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New CWCT Technical Notes
TN117, TN118 and TN119
Membranes and Interfaces

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CWCT Technical Notes – Membranes and Interfaces

Agenda

▶ Welcome,

▶ Purpose of today's webinar,

▶ New TN's webinar,

▶ Questions.

TN119	Interfaces and joints - Procurement (12 pp) - NOW AVAILABLE
TN118	Interfaces and joints - Performance (26 pp) - NOW AVAILABLE
TN117	Breather membranes and vapour control layers in walls (25 pp)* (supersedes TN33) * Minor correction in Annex B published 21/04/26

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Welcome

▶ <https://www.cwct.co.uk/pages/cwct-webinars>

CWCT WEBINARS

This page contains details and recordings of CWCT webinars, held to discuss new publications and guidance.

+ Technical Notes Webinar 01 - Thermal series, March 2024

+ Technical Notes Webinar 02 - Fire performance, December 2024

+ Technical Notes Webinar 03 - Fire performance, TN116, November 2025

+ CWCT Webinar 04 - Embodied carbon tool (FaCE), Part 1, January 2026

+ CWCT Webinar 05 - Embodied carbon tool (FaCE), Part 2, May 2026

+ Technical Notes Webinar 06 - Membranes and Interfaces, September 2026

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Welcome

▶ CWCT AGM and Members' Meeting 2026

▶ Sustainability,

▶ Fire,

▶ Innovation,

▶ Thursday 24th September,

▶ Final few tickets available.





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▶ The latest updates and insights from CWCT,

▶ Please engage to help visibility.





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Introduction

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Outline

▶ For each Note we will touch on

▶ The target audience

▶ The scope

▶ A few of the key takeaways

▶ Annexes

▶ TN117: Breather membranes and vapour control layers in walls

▶ TN118 Interfaces and joints – Performance

▶ TN119 Interfaces and joints - Procurement

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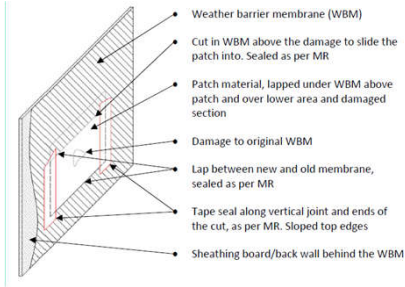
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TN117 - Breather membranes and vapour control layers in walls



▶ Target audience:

▶ Specifiers,

▶ Designers,

▶ Persons working with membranes and wanting a greater understanding.

▶ Scope:

▶ Update TN33,

▶ Membrane types, primarily focusing on breather membranes and VCL,

▶ Membrane performance requirements.

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TN117 – Key takeaways



Performance requirements and standards



Terms for different membrane types and classifications



A quick reference for performance classes (Annex B)

TN117 – Performance requirements and standards

- 6 Depending on the design of the wall, these layers or membranes may be required to provide:
- Water penetration resistance,
 - Vapour permeability or resistivity,
 - Low air permeability,
 - Tear/wind-load resistance,
 - UV resistance.

Material	Vapour resistance (MN-s/g)	Source
Glass	∞	BS 5250
Metals	∞	BS 5250
Aluminium foil (0.05 mm)	7500	BS EN ISO 10456
Polyethylene (1000 gauge)	500	BS EN ISO 10456
Polyethylene (500 gauge)	250	BS EN ISO 10456
Paint		
Emulsion	0.5	BS 5250
gloss	15	BS 5250
Vapour resistant	25	BS 5250
Bitumen impregnated	10	BS EN ISO 10456
building paper		
Breather membrane	0.5	BS 5250

Table 2 – Vapour resistance of materials

TN117 – Terms for different membrane types and classifications

- ▶ Air barrier membranes
- ▶ Sealing membranes
- ▶ Vapour control layers
- ▶ Breather membranes

- 24 **W1 membranes** are likely suitable for all exposures within a wall assembly where there is limited standing water on or against the membrane for a short (but reasonable) period, i.e., these may not be suitable as roofing or tanking membranes or in situations where water will be trapped against or left standing on the membrane for extended periods of time. Designers should consider the risk of trapped water, particularly in non-ventilated cavities or conditions where evaporation rates are lower.
- 25 **W2 membranes** are likely suitable for vertical (or near vertical) orientations. For example, as a sheathing membrane or breather membrane. These membranes would be less suitable as sealing membranes but are typically suitable where they are less exposed to direct wetting, such as masonry cavities, or in closed/sealed jointed rainscreen cavities.
- 26 **W3 membranes** are not suitable as a water-resistant membrane in facades. Products with this classification allow more than 100 ml of water to penetrate without any applied pressure (beyond 50 mm head pressure) or may simply be untested.

