

A VIP refrigerator

Energy efficiency and premium-quality insulation with AEROSIL® by Evonik for vacuum insulation panels.



Modern refrigerators need to offer plenty of room to store all our fresh produce, aromatic cheeses, juices and assorted other household foods. They also need to be energy efficient. And that's where top-quality insulation comes into play as one of the factors to ensure energy-efficient refrigeration. Many manufacturers choose AEROSIL®-based vacuum insulation panels (VIP), since this fumed silica produced by Evonik Industries possesses excellent insulation quality achievable in just a thin insulation layer.

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Evonik. Power to create.

Electricity has never been more expensive. Rising energy costs are a strain on the resources of many private households—year in, year out. So energy conservation has long been more than just an ecological imperative. It may not always be an easy decision to make the switch, but investment in new energy-efficient appliances does reduce electricity requirements substantially and lastingly. Refrigerators, it turns out, have a particularly big appetite for electricity, given the need to keep them running non-stop, year-round. According to calculations by Germany's Federal Environment Agency, a refrigerator with an "A+++" energy-efficiency classification is liable to consume less than half the amount of electricity of an old one with an "A" classification.

The insulation used in refrigerators is an all-important factor in achieving such a coveted energy-efficiency qualification. To achieve this top result using conventional insulation material requires fitting refrigerators with very thick layers of insulation. And that would mean making such appliances bigger than the standard dimension used in kitchen design. What's more, thick insulation reduces valuable refrigeration space for fresh-food storage on the inside.

That is why there has been such a keen focus on developing vacuum insulation panels (VIP) for refrigerators built to meet the requirements for top energy-efficiency classification. The idea originated more than 25 years ago as part of the drive to design particularly small refrigerators such as the ones used in hotel rooms. The aim was to create as much holding capacity as possible in a compact-size refrigerator. The obvious answer was to reduce the amount of insulation material needed. And the experts at Evonik Industries provided the suitable solution: AEROSIL® filled VIP. Its structure as an excellent core material makes fumed silica an excellent core material in vacuum insulation.

Top insulation in thin layers

VIP works much like a double-walled thermos skin. The AEROSIL® is vacuum packed and sealed inside a special multi-layered, exceptionally airtight and moisture-impermeable film. The vacuum increases AEROSIL's® already good insulating efficiency five-fold. This prohibits convection in the insulation material, meaning the natural



AEROSIL® by Evonik is an excellent insulator used in vacuum insulation panels to reduce energy requirements.

Photo: Porextherm Dämmstoffe GmbH

conveyance of heat from warm to cold. While thermos containers prevent all too much heat from being released to the outside, VIP in refrigerators prevents ambient heat from moving into the interior of the appliance. The silica functions as an insulator, but also provides support for the panels, preventing them from caving in despite the vacuum effect.

A premium insulation material

“The better the quality of the structure of the silica in its core, the better the insulation effect of VIP,” explains Dr. Frank Menzel, Manager Applied Technology Thermal Insulation at Evonik Industries. Even though it is much, much thinner, VIP achieves around eight to ten times better insulating values than conventional insulation materials. What this means in practice is that energy consumption is significantly reduced while the available refrigeration space inside is increased.

A growing number of refrigerator components suppliers therefore rely on the beneficial qualities of AEROSIL®. One such supplier is Porextherm Dämmstoffe GmbH, a Kempten-based company that



has been manufacturing VIP for more than ten years now. It produces this panels in a variety of sizes and thicknesses, ranging from ten to fifty millimeters, to meet the specific requirements of different refrigerator manufacturers. "As a producer of high-performance insulation material, we made a deliberate choice to use premium-quality silica made by Evonik", says Peter Stubner, Managing Director of Porextherm. "We're impressed by the quality and processing properties of this product. AEROSIL® allows us to make absolute-premium-standard VIP." Stubner says that the demand for vacuum insulation panels is constantly on the rise. "We will therefore be further optimizing our manufacturing processes." Another of its virtues is that AEROSIL® filled VIP is inc-redibly durable, with a lifespan of up to 30 years.

That makes VIP not only a cost-efficient solution, but an environmentally valuable one, as well. The reduction of CO₂ emissions helps to diminish the greenhouse effect. "With AEROSIL® we're responding to both present-day and emerging climate-protection and energy-efficiency challenges," stresses Dr. Hark-Oluf Asbahr, Director Marketing Thermal Insulation at Evonik Industries.

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