



Product Specification Expancel Microspheres

February, 2019 (replaces 2018.05)

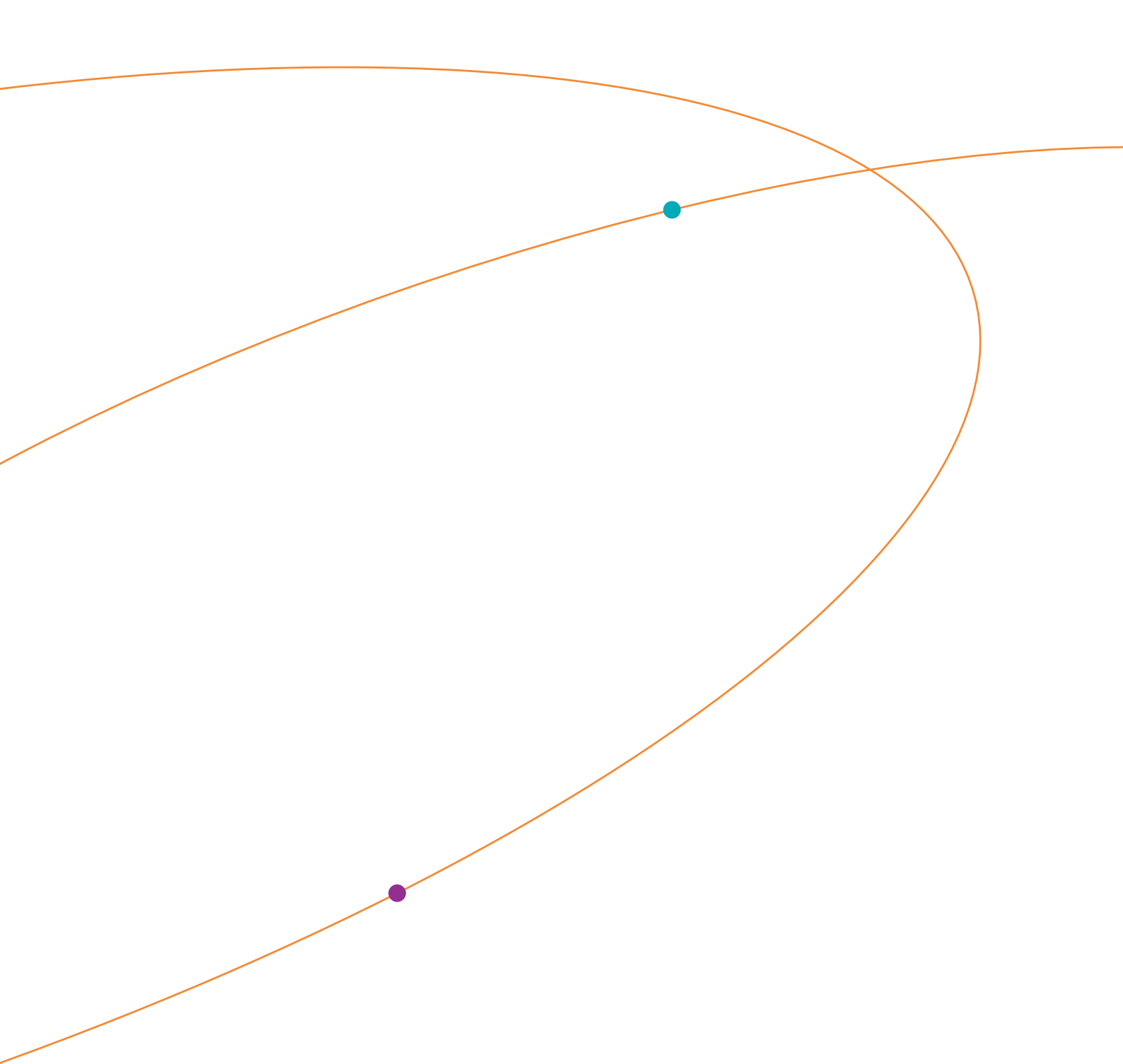
Expancel DE

Expancel	Particle Size D(0.5) $\mu\text{m}^{(1)}$	True density kg/m^3	Solvent Resistance ⁽³⁾
551 DE 40 d42	25–50	42 ± 4	3
461 DE 20 d70	15–25	70 ± 6	4
461 DE 40 d60	20–40	60 ± 5	4
461 DET 40 d25	35–55	25 ± 3	4
920 DE 40 d30	35–55	30 ± 3	5
920 DET 40 d25	30–60	25 ± 3	5
920 DE 80 d30	55–85	30 ± 3	5
New product			
043 DET 80 d20	60–95	20 ± 3	4

