

# AUTOMOTIVE BODYFILLER

WITH EXPANDABLE MICROSPHERES

See how a customer and Boud collaborated to develop an economical, lightweight filler for hot, humid climates



## OVERVIEW

### Product Type

Expanded microspheres  
Pre-wetted expanded microspheres

### Main Benefits

Easy application  
Extraordinary sanding properties  
Price competitive

### Applications

Do It Yourself (DIY)  
Vehicle bodywork repairs

## Old vs New Bodyfillers

**Traditionally** many low cost bodyfillers used in vehicle crash repair tended to be **heavyweight** with densities of around 1.6 to 1.8 g/cm<sup>3</sup>. This kept the cost of the filler low but risked **sagging**, and made the product **difficult** to **sand** and **shape**. These issues slow down the refinish process and ultimately cost more than the saving on the bodyfiller.

**Modern** bodyshops are aware of these issues, and require bodyfillers which **speed** up the **repair** process. If a bodyfiller cannot be **sanded quickly** and **easily** it is of no use. The filler must not block or blind the sandpaper either since this is also expensive to replace.

*Photography by David Kilner:*

*1957 Rover P4 75 featuring T Hutson & G Hutson*



## The Solution

When the customer and Boud Minerals work as a team

### The Challenge

Our customer is an industrial chemical blending and packaging company specialising in products for the automotive care sector.

They have built a reputation working with private label customers to formulate, manufacture and package high quality and value for money products.

Given the customer's need to **produce a new automotive bodyfiller** for a new **export** market within a **short timeframe**, this created a challenge for their technical team, where the new product needed to be:

- **Cost effective**
- **Stable** for storage in **hot** and **humid** climates
- **Extremely lightweight** with good processing properties

To **address** these **challenges**, the customer turned to **Boud Minerals** during their search for a lightweight filler that would give the results they were looking to achieve. They also wanted a manufacturer who would work with them through **product development**, to full scale **manufacture**.

**Boud Minerals** provided all the **technical support** the customer needed from start to finish, from **recommending a material** to meet their requirements, to **resolving** any **issues** that arose quickly and efficiently.



Over the years **Boud Minerals** have worked with **customers** looking to further **improve** the properties of their bodyfiller, reduce density and keep costs down.

For this customer, **glass microspheres** did not give the results they were looking for. Most **polyester putties** use a polyvinylidene dichloride (**PVDC**) **dry expanded microsphere**. While contributing to a lower density, this sphere type is not typically chosen when chemical and temperature resistance are important.

**Replacing PVDC microspheres with** polyacrylonitrile (**PACN**) spheres made it possible to **lower density** further, and achieve the required **chemical** and **temperature resistance**.

The **lower** the **density** of expanded microspheres, the **thinner** the polymer **shell**. Since **PACN** spheres offer **better chemical** and **temperature resistance** than PVDC spheres it is possible to use a lower density grade, without comprising chemical or temperature resistance.



## The End Result

Less than 1% microspheres, more than 50% volume

### The Formulations

The **starting point** was a polyester body filler formulation provided to us by the customer. Using this we were able to show the **effects** of replacing **mineral fillers** and/or **glass microspheres** with PACN dry expanded microspheres:

#### Formulation 1 / Density – 1.14 g/cm<sup>3</sup>

42.6% Polyester resin  
47.7% Mineral filler  
3.4% Glass microspheres  
0% Dry expanded microspheres\*

#### Formulation 2 / Density – 0.95 g/cm<sup>3</sup>

43.6% Polyester resin  
48.9% Mineral filler  
0% Glass microspheres  
1.0% Dry expanded microspheres\*

#### Formulation 3 / Density – 1.07 g/cm<sup>3</sup>

35.8% Polyester resin  
58.2% Mineral filler  
0% Glass microspheres  
0.8% Dry expanded microspheres\*

#### Formulation 4 / Density – 1.78 g/cm<sup>3</sup>

27.3% Polyester resin  
66.6% Mineral filler  
0% Glass microspheres  
0% Dry expanded microspheres\*

