

Expancel® BIO microspheres

The future of blowing agents and fillers starts now



Nouryon

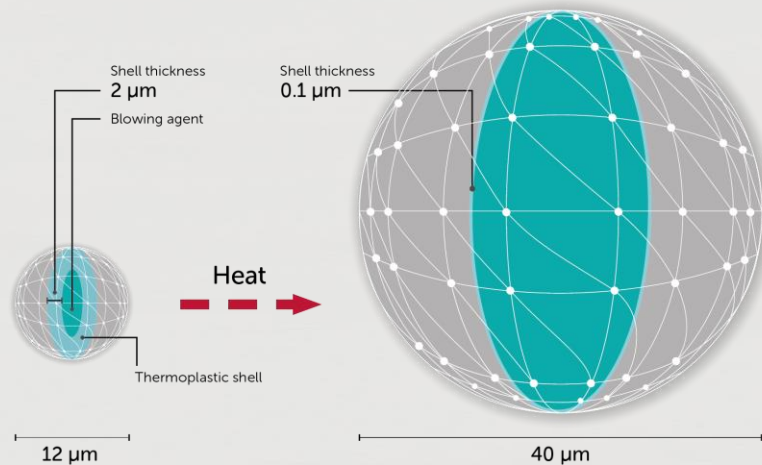
Global network to serve you locally



Expancel® Microspheres

Blowing Agent and Lightweight Filler In One

Expansion up to 60x original volume

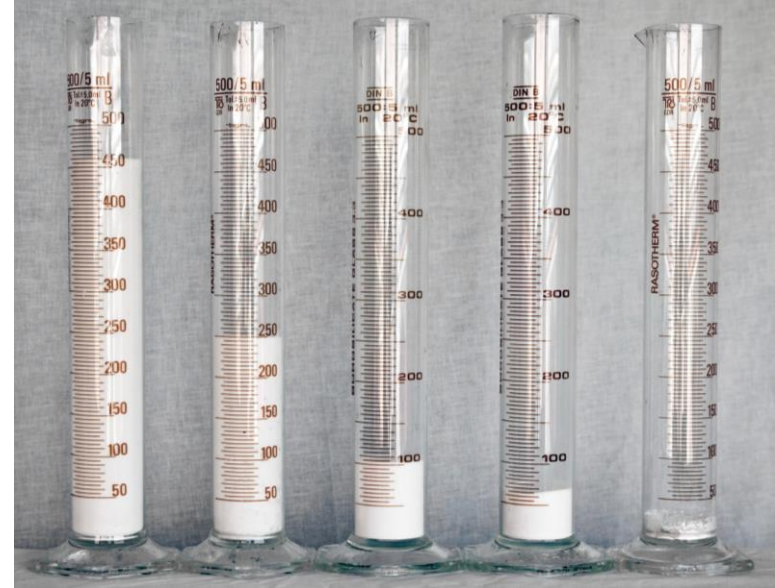


The Magic of Expancel® Microspheres



Reduce Costs by Exchanging Other Fillers

- 100x volume for the same mass as mineral filler
- Typically displace 5 to 50% material by volume in select applications