- Expancel DE = Dry Expanded Expancel Microspheres
- Packed in cartons with 1, 4, 5 or 6 polyethylene bags, e.g. 4x5 kg Expancel 551 DE 40 d42. Volume of carton 1.15 m³, incl pallet.
- Use the product within three years after production date, if unopened.
- Not all grades available in all locations. Check local sales office for availability.

More information:

- 1) "Particle size of Expancel MS"
- 2) "Density measurements of Expancel MS"
- 3) "Chemical resistance of Expancel MS"

The top half of the page features two thin, curved orange lines that sweep across the frame. A small teal dot is positioned on the upper curve, and a small purple dot is on the lower curve.

For more information on our
microspheres you can contact us at:

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Nouryon

Expancel® Microspheres
Your Engineered
Solution



Expancel 

Nouryon



The engineered solution in competitive advantages

Lighter. Stronger. Faster. Cheaper. More attractive. Longer lasting. Better performing. More sustainable. Today's products have a lot to live up to. And with increasingly tough competition in many industry areas, product developers need every advantage they can get.

This is the world Expancel® microspheres was created for. Since 1980, this unique ingredient has helped developers and manufacturers reduce weight and cut costs while improving quality, adding functionality and enabling innovation.

Our three promises to you

Expancel® microspheres is not just an ingredient – it's also our promise of continuous innovation for a better and more sustainable world. It stands for new possibilities, more effective processes, and expertise applied to keep you ahead.



1. We give you the best

Quality makes your product – and your reputation. When you choose Expancel® microspheres, you choose the gold standard. Accept no imitations!



2. We do more for you

We do everything possible to ensure Expancel® microspheres is optimally implemented into your process and delivers its full potential. Our technology expertise is unmatched, and it's at your disposal.



3. We're in your future

We have a proven track record and a deep commitment to sustainable business. Wherever you want to go next, we'll be here for you.

The engineered solution that expands your horizons

Expancel® microspheres came about as part of a research collaboration in the mid-1970s. The team created microspheres that could expand to up to 60 times their original size without increasing in weight. Today we are a world leader in thermoplastic microspheres.

WU/DU Composites
Add volume with reduced weight and increased stiffness. Low binder demand.

