SEALANTS

WITH EXPANDABLE MICROSPHERES

Make lower cost sealants with reduced weight, increased volume and improved flexibility

OVERVIEW

Product Type
Expanded microspheres

Main Benefits
Cost savings
Improved flexibility
Low binder demand
Low water absorption
Reduced shrinkage
Reduced weight

Applications
Acrylic sealants
Caulks
Hybrid adhesive-sealants
Polyurethane sealants
Silicone sealants

Expandable Microspheres

A small quantity of **expanded microspheres** as a lightweight filler in caulks and sealants can give a **large reduction** in **density** and **add** a large amount of **volume**, resulting in **lower** volume **cost**.

Additional cost savings may be possible for a sealant containing expanded microspheres as **less product**, typically 10% less, is needed to fill a cartridge.

The microspheres can be used in many **different sealant types**, such as, acrylic, polyurethane and silicone. Best results are usually seen in silicone, polysulfide and polyurethane sealants.

The ultra-lightweight expanded microspheres are highly **elastic**, compressible spherical particles with low specific surface area, **low binder demand** and **low water absorption** by volume. The microspheres are gas-tight and, **keep** their **form** and **volume** during production and application.

In Acrylic & 2K PU

Advantages of using expanded microspheres

Reducing Cost & Improving Properties

With an extremely low density, expanded microspheres **add volume** without adding weight, or **lower weight** without losing volume. **Cost savings** can be achieved at addition levels of **0.5%** w/w, or less.

Using **0.3%** w/w expanded spheres with a particle size of 40 µm and density of 0.025 g/cm³, **volume shrinkage** can be reduced from 10% to 4% (ASTM C-733).

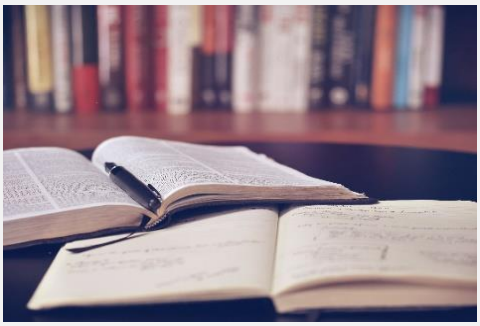
At **0.6%**, **recovery** is **improved** and **deformation reduced** when subjected to 25% elongation for 10 minutes, then allowed to recover for 10 minutes. A sealant containing the microspheres reaches a recovery of up to 88%, while sealant formulated without the spheres recovers to 78%.

Tensile strength at maximum and at break remain unaffected, while elongation at break is. In the presence of microspheres, **elongation at break** decreases from 310% to 390%, to 240% to 300%. This shows the spheres give indications of fracture, but only when the material is extremely loaded.

180° **dry peel adhesion** tests show no delamination between the layers of sealant and substrate. Adhesion to stainless steel and aluminium is stronger than the sealants themselves. Cohesive failures indicate no differences between sealants made with or without expanded microspheres.

In **acrylic sealants**, expanded microspheres give a **low density**, **low viscosity**, creamy and homogeneous product, which is **easy to apply**. Its low hardness together with **improved recovery** at elongation and compression result in a sealant with **improved resilience**. Sealants show good resistance to **sagging** and **slumping** when applied vertically. They are extruded with **higher capacity** than a standard sealant, which means sealant viscosity decreases with increased microsphere content at 50 psi. Volume shrinkage during drying is reduced.

2K PU sealants formulated with expanded microspheres are used for horizontal and vertical applications in construction and submerged environments, such as, canal and reservoir joints. These sealants are capable of up to **50% joint movement**, while offering exceptional **adhesion** to substrates without priming and excellent **weather resistance**. They can be **painted** with oil, rubber and water based paints. The effect of the spheres on mechanical properties is low, up to addition levels of 20% w/v.



What's Next?

Further Reading

Our **Technical Guide – Expandable Microspheres** takes an in depth look at the properties of expandable microspheres. A great introduction if you are new to the world of expandable microspheres.

Hybrid adhesives and sealants offer an innovative and versaltile solution, the strength of an adhesive, together with the elasticity and flexibility of a sealant. To discover about using Expandable Microspheres in sealants, refer to our **Application Guide – Expandable Microspheres in Adhesives.**

For guidance on the best way to handle and mix dry expanded microspheres take a look at our **Technical Guide – Handling Expandable Microspheres**.

Do you need help **choosing the right grade** for your application, **more information** or a **sample** to try?

We are always happy to help and answer any questions you may have. Please do not hesitate to contact us:

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