

HANDLING

OF EXPANDABLE MICROSPHERES

Find out how to handle dry expanded microspheres, whether its in the laboratory or production quantities



OVERVIEW

Product Type

Dry expanded microspheres

Main Benefits

Minimise dusting
Safer work environment

Applications

Laboratory
Manufacturing

Sealing the Process

Dry expanded microspheres are a free-flowing powder with a very low density. By using the right technique dust can be minimised when handling, creating a **safer** and more **pleasant work environment**.

The best way to **avoid problems** with dusting is to prevent dust from leaking out of your process to the surrounding environment.

At connections between different parts of your process, leakage can be avoided by using a **filter** and **rubber sleeves**.

A **filter** may be required to separate the microspheres from the air leaving the mixing vessel. Sintered polyethylene filteres, such as **PIAB**, are recommended.

Rubber sleeves are used at different parts of a process to prevent dust leakage. They must be made from **semi-conductive material**.

Use **local exhaust** where the process cannot be completely sealed,



Keeping it Clean & PPE

It's important to have a very good **cleaning routines**, and take care of any **leakage** or **spillage**.

We recommend you use a **vacuum cleaner** with an **Ex II 3D** classification. However, you need to make your own assessment in what environment the vacuum cleaner might be used. You can get **recommendations** from your supplier.

If dusting cannot be avoided, use **respiratory protection**. For shorter working periods you can use a dust filter mask, particle filter P2 (EN 143). For working periods of several hours use a fresh air mask. If you work with dry expanded microspheres frequently we recommend the use of **gloves** to prevent dehydration of your skin.

Handling System

For bags of dry expanded microspheres



The handling system makes it easy to empty bags of dry expanded microspheres. It consists of a spear, diaphragm pump, metal hose (and couplings), air hose and stand.

The **spear** allows bag to be punctured without dusting.

The **diaphragm pump** is used to pump the microspheres into the mixing vessel, being placed as close as possible to the destination of the microspheres. Most types of diaphragm pumps can be used, a capacity of about 400 litres/minute is suitable.

For **metal hose** and couplings, we use $\varnothing 2.0''$, to connect the spear to the pump.

An **air hose** is connected to the spear, as it is necessary to fluidise the material in the bag during emptying.

The **stand** is for holding the bag during emptying.

For safe handling, it is important that the handling system is grounded.



Adapting the Handling System

A Quick Start Guide

Here is your step-by-step guide to using the handling system:

Step 1

Pierce the spear slowly through the bag. Try not to make the hole wider than necessary.

Step 2

Move the ring against the shoulder in order to fasten the bag. Rotate the ring to tighten it up.

Step 3

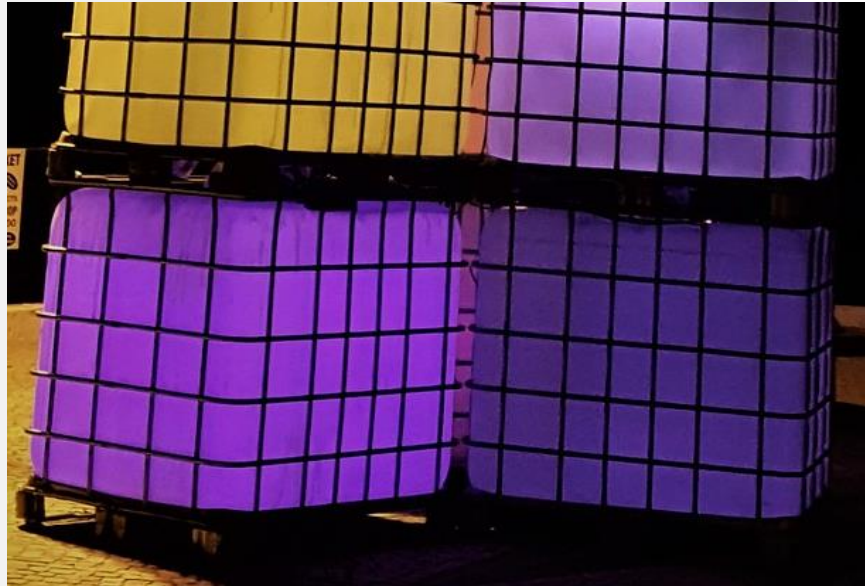
When the spear is inside the bag and fastened correctly, start the diaphragm pump.