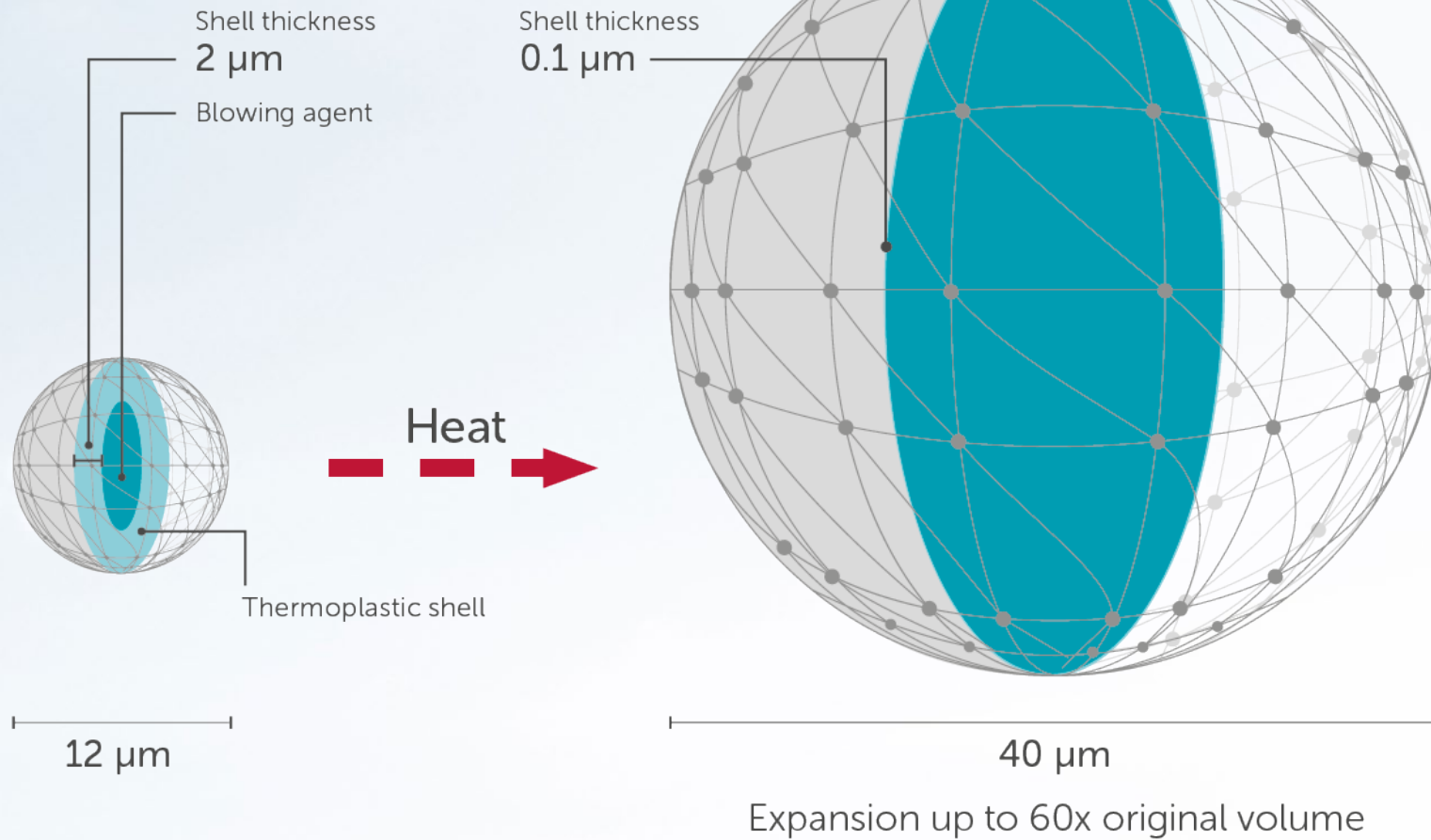
For more than 40 years, we have continuously pioneered new products and new usage areas for Expancel® Microspheres. You'll find them in a huge array of products around the world – from the paint on your walls to the car you drive, the shoes you walk in and the packaging that protects your food.

Expancel® microspheres give leading products the edge. If something looks better, feels better or performs better, it might well contain Expancel® microspheres.

From small sphere to big idea

It's a simple concept – a small thermoplastic sphere encapsulating a gas. Add heat and the gas expands while the shell softens. The result is a dramatic increase in volume and billions of new possibilities.

Expancel® microspheres have dual functionality as both a lightweight filler and a blowing agent. When you need to cut manufacturing costs, reduce weight, create attractive textures, protect against damage or shield against the elements, Expancel® microspheres deliver.



1980

The first order of Expancel® microspheres is shipped

High-temperature microspheres launched 1991

2005 Fourth generation of Expancel® microspheres launched

Food packaging products introduced 2011

1988 First US office established, later followed by a production unit

2009 Start of Expancel® microsphere production in China

FG Food Packaging

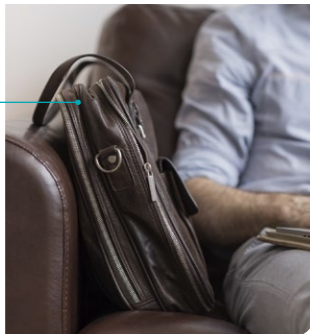
High compressibility, no shrinkage, no moisture absorption. Approved by regulations authorities.

