

Hall's Notes and Queries

NQ3

Water vapour permeability: Errors in BS EN ISO 12572:2016¹

In our recent review² of water vapour permeability, we noted that the standard BS EN ISO 12572:2016 contains several errors. It may be useful to identify these.

1. Eqn 7 is **not** the Schirmer equation.
2. Eqn 8 of BS EN ISO 12572:2016 is wrong. It appears to be derived from a simple transcription of the original Schirmer equation (as published in 1938³), with Schirmer's factor 0.083 printed as 0.086. The values of δ_a calculated from this equation are in Schirmer's original unit, not the SI unit of water vapour permeability used in the standard. (The corresponding equation of ASTM E96:16⁴, Eqn 5, is derived from the original

¹British Standards Institution (2016) EN ISO 12572:2016 Hygrothermal performance of building materials and products—Determination of water vapour transmission properties—Cup method (ISO 12572:2016). BSI Standards Ltd, London

²C Hall, G J Lo, A Hamilton (2024) Water vapour permeability of inorganic construction materials. *Materials and Structures* v57, 39.

³R Schirmer (1938) Die Diffusionzahl von WasserdampfLuft-Gemischen und die Verdampfungsgeschwindigkeit. *Z des VDI Beih Verfahren* 6:170–177

⁴ASTM (2016) E96:16 Standard test methods for water vapor transmission of materials. ASTM, W Conshohocken, PA

Schirmer equation, and is correct.)

3. The quantity δ_a (as listed in section in 3.2) and used in Eqn 8 and Eqn 11 is printed as δ_{air} in Eqn 7 and again in Eqn 9. The reader must assume these two quantities are the same.
4. The quantity R_D used in Eqn 8 is not defined in section 3.2. Instead the related quantity R_V (not used in Eqn 8) is defined in section 3.2.
5. In Eqn 4 (the Magnus equation), the reader must assume that p is the vapour pressure of water, although p is defined in 3.2 as the barometric pressure. If Eqn 4 is used to calculate the water vapour pressure it should be made clear that the unit is Pa.

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