Air and Vapour Control Layer's, (AVCL's) and condensation risk

TECHNICAL OVERVIEW

What are AVCL's?

AVCL's are a 'barrier' layer that is designed to prevent/ limit the movement of moist air from inside the building to into the structure where it could condense and cause damage.

What makes them different to VCL's?

A VCL, or Vapour Control Layer, is designed to prevent/ limit the movement of vapour, whereas an AVCL also prevents/ limits the movement of air alongside vapour.

What is the AVCL's purpose?

As mentioned, it is to prevent/ limit the movement of moist air to avoid condensation.

If vapour can reach cold parts of the structure, such as between the cold side of the insulation and the waterproofing layer, condensation can form leading to mould, rot or condensation leaks. Condensation can lead to damaging the waterproofing, insulation and even the structural integrity of the building itself. It can also lead to harmful living spaces for occupants of the building if mould growth gets out of hand.

How are AVCL's effectiveness measured?

On any AVCL TDS, there should be a 'Water Vapour Diffusion-equivalent' value, or 'Sd' for short. In general, the higher the value is, the less vapour will be able to travel through the AVCL.

SOPREMA UK I SOPREMA House, Freebournes Road, Witham, ESSEX, CM8 3UN
Tel: 0330 058 0668 I **Mail:** techsupport@soprema.co.uk

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Which AVCL should you use?

From a technical standpoint, whichever AVCL has the highest Sd value, from a sales standpoint, whichever AVCL has the highest margin, but in reality there is no clear answer. Factors such as which insulation and waterproofing has been used, the location, the testing period and the building usage all affect which AVCL is best for your project.

Unsurprisingly, an office building with ventilation, such as an aircon unit, and is only inhabited during working hours, has vastly different internal humidity levels to say a swimming pool. On that same line, a building by the coast will likely be more humid than a building in the centre of the country.

To the right I have created a table of our 'most common' AVCL's and their respective Sd value

Soprema AVCL	Sd (m)
Sopravap Stick A 07	2,435m
Sopravap Stick ALU S16	1,850m
Sopravap EVA 35	1,500m
Sopravap Stick A 15	470
Vapor Flag	48-96

How much condensation is too much condensation?

While it should not be our responsibility to decide this, we can offer advice to clients. We should always suggest a system that shows no condensation in the calculation, however in some circumstances this is not possible. No matter the result, even if the calculation shows no condensation, it should be down to the clients Structural Engineer to decide if the results are acceptable and pose no risk to the building or occupants.

Below is an extract from BS 5250 to help understand the effects of condensation. Many calculations we issue show a build-up of less than 1g/m2 condensation that dries in the summer months. This is often raised as a concern by clients but as you can see below, it is way below the predicted amount required for droplets to form. Minimal amounts of condensation can still potentially cause damage, so it is important to run all calculations past the clients Structural Engineer.

It is important to note that the software assumes near perfect workmanship and any damage to the AVCL can have drastic effects to the results.

Amount of condensate	Effect
<30	A fine mist which does not run or drip
30-50	Droplets form and begin to run down vertical surfaces
51-250	Large droplets form and begin to run down sloping surfaces: g/m^2 runs down a 45° slope g/m^2 runs down a 23° slope
>250	Drops form and drip from horizontal surfaces

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