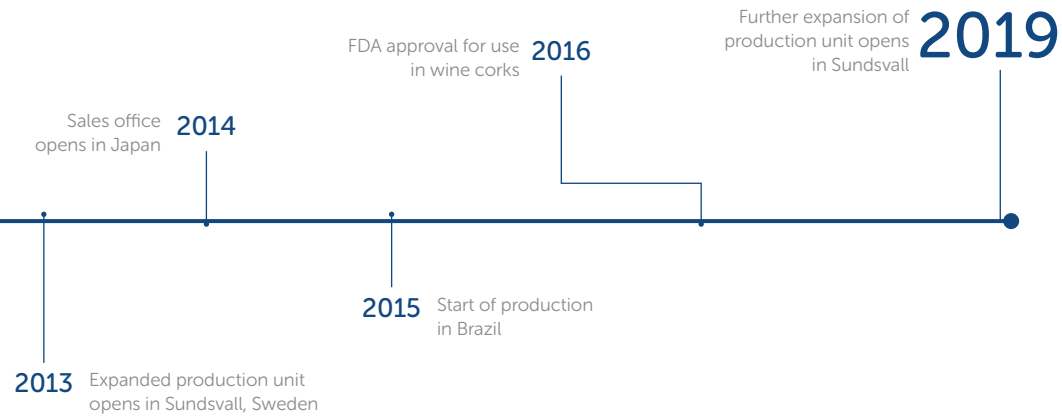
WE/DE Elastomeric cool-roof coatings

Superior reflectance and elasticity. Reduces cost and weight.

WE Genuine leather

Outstanding filling capacity, low shrinkage and good buffing properties.





 **4**
production sites covering the world

 **15** sales offices
Germany, Poland, the Netherlands, Russia, Italy, Spain, China, Japan, India, Indonesia, USA, Brazil, Colombia, Argentina and Mexico.



DU/MB Shoe soles
Low weight, durability, shock absorption.



DU/DE Automotive
Reduce weight, dampen sound, improve sealing.

Expanding where it counts
Expancel® microspheres are marketed all over the world via our headquarters in Sweden where we also have R&D and production. We have 15 sales offices across the world and, in addition, a worldwide network of distributors that enables us to meet the demand wherever it arises. To efficiently cover the American and Asian markets, we have production units in Green Bay, USA; Jundiai, Brazil, and Suzhou, China.



A variety for every need

Expancel® microspheres are available either expanded or unexpanded. Both types can be supplied in wet or dry form. We also have Masterbatch. This means Expancel® microspheres work in systems with or without heat or water. We offer a variety of chemical compositions to give expansion at different temperatures.

A range of particle sizes makes it possible to achieve numerous surface effects, including matting, smoothness and roughness. The very low density gives a significant weight reduction even at small dosages.

WU Wind turbines

Add bulk without adding weight. Increase stiffness and reduce the need for binder.

The 7 forms of Expancel® microspheres



Expancel® DU
Dry, unexpanded microspheres



Expancel® WU
Wet, unexpanded microspheres



Expancel® MB
Masterbatch, unexpanded microspheres mixed with a carrier



Expancel® SL
Slurry, unexpanded microspheres dispersed in water



Expancel® DE(T)
Dry, expanded microspheres



Expancel® WE
Wet, expanded microspheres



Expancel® FG
Microspheres for food packaging applications



Lightweight filler and blowing agent in one

25 kg/m³

Our standard expanded microspheres (DE(T) and WE) have densities as low as 25 kg/m³.

Expancel® microspheres is a lightweight filler and blowing agent all in one. Its high performance in these two functions opens up a world of surprising possibilities. Using Expancel® microspheres improves the properties of your product, and also enables considerable savings in the cost of materials, production and finishing, handling and transportation. For manufacturers, it means economy, consistency and control. For consumers, it means quality and satisfaction.

DE(T) Cultured marble

Reduced weight, less risk of cracks during production, improved machinability.