#### Formulation 5 / Density – 0.57 g/cm<sup>3</sup>

84.9% Polyester resin  
0% Mineral filler  
0% Glass microspheres  
2.1% Dry expanded microspheres\*

\*Average particle size 40 µm, density 0.025 g/cm<sup>3</sup>. **Boud Minerals** produce **dry expanded microspheres** in the **United Kingdom** to bring down costs, make production more environmentally friendly and improve product availability. This gives our **customers** more freedom in the choice of densities and packaging.



We showed **replacing** the **mineral filler** and/or **glass microspheres**, partially or fully, with **dry expanded microspheres** reduced the density of the putty.

Due to the very **low density** of the dry expanded microspheres, it was possible for us to add large amounts of volume to the formulation and reduce density. Therefore, the **cost**, £ per litre price of the formulation, was **reduced** accordingly.

The image above was taken during the initial stages of our development work. This shows how much **more volume**, and **more product**, you can achieve by using dry expanded microspheres. In our case, approximately **50% more**:

#### Left cylinder / Density – 1.8 g/cm<sup>3</sup>

500g of automotive bodyfiller **without** dry expanded microspheres  
66.6% w/w Mineral filler

#### Right cylinder / Density – 1.1 g/cm<sup>3</sup>

500g of automotive bodyfiller **with** dry expanded microspheres  
58.2% w/w Mineral filler  
0.8% w/w Dry expanded microspheres\*



# The Conclusion

Mission accomplished

## Our Thoughts

Dry expanded **PACN microspheres** (40  $\mu\text{m}$ , 0.025 g/cm<sup>3</sup>) were chosen to offer improvements in **density reduction** and properties, together with a **reduction in volume unit cost**.

With a density of only 0.025 g/cm<sup>3</sup> a **small addition** of this grade has a significant impact on density reduction.

Good **chemical** and **temperature resistance** properties of the PACN spheres are ideal for the customer's putty which is to be stored and used in climates more challenging than we are familiar with in the UK.

The use of **glass microspheres** was **avoided**. Under some process conditions these types of microspheres may **fracture** or break giving **variations** in density between manufactured batches of polyester putty.

Additionally, the resulting dust from sanding a bodyfiller made with glass microspheres contains broken spheres with sharp edges, which may cause eye and respiratory **irritation**.

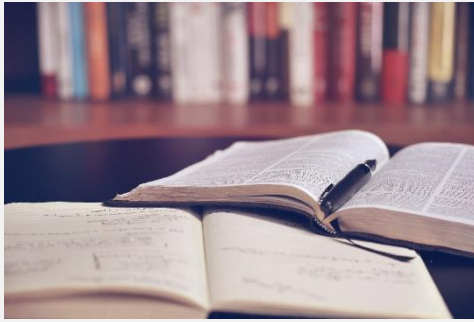
**In contrast**, dry expanded microspheres are elastic, resilient and able to withstand repeated loads of pressure without breaking.



By reducing mineral content and adding dry expanded microspheres, the customer **overcame** all their **challenges** to **produce** an **automotive bodyfiller** that met all of their specific requirements, within their desired timeframe. The customer was in full scale **manufacture** and **supplying** their customers within **6 months** with a bodyfiller:

- Easy to shape, with no sagging
- Fast curing, sandable in 20 minutes from mixing
- Easy to sand, with less dust generated compared to glass microspheres
- Lightweight automotive body filler, with maximum density of 1.1g/cm<sup>3</sup>
- Low cost (to compete with existing heavyweight bodyfillers and more modern lightweight fillers)
- No gloss reduction when over-coated
- Smooth surface when applied, no pinholes
- Suitable for storage and use in hot and humid climates

When the customer moved into **full scale manufacture** we lent a helping hand to show the customer how they could handle the microspheres in an easy and safe way.



## What's Next?

### 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**.



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

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.