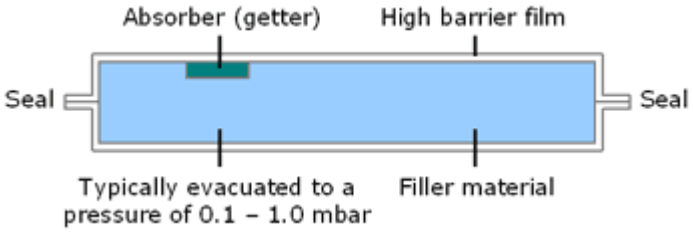
VIPs (vacuum insulation panels)



Background

Improving thermal insulation can increase the thermal performance of refrigerated containers and spaces, including transportation boxes, refrigerators, freezers, cold storage rooms and refrigerated transport vehicles.

The standard way to achieve better insulation is to increase the insulation's thickness. In many situations this is not feasible, as the overall dimensions are restricted and so increased insulation thickness reduces the usable volume and thus the functionality.

Vacuum Insulation Panels (VIPs), however, offer greatly enhanced thermal resistance for the same or even reduced thicknesses. This means that using VIPs in the insulation of containers, rooms and other spaces allows their overall external size to be reduced, internal size increased or allows an increase in the container's thermal performance.

VIPs typically comprise an open-cell insulating material, vacuum packed inside specially designed laminated films. Inserts known as 'getters' are often included within the sealed panel to absorb both residual gasses and those that inevitably leak through the laminated bags over time.

Typical mid-panel conductivities of VIPs are up to 5 times lower (i.e. better) than those of standard insulation materials.

Developing innovative insulating solutions based on VIP technology is an ideal way to achieve better thermal performance and, in many cases, substantial reductions in energy consumption.

How frperc can help

Developing innovative insulating solutions based on VIP technology is an ideal way to achieve better thermal performance and, in many cases, substantial reductions in global energy consumption.

frperc have experience of incorporating VIPs into existing refrigerator and insulated box designs to create working prototypes and have written a software kit to predict performance improvements that could be achieved by the addition of VIPs to typical products and so aid their design.

Performance of insulated polyurethane boxes was greatly improved by the addition

of VIPs, with temperature preservation times of more than double the times for standard polyurethane boxes.

Domestic refrigerated appliance (refrigerators and freezers) performance was also improved, with conduction heat loads reduced to 60% of those for the standard appliance.

It is estimated that significant improvements could still be made in both cases.

To discuss any aspects of using VIPs or their incorporation into existing equipment or designs, please contact us on +44 (0)1472 582400 or email us on frperc@grimsby.ac.uk