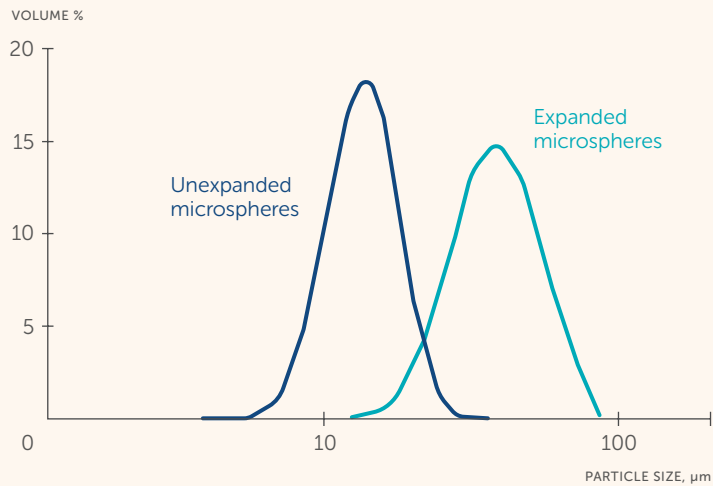
The lighter side of performance

Expancel® microspheres can significantly reduce the weight of a product while creating the look and feel needed for an attractive product.

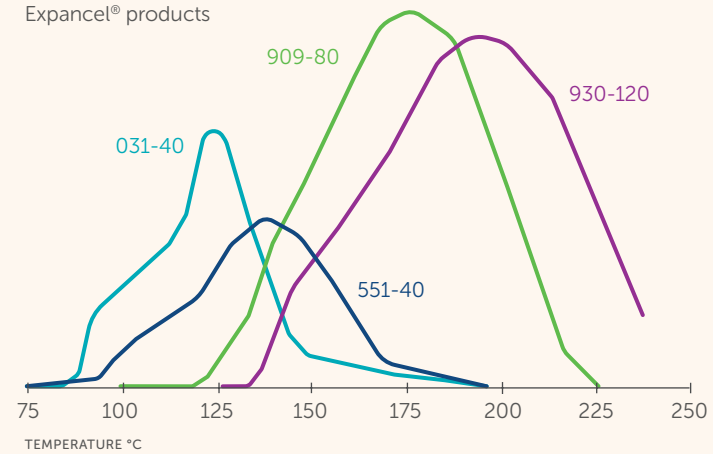
As a lightweight filler, it can achieve very low densities. Our standard expanded microspheres (DE(T) and WE) have densities as low as 25 kg/m³ depending on product. This is much lower than, for example, glass microspheres. Even small proportions of Expancel® microspheres will reduce the density of the end product to a significant degree.

Binder demand is low, so the amount of binder in the end product can be reduced with no loss of desired properties. Reducing binder also saves costs.

Expancel® microspheres is used as a lightweight filler in many applications today, including elastomeric cool roof coatings, paint, cultured marble, underbody coatings and sealants, polyester putties and many more. Its many benefits include cost reduction, low density, flexibility, sandability and a smoother surface with no pinholes.



