4108-11
- New standardisation project „Airtight adhesives“
Principles of standardization work

### Test standards
- Single test methods
  - Conditioning
  - Test specimen dimensions
  - Test speed
  - ...
- Examples
  - EN 12311-1

### Product standards
- Product (-group)
  - hEN (harmonised) vs. EN
  - How to evaluate the performance of the product
- Examples
  - DIN 4108-11
  - No EN XXXX for airtight adhesives

### Application standards
- Constructions
  - Construction guidelines
  - Minimum requirements for material properties
- Examples
  - NF DTU 31.2 P1-2
Principles of standardization work

- Consequences of European (product) standards
  - Based on consensus of all involved parties
    - Sometimes hard to reach
    - Makes standardization work longlasting
  - National product standards have to be withdrawn in case of a European standard
  - No minimum requirements / thresholds → solely information „how to“ evaluate the performance of a product

National product standard – DIN 4108-11

- Published 2018

  Thermal insulation and energy economy in buildings — Part 11: Minimum requirements to the durability of bond strength with adhesive tapes and adhesive masses for the establishment of airtight layers

  Wärmeschutz und Energie-Einsparung in Gebäuden — Teil 11: Mindestanforderungen an die Dauerhaftigkeit von Klebeverbindungen mit Klebebändern und Klebemassen zur Herstellung von luftdichten Schichten

  Protection thermique et économie d’énergie dans la construction immobilière — Partie 11: Exigences minimales à la durabilité des joints collés avec des rubans adhésifs et des masses adhésives pour la fabrication des couches étanche à l’air
National product standard – DIN 4108-11

1 Scope

◼ Clarifies the desired applications …

“[… ] durability of adhesive joints prepared by means of adhesive materials [… ]”

“[… ] airtight layers according to DIN 4108-7 […]”

National product standard – DIN 4108-11

1 Scope

◼ …and exceptions.

This standard does not cover test methods for:

- pre-compressed sealing tapes and sealing profiles which will be mechanically secured;
- butyl-based adhesive tapes or adhesive masses;
- sheet joints of wood-based panels or gypsum plasterboards with adhesive masses or filler systems;
- joints and joint bondings of bitumen sheets;
- joints of self-adhesive tapes;
- adhesive masses from reels. Adhesive masses from reels are cured viscoelastic adhesive masses which are used in the same field of application as adhesive masses.
National product standard – DIN 4108-11

2 Normative References

3 Terms and Definitions

4 Symbols and Units

5 Testing

- Reference substrates
  - boPET sheet
  - Beechwood

- Product combinations
  - Specific combinations

5 Testing

- Definitions about
  - Apparatus used
  - Specimen preparation (joint length and width, cutting, preparation of the joint, etc.)

- Test procedure (Reference to test standard, test speed (10 and 100 mm/min, pre-load = 0.5 N, climate conditions, etc.)
National product standard – DIN 4108-11

5 Testing

Table 2 — Sample preparation, conditioning and test procedures for testing adhesive tapes

<table>
<thead>
<tr>
<th>Test description</th>
<th>No.</th>
<th>Number of test series with 5 samples each</th>
<th>Validation according to 5.3.1. to be recorded</th>
<th>T-peel test (T-peel test number)</th>
<th>T-peel test with artificial ageing $P_{\text{max}}$</th>
<th>$P_{\text{max}}$</th>
<th>$P_{\text{max}}$</th>
<th>$P_{\text{max}}$</th>
<th>Temperature boundary level bending testing</th>
<th>Crosshead speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-peel test without artificial ageing $P_{\text{max}}$</td>
<td>1</td>
<td>2</td>
<td></td>
<td>T-peel test with hot RET</td>
<td>$120 \text{ d}$ (65 ± 2) °C / 80%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1.19 mm/min</td>
<td>2.10 mm/sec</td>
</tr>
<tr>
<td>T-peel test with artificial ageing $P_{\text{max}}$</td>
<td>2</td>
<td>2</td>
<td></td>
<td>T-peel test with hot RET</td>
<td>(3 ± 1) °C / 50 ± 5%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1.19 mm/min</td>
<td>2.10 mm/sec</td>
</tr>
<tr>
<td>Static peel strength in the 90° peel test</td>
<td>3</td>
<td>5</td>
<td></td>
<td>—</td>
<td>24 h at (30 ± 2) °C heating cabinet</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

NOTE: “hot RET” and “beef” designate the reference substances according to 5.2.1.