TN117 – Annex A

- ▶ Annex A provides a glossary of terms that is an update to TN33 and aligning with more recent Technical Notes

- 1 **Breather membrane:** Flexible sheet that resists the passage of liquid water but allows water vapour to pass.
- 2 **Dew point (DP):** 'temperature at which air becomes saturated with water vapour and condensation occurs' (BS 5250). This corresponds to the temperature where the specific humidity contained within the air would saturate the air. E.g., at standard atmospheric pressure, air at 4.09 °C has a saturation vapour pressure of 0.818 kPa. Therefore, 4.09 °C is the dew point of air with a vapour pressure of 0.818 kPa. Example conditions with a dewpoint of 4.09 °C include air at 10 °C and RH of 66.7%, and of air at 20 °C and RH of 33.0%. Also referred to as 'dewpoint'.
- 3 **Lap joint:** The joint between two sheets of membrane or membrane and flashings or similar where one layer of membrane is overlapped on top of the other membrane, flashing or similar.
- 4 **Positive lap joint:** A horizontal lap joint where the upper membrane is lapped over the lower layer, creating a continuous drainage path for liquid water. Can be described as 'positively lapped'.
- 5 **Negative lap joint:** A horizontal lap joint where the upper membrane is lapped under the lower layer, creating a potential edge to trap water or pathway for water to drain behind the lower layer. Can be described as 'negatively lapped'.
- 6 **Specific humidity:** the amount of water vapour contained in the air. This is measured in grams of water vapour per mass of dry air (g/kg). This is also known as 'moisture content'.

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TN117 – Annex B

- Annex B attempts to provide a summary of different test standards that are used to describe different performance characteristics of membranes.
- Primarily: resistance to water penetration, vapour transmission and resistance to penetration of air.

Test Standard	Class/rating	Duration	Applied pressure
BS EN 1928 (Method A)	Pass	24hrs	'Sheets intended for use in low pressure application' (≤160 kPa)
BS EN 1928 (Method B)	Pass	24hrs	'Sheets intended for use in high pressure application'
BS EN 13111	Volume of penetration (ml)	3hrs	50 mmHg ⁽¹⁾
BS EN 13859-1 or -2	W1	2hrs	200 mmHg ⁽²⁾
BS EN 13859-1 or -2	W2	As per BS EN 13111, <100 ml of penetration ⁽³⁾	
BS EN 13859-1 or -2	W3	Failed to achieve W2 or untested	
BS EN 13984	Watertightness – Pass	BS EN 1928 Method A at 2 kPa for 24hrs.	
BS EN 1027 ⁽⁵⁾	Pressure at time of failure	Increasing pressure in steps	
BS EN 12208 ⁽⁶⁾	Class	Class based on BS EN 1027 results	

Table B1 – Summary of standards relevant to resistance to water penetration

Test Standard	Results – rate	Results – resistance
BS EN 1931 Method A or B ⁽¹⁾	g in kg/(m ² ·s)	μ (unitless)
BS EN 13984	Type A	Vapour control layers (VCL)
BS EN 13984	Type B	Vapour control layers (VCL) – non-watertight
BS EN 13984	Type V ⁽³⁾	Vapour control layers (VCL) – ventilating or draining VCLs
BS EN ISO 12572	g in kg/(m ² ·s)	Vapour permeance ⁽²⁾ , permeability ⁽²⁾ , or vapour resistance.
BS EN ISO 7783	Supplement to BS EN ISO 12572	
BS EN 13859	Se ≥ 0.2 m, test as per BS EN 1931 Se < 0.2 m, test as per BS EN ISO 12572	

Table B2 – Summary of standards relevant to vapour transmission

Test Standard	Maximum pressure difference	Results
BS EN 12114	ΔP = 50, 100, 200, 500 or 1000 Pa	Table of results at different ΔP
BS EN 13859-2	Tested to a 100 Pa maximum pressure difference	
BS EN 13984	No compliance criteria	

Table B3 – Summary of standards relevant to resistance to penetration of air.