Step 4

Open the air pressure valve to fluidise the powder, for 3 to 5 seconds, then close the valve. This minimises the amount of air introduced into your system. Shaking the bag can help with fluidising the microspheres.

Step 5

Turn on the pump to empty the bag. When the bag is empty, stop the pump. Pull the bag off and roll it together, starting where the hole is.



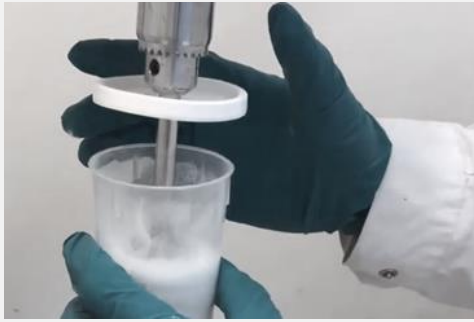
It is possible to adapt the handling system, to **pump directly** from an IBC filled with dry expanded microspheres, by not using the spear, and coupling the metal hose directly to the IBC.

To **reduce pressure build-up** when fluidising the microspheres with air, use an air bleed valve on the top opening of the IBC, and empty the IBC from the bottom.

Tilting the IBC at a **slight angle** when emptying will **maximise the quantity** of microspheres transferred from the IBC, to your mixing vessel.

Over time microspheres in an IBC will settle and de-aerate. This means, the volume of microspheres in an IBC will reduce on standing. On transferring into your mixing vessel, **minimal air** will be introduced.

On transferring the microspheres to your mixing vessel, **loss of the microspheres** can be **minimised** by pumping them into the bottom of your mixing vessel, rather than the top.



Mixing it Up

Most **mixing equipment** can be used for mixing dry expanded microspheres, for example planetary mixers, dissolvers and butterfly mixers. A higher mixing speed may be needed to get a **proper dispersion** of the spheres in the matrix.

Viscosity of the mix, mixer speed, amount of material and shape of the mixing vessel **influence dispersion**.

Therefore, it is recommended the **mixing equipment** and **mixing time** are evaluated, to determine sufficient dispersion of the dry expanded microspheres.

Due to the **highly compressible nature** of the microspheres, practically **no spheres are destroyed** during the mixing operation.

For **rigid spheres** however, a rather high proportion of the spheres are often **destroyed** during the mixing step.

Sampling

Our top tips for handling samples in the laboratory



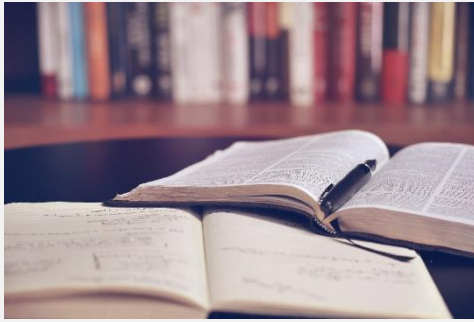
Wearing **appropriate PPE**, weigh out the dry expanded microspheres using **slow movements** to avoid dusting.

The fume hoods' **exhaust fan** should **not be running** to avoid spreading the spheres.

A **large plastic pipette**, such as a turkey baster, makes it easier to weigh out the spheres and add them to your matrix.

For mixing the dry expanded microspheres with a liquid, **make a lid in the hole of the lid** of your container for the mixer.

Start **mixing slowly**, then gradually increase speed.



Further Reading

Our **Application Guides** and **Case Studies** show the many other ways in which expandable microspheres can be used:

- Adhesives
- Automotive bodyfiller
- Concrete
- Crack filler
- Elastomeric coatings
- Fairing compounds
- Faux leather
- Faux marble
- Filling compounds
- Leather finishing
- Lightweight foam
- Modelling board
- Modelling clay
- Paints & coatings
- Plastisols
- Polyester putty
- Porous ceramics
- Printing ink
- Rubber
- Sealants
- Silicone rubber
- Technical textiles
- Thermoplastics

If your application is not listed, then please get in touch so we can help you.

Discover the unique properties of expandable microspheres and the benefits of using them in our **Technical Guide – Properties of Expandable Microspheres**.

What's Next?



Would you like to discover if there are any **different handling options** suitable for your process, or find out if our pre-wetted and completely **dust-free microspheres** would work in your application?

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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