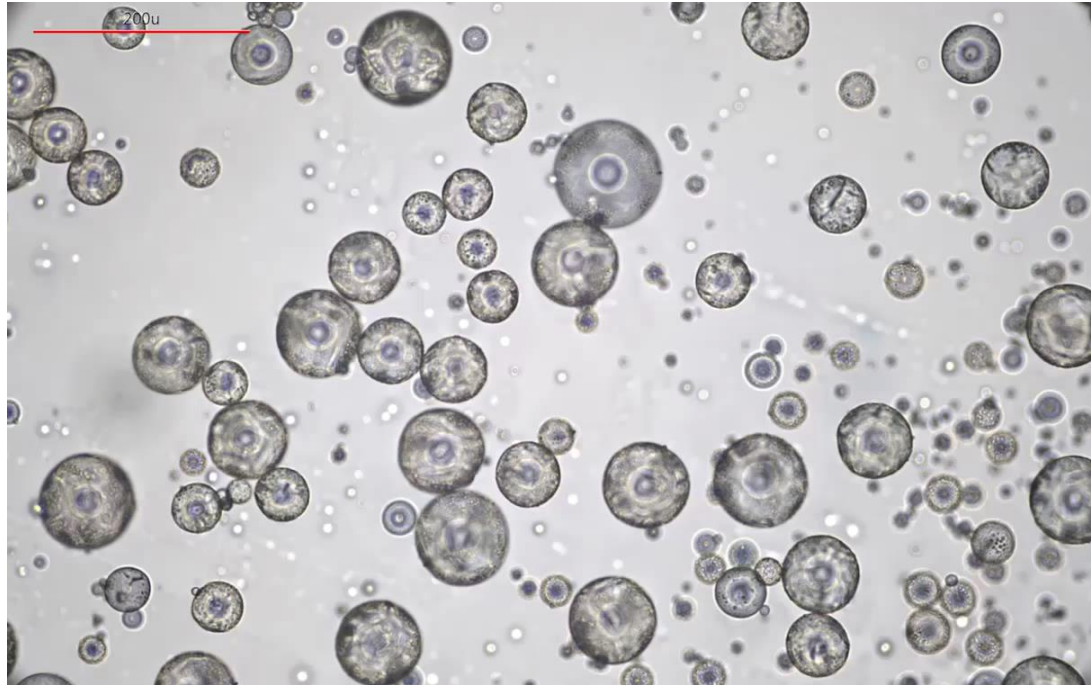
Cylinders with 7 grams each of:

Expancel® d 25 kg/m ³	Expancel® d 60 kg/m ³	Glass MS d 128 kg/m ³	Glass MS d 215 kg/m ³	CaCO ₃ d 2700 kg/m ³
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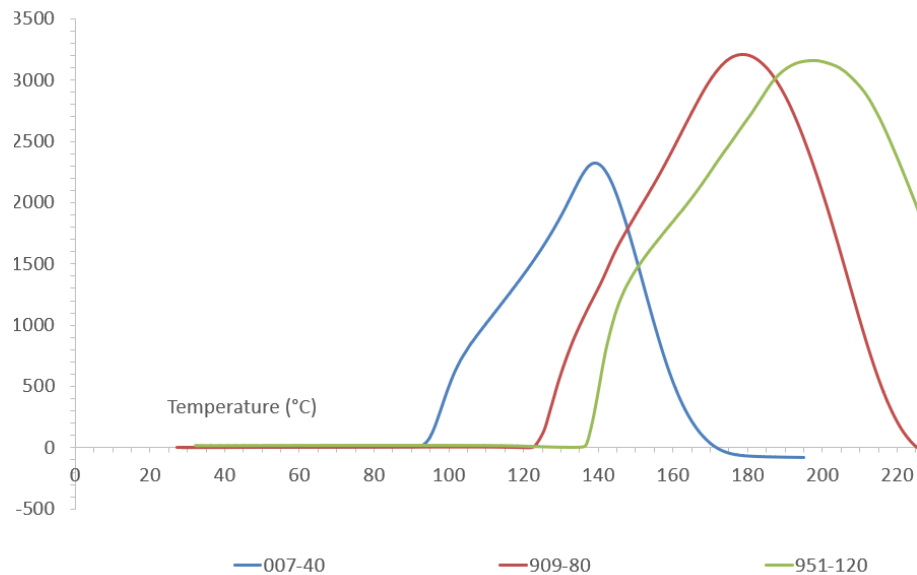
1 kg equals:

40 liters	16.7 liters	7.8 liters	4.7 liters	0.37 liters
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Elasticity and Compressibility

