

TightVent Webinar

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

New standardisation project



1

Structure

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

2

Principles of standardization work



Test standards

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

Product standards

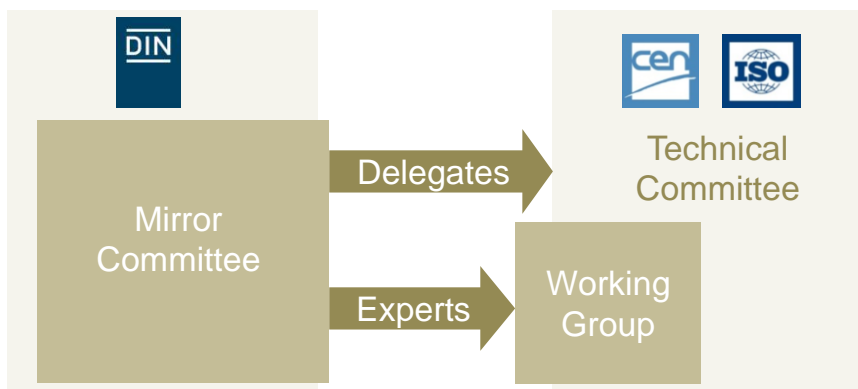
- Product (-group)
 - hEN (harmonised) vs. EN
 - How to evaluate the performance of the product
- Examples
 - DIN 4108-11
 - No EN XXXX for airtight adhesives

Application standards

- Constructions
 - Construction guidelines
 - Minimum requirements for material properties
- Examples
 - NF DTU 31.2 P1-2

3

Principles of standardization work



4

Principles of standardization work



- Consequences of european (product) standards
 - Based on consensus of all involved parties
 - Sometimes hard to reach
 - Makes standardisation 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 - National product standards have to be withdrawn in case of a european standard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

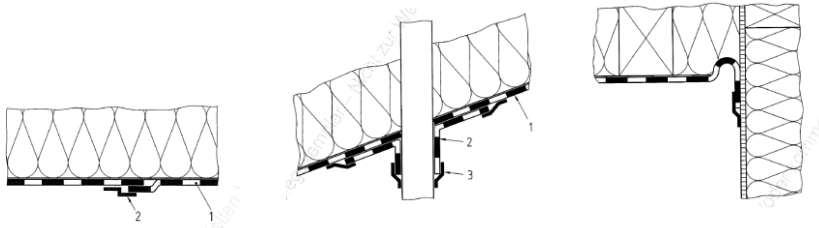


1 Scope

- 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

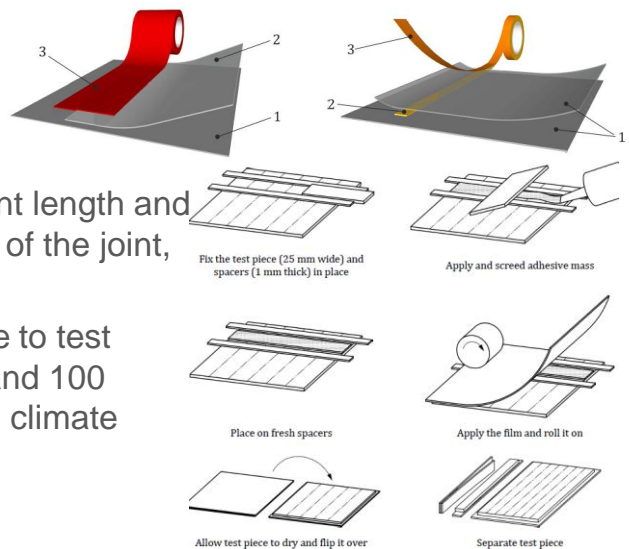
- Reference substrates
 - boPET sheet
 - Beechwood
- Product combinations
 - Specific combinations

National product standard – DIN 4108-11



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

Test description	No.	Number of test series with 5 samples each	Substrates according to 5.2.1 to be used for reference test		Conditioning	Conditioning	Conditioning	Conditioning	Conditioning	Conditioning	Conditioning	Temperature/humidity level during testing	Crosshead speeds
			A	B									
T-peel test without artificial ageing $F_{3,max}$	I	2	boPET with boPET	120 d	$(65 \pm 2)^\circ\text{C} / 80\%$	—	—	—	—	—	—	I	J
T-peel test with artificial ageing $F_{3,max,120}$	II	2											
Static peel strength in the 90° peel test	III	1	Beech with boPET	5	$(23 \pm 2)^\circ\text{C} / (50 \pm 5)\%$	—	—	—	—	—	—	24 h at $(30 \pm 2)^\circ\text{C}$ heating cabinet	—

NOTE "boPET" and "beech" designate the reference substrates according to 5.2.1.

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5 Testing

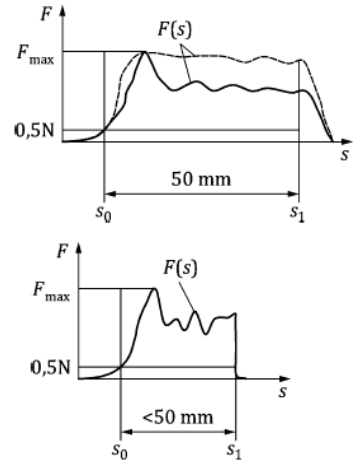
Tape single-sided	Tape double-sided	Adhesive masses
T-Peel (10 and 100 mm/min)	T-Peel (10 and 100 mm/min)	180° peel (10 and 100 mm/min)
Static peel test (30°C, 24 h, 0.3 N)	Static peel test (30°C, 24 h, 0.3 N)	Static peel test (40°C, 24 h, 0.3 N)

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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



National product standard – DIN 4108-11



6 Minimum requirements for adhesive tapes and adhesive masses

		Peel strength				90° peel strength load 0,3 N
		Crosshead speed 10 mm/min		Crosshead speed 100 mm/min		
		$F_{s,max}$ N/10 mm	$F_{s,m}$ N/10 mm	$F_{s,max}$ N/10 mm	$F_{s,m}$ N/10 mm	
Adhesive tape (T-peel test)	boPET	$\geq 2,6$	$\geq 1,3$	$\geq 5,9$	$\geq 3,4$	passed
	System	$\geq 2,6$	$\geq 1,3$	$\geq 4,7$	$\geq 2,7$	passed ^a
Adhesive masses (180° peel)	boPET	$\geq 3,0$	$\geq 1,5$	$\geq 6,0$	$\geq 3,2$	passed
	System	$\geq 2,4$	$\geq 1,2$	$\geq 4,8$	$\geq 2,5$	passed

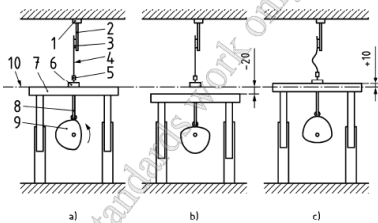
Mutually not possible in a european product standard

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

- | | | |
|--|---|--|
| <input type="checkbox"/> Discharges to soil | <input type="checkbox"/> Discharges to water | <input checked="" type="checkbox"/> Emission to air |
| <input checked="" type="checkbox"/> Heat | <input type="checkbox"/> Noise/Vibration | <input type="checkbox"/> Other effects on biodiversity |
| <input type="checkbox"/> Radiation | <input checked="" type="checkbox"/> Use of energy | <input type="checkbox"/> Use of land |
| <input type="checkbox"/> Use of material | <input type="checkbox"/> Use of water | <input type="checkbox"/> Waste |
| <input type="checkbox"/> 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

European product standard – PWI „Airtight Adhesives“



- 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