Expansion curves for several Expancel® products

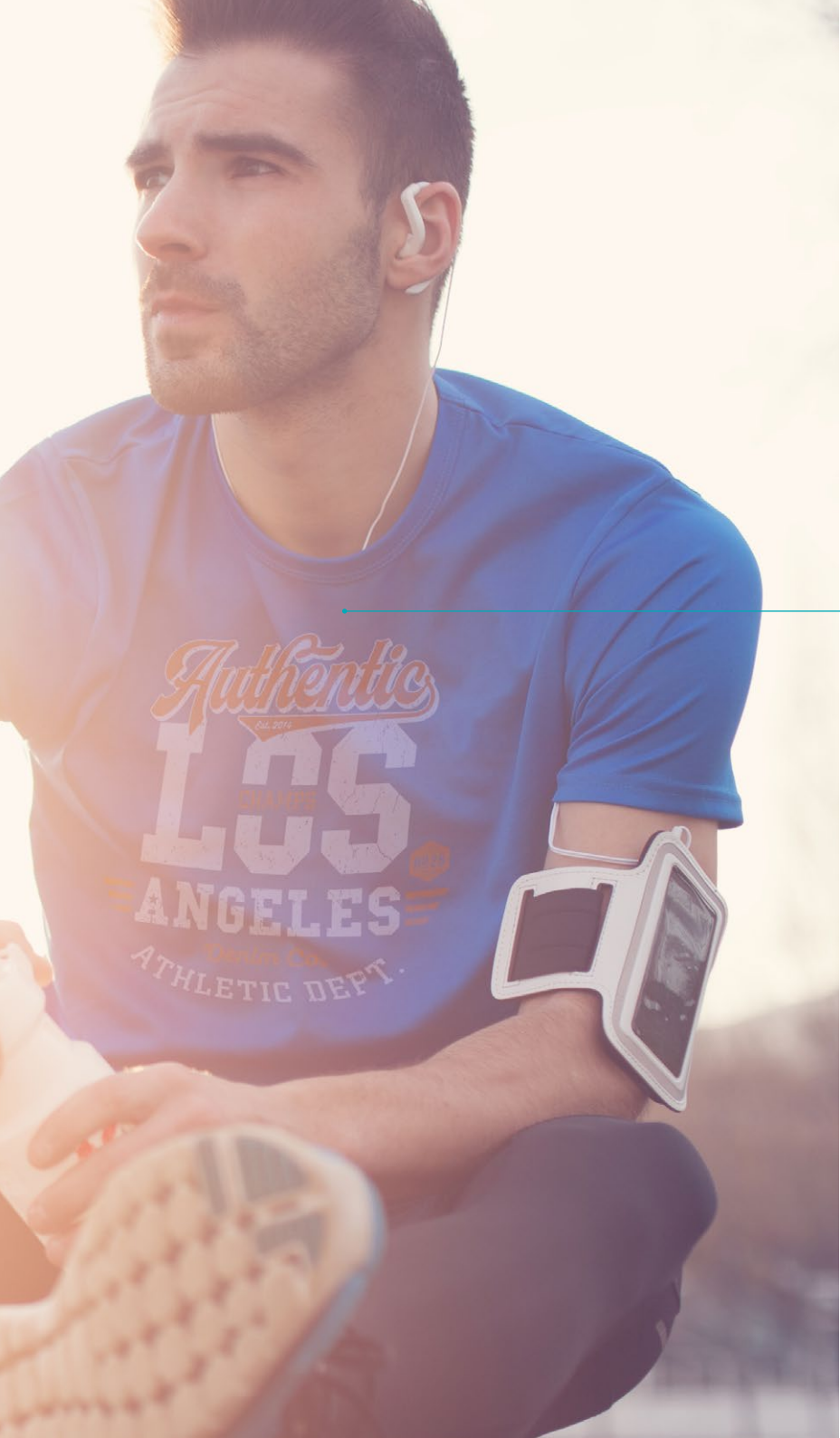


Your choice.

Expancel® microspheres is a product with truly unique properties. It is delivered in a variety of forms: wet and dry, expanded and unexpanded, slurry and masterbatch.

85–230°C

Different products of Expancel® microspheres are available with expansion temperatures in the range of 85°C to 230°C (185–446°F).



WU/DU Printing inks

Create a variety of surface effects like 3D, velvet and matt finish.

FG Microagglomerated cork

Excellent compressibility, ultimate seal, optimal granule structure.

Perfecting the structure

Unexpanded Expancel® microspheres is an excellent blowing agent that gives highly controlled foaming, resulting in a fine and uniform cell structure. You can avoid the use of chemical blowing agents and achieve excellent performance at low viscosities. Expancel® microspheres can also be combined with chemical blowing agents if required.

Expancel® microspheres is used as a blowing agent in many applications today, including shoe soles, wine stoppers (plastic and agglomerated), printing inks, wallpaper and weather strips for cars.

As a blowing agent, Expancel® microspheres delivers many essential benefits, including a fine cellular foam structure, outstanding stability during processing, shorter cycle times and an attractive surface finish.

One solution. Unlimited possibilities.