TN118 – Interfaces and joints – Performance

- Target Audience:
 - Specifiers,
 - Designers,
 - Contractors,
 - Specialist contractors.

- Scope:
 - Builds on TN78 Interfaces and joints – introduction,
 - Provides further information on performance requirements of interfaces (primarily) and joints.

5 An **interface** occurs at the junction between different forms of construction. The following interfaces may be encountered in the construction of façades:

- Between the façade and the structure of the building,
- Between different forms of wall construction,
- Between a wall and windows or doors,
- Between a façade and a roof or ground,
- Between the layers of a built-up wall,
- Between a wall and penetrations through the wall such as for ventilation ducts, balcony support brackets etc.

TN118 – Interface performance requirements

- Interfaces are commonly a source of water ingress, movement accommodation failures, thermal bridging, and more.
- This Note highlights the importance of an interface and what are the needed performance requirements.
- The Note provides a brief discussion on each of the following topics:
 - Weathertightness (air, water, and vapour),
 - Thermal,
 - Fire (though largely references the fire series of Technical Notes),
 - Acoustic,
 - Movement and tolerance,
 - Conductivity/lightning,
 - Testing, and,
 - Buildability, maintenance and sustainability.

TN118 – Movement and tolerances

- This Note provides a more flexible calculation method for sizing joints / interfaces.
 - The existing method, described in TN20 *Design of sealant joints* aligns with BS 6093 and assumes sealant has a uniform movement accommodation to either side of nominal and that all movements are influencing the sealant.
 - The new equation allows for designers to utilise non-uniform sealant movements as well as their judgement on which movements to include before or after sealant application, producing less conservative joint sizes.

62 The minimum joint size for either symmetric and asymmetric joint movement can be calculated using equation below for each expansion and contraction of the joint independently. This approach is a less conservative and requires greater amounts of engineering judgements.

$$D_{min} = \sum \Delta D_1 + \sum \Delta D_{1a} + \frac{1}{\epsilon} \times \sum \Delta D_2 \tag{1}$$

66 Therefore, when accommodating shear, equation (1) can be rewritten as:

$$D_{min} = \sum \Delta D_1 + \sum \Delta D_{1a} + \frac{\sum \Delta D_1 + \sqrt{\sum \Delta D_1^2 + (2\epsilon + \epsilon^2) \cdot (\sum \Delta D_2^2 + \Delta S^2)}}{(2\epsilon + \epsilon^2)} \tag{3}$$

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TN118 – Annex A

Annex A provides a worked (conservative) example for how to calculate the displacement values for the equation shown previously.

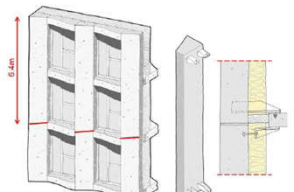


Figure A1 – Precast concrete façade panel

Movement	Displacement	Description
Fabrication and installation tolerances	+6 mm	This is taken from BS 8297:2017, clause 11.5.
Irreversible moisture movement	0.03 – 0.06%	Taken from BRE Digest 228, Table 1, which gives irreversible movement as shrinkage for steel-fibre reinforced concrete. Unless it can be established that the panels are sufficiently cured prior to sealant application, this movement should be considered as an in-service displacement. This is a conservative approach, and a qualified person could choose to take a less conservative approach.
Thermal movement	$\Delta S = 14 \times 10^{-6} \Delta T$	BRE Digest 228, Table 1, which gives coefficient of linear thermal expansion for steel-fibre reinforced concrete. Table 2 of the same digest gives a minimum and maximum temperatures (valid for the UK) for a heavyweight, light coloured cladding material as: -20 to 50 °C.
Reversible moisture movement	+0.02 – 0.06%	Taken from BRE Digest 228, Table 1, which gives reversible movement for steel-fibre reinforced concrete.
Slab deflection	+10 mm	This is assumed and should be provided by the structural engineer.
Column axial shortening	-2 mm	This is assumed and should be provided by the structural engineer.

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TN119 – Interfaces and joints - Procurement

Target Audience:

- Anyone and everyone involved in tendering, contracts, procurement, construction.

Scope:

- Focuses on areas where interface coordination can become problematic and provides advice and guidance for avoiding conflicts relating to interface design and on-site coordination.

Summary

55 Interfaces are a necessary part of construction, allowing for changes in materials, construction forms, works packages and more.

