

# Vapour – A Big Industrial Problem You Probably Didn't Realise You Had

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Most people hardly give vapour permeability a second thought, which is a pity as it creates severe problems in almost every industry - costing UK industries several billion pounds a year! Problems range from equipment breakdown to spoiled foods and from electronics failure to poor print quality, buildings that fall down or leaking hydrocarbons. It has even caused missiles to fail and pizzas to go soggy.

So, what is vapour permeability? It's the ability of a gas / vapour to "permeate" through any material or barrier, even those that keep liquids out. The vapours then condense back to a liquid on the other side where they become trapped and cause all of the problems above – and many more.

You can't prevent it happening - but you can usually reduce it to a level where it doesn't cause a problem. What you need is to be able to measure this effect and choose materials, composite materials or product designs that are right for your specific application.

An additional problem is that manufacturing processes themselves can change permeability by some 400%, especially when they involve bending, forming, joining, sealing or heating.

Until thirty years ago permeability was measured by sealing a little cup of absorbent with the material, weighing it, waiting weeks or months then weighing it again to see how much vapour had accumulated. This takes time and money but is still widely used.

However, a series of instrumental techniques have been developed which can quickly produce a precise measurement, sometimes in just 30 minutes.

There are two ways to measure the permeability of a finished component or product. The most reliable is to include, a vapour source within the container which has a dry gas pumped around it. Any vapour that escapes is measured using a variety of techniques. The alternative involves passing the dry gas through the enclosure itself, but placing the component in a controlled chamber.

## Material samples are tested using a special enclosure.

The right equipment can measure the permeability of either the finished component or a material sample– even if this is a coating. You can even measure the permeability of an edible film, in-situ, in a pizza (they to keep the base firm and the topping moist!).

Testing and QCing materials and products is the only real solution and we can provide the equipment, lab tests or consultancy to help – but the right choice boosts efficiency, reduces failure, enhances printing, preserves content and extends both working and shelf lives.

And that's not bad for a solution to a problem you didn't know you had!

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