Lightweight filler



Application	BUILDINGS & INFRASTRUCTURE	TRANSPORTATION	CONSUMER GOODS	INDUSTRIAL / OTHER	Description
Cultured marble	•				Reduced weight, less risk of cracks during production, improved machinability, lower resin consumption
PU foams		•			Reduced weight, controlled and uniform foam structure
Model-making board			•		Cost savings, weight reduction, improved machinability
Polyester putties	•				Low volume cost, easy to apply, extraordinary sanding properties, reduced shrinkage
Underbody coatings		•			Improved stone chip resistance and sound damping, low UBC weight helps cut fuel consumption
Sound-damping coatings		•			Reduced noise and vibrations
Interior panels for car roofs/sides		•			Low weight, improved flexibility
Body fillers		•			Low weight, better sandability, good surface appearance, non-irritable dust during sanding, reduced cracking and shrinkage of the dried material, easier to apply, low hardness, low impact on curing parameters
Paper & Board		•			Improved bulk, bending stiffness, thermal insulation. Coated applications can give soft touch and anti-slip
Porous ceramics		•		•	Controlled and uniform pore structure
Silicone rubber	•				Cost savings, reduced weight, uniform and closed cell structure, dry surface
Cable-filling compound				•	Reduced dielectric constant, reduced water penetration, cost reduction, reduced weight
Composites		•			Reduced weight, reduced cost / lower resin consumption, increased stiffness
Crack filler	•				Sandability, easy to apply, sanding dust less irritating than with glass MS
Modeling clay			•		Easy to shape, low shrinkage upon drying
Paint	•		•		Reduced weight, better applicability, higher water vapor permeability, matting effect, low emission of VOC, lower transportation cost for producer
Sealants	•				Cost savings, weight reduction, reduced volume shrinkage during drying
Genuine leather		•	•		Outstanding filling capacity, very low shrinkage, very good buffing properties, good flexibility, soft touch feeling
Elastomeric cool roof coatings	•		•		High solar reflectance and thermal insulation, enhanced durability and weather resistance

Blowing agent



Application	BUILDINGS & INFRASTRUCTURE	TRANSPORTATION	CONSUMER GOODS	INDUSTRIAL / OTHER	Description
Microagglomerated cork			•		Excellent compressibility, ultimate seal, optimal granule structure
Synthetic cork			•		Reduced weight, density control, better elasticity
Food packaging			•		Excellent seal, no shrinkage, no water absorption
PU foams			•		Reduced weight, controlled and uniform foam structure
Thermoforming			•		Thinner sheets, shorter heating time
Wood-plastic composites	•				Reduced weight, easier to saw and drill
Shoe soles			•		Reduced weight, matt surface, improved wearing comfort due to unique cell structure
Underbody coatings		•			Improved stone chip resistance and sound damping, low UBC weight helps cut fuel consumption
Sound-damping coatings		•			Reduced noise and vibration
Interior panels for car roofs/sides		•			Low weight, improved flexibility
Gaskets for automatic gear boxes		•			Improved sealing effects, improved compression set, fills voids between matching surfaces
Expandable adhesives for cars		•			Low weight, improved stiffness, improved compression set, fills voids between matching surfaces, creates inner pressure and better sealing
Floor mats for cars		•			Low weight, anti-slip effect, matting effect, elasticity, more rubberlike appearance
Weather strips for cars		•			Low weight, cost savings, uniform closed cell structure, better sealing properties, narrow specification along profile compared to CBA, more stable foaming process, better surface appearance
Lightweight foam			•	•	Good absorbance and recovery
Nonwoven for composites		•		•	Cost savings, reduced weight, good insulation, increased dimensional stability, increased bulk and thickness
Paper & Board				•	Improved bulk, bending stiffness, thermal insulation. Coated applications can give soft touch and anti-slip
Porous ceramics		•		•	Controlled and uniform pore structure
Printing ink for wallpaper, fabrics and textiles			•		3D effects, matting, peach or suede look
Sheets, boards & profiles	•	•		•	Closed cells, foam stability, reduced weight, cost saving potential
Silicone rubber	•				Cost savings, reduced weight, uniform and closed cell structure, dry surface
Thermal release material				•	Debonding at elevated temperatures
Artificial leather		•	•		Surface modifications such as suede and nubuck effects

The engineered solution in product development

Expancel® microspheres is more than a microsphere. It's a commitment to continuous improvement and business success for the long term. Because every product – and every process – has unique demands. That's why we strive to be an expert product development partner, not just a supplier.