56 The procurement of interfaces, particularly contractor interfaces (between works packages) can introduce additional project and contract complications requiring some additional coordination, oversight and planning.

57 Elements to consider include:

- Requirements at different construction stages,
- Responsibility and liability,
- Responsibility of performance testing,
- Coordination of drawings,
- Coordination of works.

58 Coordination of works should be carefully considered, including, but limited to considerations around:

- Access,
- Protection,
- Temporary performance,
- Timeframes,
- Penetrations.

59 In general, these elements require comprehensive specifications, clear identification of responsibilities, and early coordination.

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TN119 –Recommendations at different RIBA stages

Includes a brief discussion on elements to consider with regards to interface procurement and coordination for different RIBA stages.

- It should be noted that each project will require its own considerations.

17: Stage 4 (technical design)

- Drawings should provide indicative details of the interfaces,
- Specifications should identify performance and testing criteria for physical interfaces,
- Specifications should (as appropriate/practical) assign responsibilities,
- If retained at this stage, specialist contractors should be coordinating details and sequencing. The earlier this is accomplished the better,
- Drawings should clearly identify who 'owns' the interface parts,
- Specific materials should be listed, and compatibility confirmed,
- Contractual interfaces (that don't coincide with a physical interface) tend to be created at this stage (if at all). CWCT recommends avoiding these where possible. Contractual interfaces, where they exist, should be accompanied by additional coordination and oversight. The processes for these should be established with the creation of the contractual interfaces.

18: Stage 5 (manufacturing and construction)

- Construction drawings should be accurate and updated promptly (as required) to reflect changes from all elements of the interface detail and to eventually form the as-built drawings,
- The programme should clearly identify the sequence of interface parts,
- Each sub-contractor, specialist or trade contractor should check that the material or product to which they are fixing is correctly positioned and appears as shown in the accepted drawings,
- Access, timing and protection of works should be coordinated between relevant parties.

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TN119 – Coordination of design and works

42 Construction (Design and Management) Regulations 2015 (CDM) under the 'Contractors' roles and responsibilities': requires that 'contractors working on projects involving more than one contractor must coordinate their work with the work of others in the project team.'

43 Building regulations 2010, requirement 11K (3) states: 'In providing a design, a designer must take all reasonable steps to provide sufficient information about the design, construction and maintenance of the building to assist the client, other designers and contractors to comply with all relevant requirements.'

44 Building regulations 2010, requirement 11K (4) states: 'Where a designer is carrying out only part of the design of the building work which comprises a project, the designer must consider other design work which directly relates to that building work and report any concerns as to compliance with all relevant requirements to the principal designer.'

45 Building regulations 2010, requirement 11L (3) states 'In relation to building work, a contractor must take all reasonable steps to provide sufficient information about the work to assist the client, other contractors and designers to comply with all relevant requirements.'

46 Building regulations 2010, requirement 11N (2) states: 'The principal contractor must take all reasonable steps to ensure:—
(a) contractors and any other person involved in relation to the building work cooperate with the client, the principal designer, the principal contractor and each other (including any successor in a role);
(b) the building work of all contractors is coordinated so that the work is in compliance with all relevant requirements; and
(c) contractors and any other person involved in relation to building work comply with the duties under these Regulations.'

50 Building regulations 2010, requirement 11L (4) states: 'Where a contractor is carrying out only part of the building work which comprises a project, the contractor must consider other work which directly relates to their building work and report any concerns as to compliance with all relevant requirements to the principal contractor.'

51 When coordinating the sequencing, considerations include, but are not limited to:

- Access. Which trade will have access first and how will they ensure appropriate access remains for the subsequent trade?
- Protection. Whichever works are completed first should be appropriately protected but in a way that still allows the subsequent works,
- Temporary performance. What temporary performance is required (e.g., weather-tightness) and how is this provided, is the temporary performance provided by temporary components, how does this affect access, material compatibility, and other performance and coordination elements?
- Timeframes. This relates back to the other bullets. What is the period of time the interface will be left in the temporary condition? Will the materials still be workable, clean, etc if left for the expected period of time (considering reasonable delays also)?
- Penetrations. What penetrations are required through one system and/or the other? What party is installing the things, brackets or similar that penetrate the other system? Which party is responsible for ensuring the performance at the penetration is maintained?

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Questions?



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