

PLASTISOLS

WITH EXPANDABLE MICROSPHERES

Make elastic and flexible, thermoplastic and compressible, lightweight plastisols



OVERVIEW

Product Type

Expanded microspheres
Unexpanded microspheres

Main Benefits

Improved flexibility
Low wear on tools
Reduced noise & vibrations
Reduced weight
Uniform cell structure

Applications

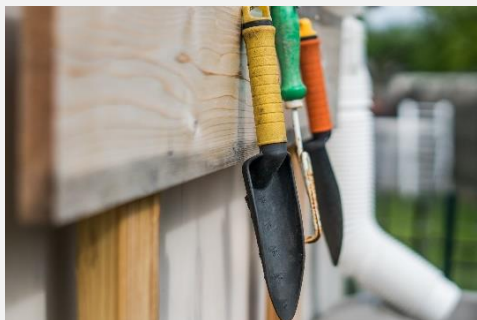
Bicycle handlebar grips
Car sealants
Playground equipment
Sound damping coatings
Tool grips
Under body coatings

Expandable Microspheres

The **ultra-light density** and **closed cell structure** of expandable microspheres creates a **uniform foamed plastisol**, making them suitable for car sealants and underbody coatings.

Both **dry expanded** and **unexpanded microspheres** impart excellent chemical resistance, good flexibility and resilience, high pressure resistance and thermal stability, surface smoothness and, maintained or improved stone chip resistance. These **properties** are influenced by the particle size of the microspheres and chosen to improve a particular property, as required.

Plastisol containing expandable microspheres gives a **soft impact resistant surface** which can **reduce** metal-on-metal sounds such as **buzzing, rattles** or **squeaks**. The plastisol also gives the all important **weight reduction**, contributing to **lower fuel consumption**. Dry expanded microspheres give an immediate weight reduction after addition, with good **flexibility** and **resilience** after gelation.



Preparation, Addition & Baking

When **preparing** PVC-plastisol, microspheres can be added at any time. When added last the high viscosity will make them easier to disperse. The **spheres** can **withstand** mixing at **high shear rates**, without damage.

The **addition** level of expanded or unexpanded microspheres is determined by the required final density of the plastisol. When **expanded microspheres** are used, the plastisol density can be determined immediately. For **unexpanded microspheres**, a **1% w/w** addition under normal expansion can give the same plastisol density after gelation as 30% v/v of expanded microspheres.

PVC-plastisols made with **unexpanded microspheres** are resistant to high pressure and high shear, making airless spray application possible without negatively influencing the expansion capacity of the microspheres. The larger the sphere, the better.

Unexpanded microspheres quickly expand during baking, and remain intact through the depth of the plastisol. Oven temperatures can vary, from the centre to the edges. A large process window for temperature and time is needed for a consistently low density. This can be achieved with thermomechanically stable unexpanded microspheres.

Properties

Resistance and strength

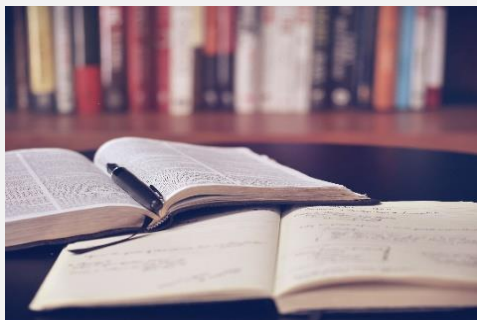


Expandable spheres are **chemically resistant** to plasticisers, such as DINP, commonly used in plastisols for sealants and underbody coatings.

For a plastisol containing 1% w/w 80 µm unexpanded microspheres and 30% v/v 80 µm expanded microspheres **baked** at 150°C for 40 minutes **adhesion** between the baked plastisol and an electro-coated steel plate is **very strong** when an effective adhesion promoter, such as tri-ethylene-tetra-amine, is used resulting in cohesive failure, with **expansion** and **heat resistance** of the spheres being unaffected by the adhesion promoter.

Tensile strength is improved and **elongation at break** increased. In the presence of the adhesion promoter plastisol is harder, but is reduced by the expanded compressible microspheres.

Stone chip resistance tests dropping stainless steel M4 nuts through a tube from a height of 2 metres on a plastisol coated plate resulted in low abrasion and maintained thickness of coating.



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.

Unexpanded microspheres are also used in plastisol printing inks to create 3D prints and different surface effects. Printing techniques are successfully used on textiles, paper and wallpaper. For more information refer to our **Application Guide – Expandable Microspheres in Printing Inks**.

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

What's Next?



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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Something to Note

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