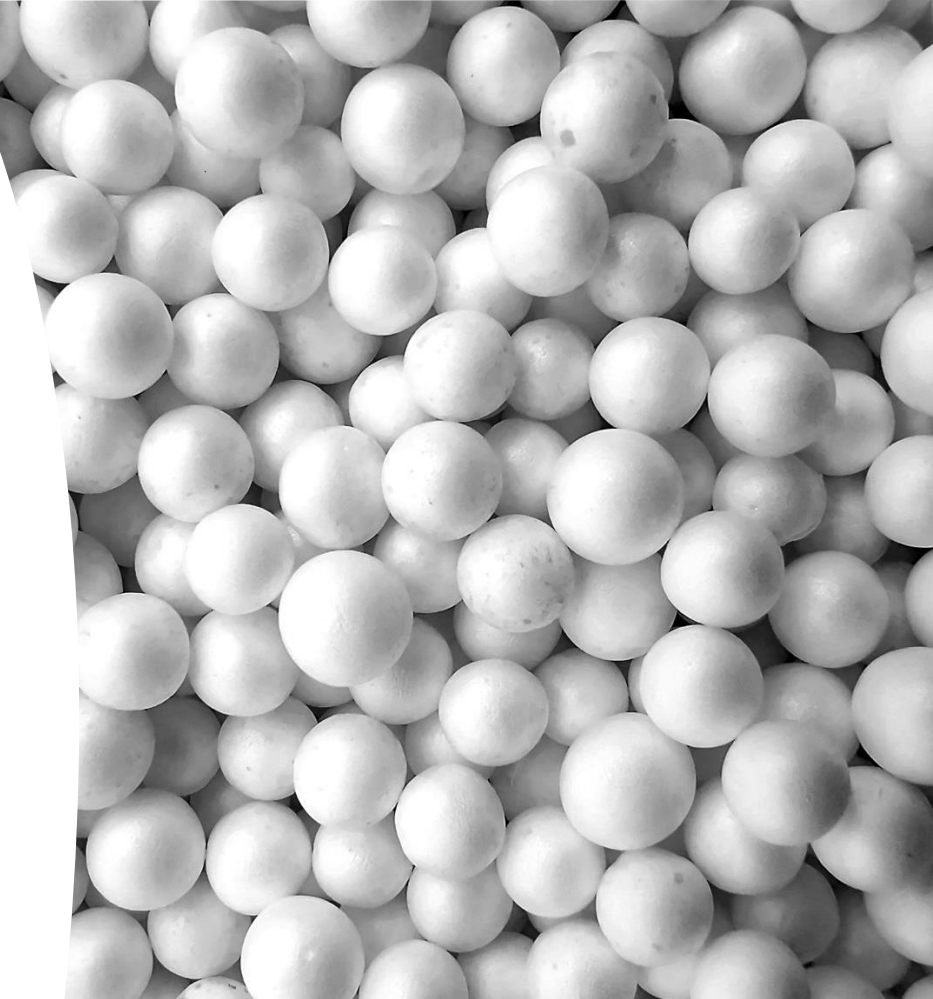


Solutions for versatile application needs



Foam Applications

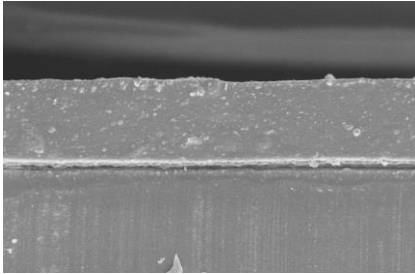
- Expancel® microspheres can be used as "standalone" or dispersed with materials such as PU, EPDM, or Silicon.
- During an exothermic reaction, the microspheres expand to form a uniform, closed-cell structure.
- The encapsulated gas remains inside the microsphere, significantly reducing VOC
- Our DU grades enable foaming with Expancel® microspheres, – also in combination with conventional blowing agents



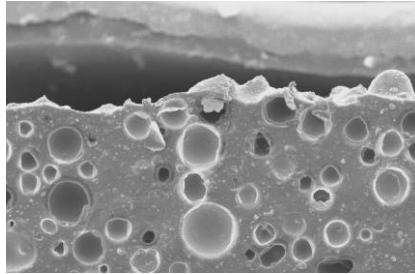
Adhesives Applications

Filler comparison

Expancel® microspheres provides a larger volume of filler compared to CaCO_3 at the same weight percent