Our sphere of expertise

Expancel® thermoplastic microspheres were invented in the mid-1970s. Since then, we've been refining the most effective ways to make them work in diverse applications across numerous industries.

Achieving the full potential of microspheres demands the best brains in the business. Brains that understand business goals in addition to chemistry and

processes. We know how to achieve the best results for your production process and your business. You can be assured of all the advice, support and hands-on technical assistance you need to make things run smoothly and profitably.

Bringing Expancel® microspheres closer to your business

As a product development partner, we are constantly searching for new ways to make Expancel® microspheres work better for your business. We aim to make it a seamless and cost-effective part of your operation.

One of the innovations this has led to is our unique on-site expansion system. This patented, high-capacity system makes it simple to expand Expancel® microspheres on your own premises. It gives you greater flexibility and significantly reduces your purchase and shipping costs, helping ensure that Expancel® microspheres is the best solution from every perspective.

Contact your local representative to learn more about our microspheres and on-site expansion system.

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Expancel plays a key role in our products. Without it, we could not have developed the offering we currently have.

Dominique Tourneix, CEO Diam Bouchage

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The engineered solution in sustainability

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Expancel® microspheres not only come with several benefits for various applications – they also provide sustainable solutions to a world that needs them.

Reflecting a brighter future

With Expancel® microspheres, it's possible to create elastomeric cool roof coatings that are both protective and environmentally beneficial. They have excellent capacity for total solar reflectance, especially in the near-infrared region. In warmer climates, air conditioning alone can account for up to 70% of residential energy consumption in total. By applying an Expancel®-formulated coating to the metal roof of a large, one-story commercial building, cooling energy consumption was reduced by 40%. In addition, an elastomeric cool roof coating with Expancel® microspheres makes an excellent water proofing coating with increased durability in all types of weather. All in all, our microspheres make a great contribution to doing more with less.

Innovation close to our customers

When heated, Expancel® microspheres can increase in volume by up to 60 times. This capability is one of its key attributes. As part of our effort to make Expancel® microspheres a seamless and cost-effective part of the production process, we have developed a unique on-site expansion system. Our patented, high-capacity system makes it simple for customers to expand Expancel® microspheres on their own premises, radically reducing transportation costs, emissions and fuel consumption. It's an innovation that creates value for customers while supporting our commitment to a sustainable future.



40%
energy reduction

A coating with Expancel® microspheres can reduce energy consumption from air conditioning by more than 40%.

Cutting kilos from cars

Lighter vehicles result in less fuel consumption. The low density and closed cell structure of Expancel® microspheres makes it a valuable component in expandable adhesives and sealant materials. Which includes underbody coatings that protect against stone chips, water, salt and other road hazards. Adding Expancel® microspheres creates lightweight alternatives that have all the protective properties of heavy-duty coatings whilst extending lifespan and contributing to weight reduction. Just one more simple example of how Expancel® microspheres can expand sustainability.



Which improvements do you want for your product?

Whether you want to reduce weight, improve consistency, create a better look and feel or make manufacturing more effective, Expancel® microspheres could be just the solution you need.

Discuss your product and your needs with us. And, let our experts guide you towards the right solution for your business.

Contact us and discover for yourself why Expancel® microspheres is a world favorite engineered solution.

Learn more at:
nouryon.com/products/expancel-microspheres
info.expancel@nouryon.com

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Nouryon

Nouryon is a global, specialty chemicals leader. Markets and consumers worldwide rely on our essential solutions to manufacture everyday products, such as personal care, cleaning goods, paints and coatings, agriculture and food, pharmaceuticals, and building products. Furthermore, the dedication of around 7,800 employees with a shared commitment to our customers, business growth, safety, sustainability and innovation has resulted in a consistently strong financial performance. We operate in over 80 countries around the world with a portfolio of industry-leading brands. Visit our website and follow us @Nouryon and on LinkedIn.

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