

FILLING COMPOUNDS

WITH EXPANDABLE MICROSPHERES

Make applying and removing the filling compound simple while protecting cables



OVERVIEW

Product Type

Expanded microspheres
Pre-wetted expanded microspheres

Main Benefits

Cost savings
Reduced dielectric constant
Reduced water penetration

Applications

Electrical cables
Fibre optic cables
Subsea cables
Underground cables

Expandable Microspheres

Expandable microspheres are widely used in **petrolatum** cable filling compounds. The microspheres **raise** the **drop melting point** and **reduce** the **dielectric constant**.

Dry expanded microspheres can be used as a lightweight filler in both standard petrolatum, and higher melting point petrolatum. In addition to **reducing weight** and **changes in volume** on cooling and heating, the spheres can resist **high filling pressures** without breaking. Increased product volume contributes to **lower product cost**.

As a free-flowing very lightweight powder, with **densities** as **low** as **0.025 g/cm³**, dust can be minimised by using the right handling technique. Alternatively, pre-wetted and **dust-free microspheres** may be used.

Boud Minerals produce dry expanded microspheres in the **United Kingdom**. From them we produce blends, including our **pre-wetted** and completely **dust-free Microspheres 939** and **Microspheres 941**.



Why use Expandable Microspheres?

Protection of cables against **water** penetration is just one of the properties which has been shown to improve by adding **3 to 6% w/w of dry expanded microspheres** to a **petrolatum** cable filling compound:

Reduced density, e.g. from 0.90 g/cm³ to 0.45 g/cm³

Reduced dielectric constant, e.g. from 2.2 to 1.6, to increase capacity of the cable

Increased drop melting point, by approximately 5°C

Reduced volume contraction on cooling, and expansion on heating, e.g. from 6% to 2%, between 10-65°C

Less problems with internal pressure in cables at elevated temperatures

Less shrinkage, therefore no problems with water penetration.

Resistance to high filling pressures, dry expanded microspheres are highly compressible so can be forced into, and stay in, small spaces between conductors, further decreasing water penetration in damaged cables

Increased viscosity even at elevated temperatures; while this makes it necessary to change the way cables are filled, the compound will be less inclined to smear and easier to remove from conductors

Where to Use

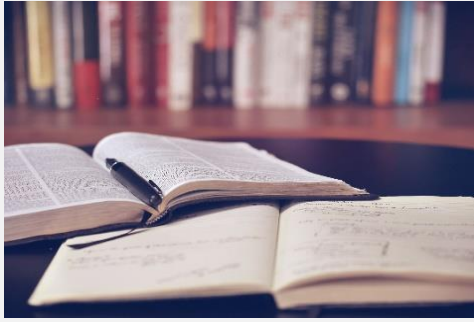
And how to mix



In the event of **damage** to a **cable covering**, cable filling compounds containing dry expanded microspheres **protect** conductors, serving as a defence **against water** and **corrosion** in:

- Electrical cables
- Optical fibre cables
- Subsea, or submarine, cables
- Telecommunications cables
- Underground cables

For mixing, an ordinary **batch mixer**, with heating and cooling, can be used. Due to the large difference in density between the expanded microspheres and petrolatum an **impeller** that forces the microspheres downwards is recommended. Make sure the **petrolatum** is completely **melted**, normally 65-75°C, before adding the microspheres. The petrolatum and the microspheres must be **thoroughly mixed**. The mixer must be connected to **vacuum** for de-aeration. To **avoid separation** of the petrolatum and the microspheres, the mix should be **cooled** to approximately 50-55°C before discharging. Pressurising the mixer and heating the discharge pipewill **help** in **discharging** the compound completely.



Further Reading

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

Expandable microspheres have a wide range of filling and sealing applications outside cable filling compounds, with further information being found in our application guides, such as, **Application Guide – Sealants with Expandable Microspheres**.

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

t: +44 (0)1406 351988

e: tracey@boud.com

w: www.boud.com

a: Boud Minerals Limited, West Bank, Sutton Bridge, Lincolnshire, PE12 9UR, United Kingdom

Something to Note

The information contained in this guide is a result of our experience and research. It is given in good faith but under no circumstances does it constitute a guarantee on our part, nor does it hold us responsible, particularly in the case of legal action by a third party.