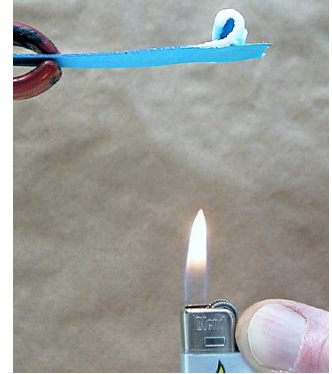
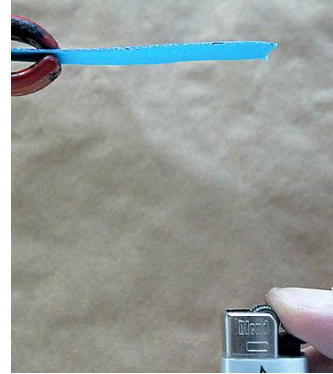


Adhesive with 1% (by weight) CaCO_3 added



Adhesive with 1 w% Expancel® microspheres added

Debonding adhesives use unexpanded low temperature Expancel® microspheres



Debonding effect of an adhesive containing Expancel® microspheres

A World of Possibilities



Wine corks



Fabric printing ink



Shoe soles



Underbody coating



Cultured marble



Construction sealants



Food packaging



Paint



Artificial leather



Weather strips



Explosives



Toy clay

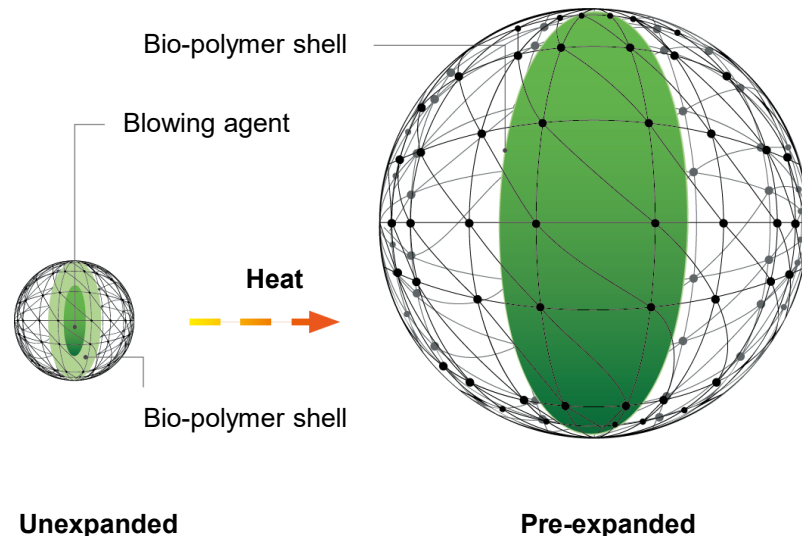
Expancel® BIO Microspheres

Accelerating sustainable microsphere solutions

Introducing our first-generation partly **biobased** **microsphere** product concept

Expancel® BIO 100 microspheres

- Partly biobased polymer shell with a cellulose ester backbone, with substituents of acetate and/or propionate
- Designed to be adaptable for a wide range of industries, and applications
- Available in various forms ensures that it can meet diverse market needs and functional requirements



Available prototypes

Pre-Expanded

Available in two versions, Expancel® BIO 110 DEP and BIO 111 DEP, the BIO 110 DEP, with its impressive 55% biobased composition and low density, stands out as a unique-solution.

Expancel® BIO 111 DEP is designed for robustness in tough process conditions

Unexpanded

Expancel® Bio 111 DU and Bio 121 DU, offer approximately 45% biobased content and expandable capabilities

Both versions showcase expansion in high temperature region

Dry pre-expanded

Expancel® grade	True density kg/m ³	Particle size D(0.5), µm
BIO 110 DEP	120-140	60-80
BIO 111 DEP	105-130	70-90

Dry unexpanded

Expancel® grade	Thermomechanical Analysis			Particle size D(0.5) µm
	Tstart °C	Tmax °C	Density kg/m ³	
BIO 111 DU	160-175	205-220	≤ 35	35-60
BIO 121 DU	125-150	150-175	≤ 35	35-70

The future of microspheres starts now

We offer you the chance to try the Expancel® BIO microspheres

- Envision its potential in enhancing your applications
- Collaborate with us to implement microspheres and make sustainable practices an integral part of your business
- Together, let's explore and shape the future of microspheres!





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