Tape single-sided: T-Peel (10 and 100 mm/min)

Tape double-sided: T-Peel (10 and 100 mm/min)

Adhesive masses: 180° peel (10 and 100 mm/min)

Static peel test: (30°C, 24 h, 0.3 N)

Static peel test: (30°C, 24 h, 0.3 N)

Static peel test: (40°C, 24 h, 0.3 N)
National product standard – DIN 4108-11

5 Testing

- Results are given in N/10 mm
- Evaluation of maximum and mean peel force
- Different stop criteria
  - Maximum peel length of 50 mm without break
  - Failure of adhesive or substrate < 50 mm

6 Minimum requirements for adhesive tapes and adhesive masses

<table>
<thead>
<tr>
<th>Peel strength</th>
<th>Crosshead speed 10 mm/min</th>
<th>Crosshead speed 100 mm/min</th>
<th>90° peel strength load 0,3 N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$F_{\text{max}}$ N/10 mm</td>
<td>$F_{\text{fm}}$ N/mm</td>
<td>$F_{\text{fm}}$ N/10 mm</td>
</tr>
<tr>
<td>Adhesive tape (T-peel test) boPET</td>
<td>≥ 2,6</td>
<td>≥ 5,9</td>
<td>≥ 3,4</td>
</tr>
<tr>
<td>Adhesive tape (180° peel test) boPET</td>
<td>≥ 3,0</td>
<td>≥ 6,0</td>
<td>≥ 3,2</td>
</tr>
<tr>
<td>Adhesive mass (180° peel test) boPET</td>
<td>≥ 2,4</td>
<td>≥ 4,8</td>
<td>≥ 2,5</td>
</tr>
</tbody>
</table>

Mutually not possible in a european product standard
National product standard – DIN 4108-11

Annex B (informative) – Alternating load method for testing the durability of adhesives

- System related tests under practical load conditions
  - Total 6400 load cycles acc. to mean wind speed (1300 g/25mm)
  - 5 load cycles acc. to max. wind speed (2500 g/25mm)

European product standard – PWI „Airtight Adhesives“

- No mandate / Sreq for airtight adhesives – EN XXXX
- No CE marking possible based on the standard
- If no other assessment documents (ETA) → Mutual recognition

Preliminary work item (PWI) description

English title: Determination of durability of adhesive tapes and adhesive masses for the establishment of airtight layers

8. Scope

This document specifies definitions and characteristics of adhesive tapes and adhesive masses for airtight connections of building materials used for the airtight layer of the building shell. The document specifies the use requirements and test methods and provides for the evaluation of conformity of the products with the requirements of this document.
European product standard – PWI „Airtight Adhesives“

11. Environmental aspects

- Discharges to soil
- Discharges to water
- Emission to air
- Heat
- Noise/Vibration
- Other effects on biodiversity
- Radiation
- Use of energy
- Use of land
- Use of water
- Waste
- Risk to the environment from accidents/misuse
- Other:

Durable airtight connections, characterized by the methods defined in the standard that shall be developed, are key to guarantee the long-term functionality of the insulation material and the construction work and therefore help to save energy and resources over the whole life time of the building. Also, the condensation damage protection is an important task of the airtight layer thereof interdependencies to the life-time of the building and also health aspects for the users of the building can be derived.

As airtight barriers are positioned on the internal side of the insulation, potential emissions to the indoor air shall be considered.

Topic was introduced to TC89 – next steps:

- Ballot for two months based on the PWI
- Call for experts and convenors
- Call for a secretariat
- Start of the work – WG meetings
European product standard – PWI „Airtight Adhesives“

- Potential discussion for the work progress
  - Mechanical tests vs. airtightness tests
  - Constancy of product related performance vs. system tests
  - For system tests: Influence of the craftsmanship
- Artificial ageing procedures
  - Relevant influences (T, r.h., mechanical stress) may differ according to climatic and construction differences
  - Definition of useful accelerated ageing conditions
  - Definition of time frame for the ageing