Your experts for high-performance chemical and mineral specialties. Since 1894.

LEHVOSS Group

Lightweight Fillers

Overview Hollow Microspheres

ENG


We LUV it.

Hanseatic reliability – for more than 60 years

The internationally operating LEHVOSS Group, led by Lehmann&Voss&Co. in Hamburg, develops, produces and supply chemicals, mineral fillers and technical specialties for different industries. The business unit Coating Solutions is your reliable and competent partner for the production of paints and coatings, printing inks, adhesives and sealants as well as construction chemical products and lubricants.

Founded more than 125 years ago as a trading company in Hamburg, the owner-managed group of companies has continuously developed into a high-performance organization – in longstanding co-operations with renowned suppliers and own production sites in Europe, the USA and Asia.

Focus of the LEHVOSS Group is on innovative products and services for individual customer requests. With its presence on the markets around the world, the LEHVOSS Group is constantly implementing the appreciative culture of a family-owned business.

One of the specialties of this company is proximity to the people, which finds its expression in a trustful and reliable co-operation. Customers, business partners and employees can feel that we at the LEHVOSS Group put a lot of heart and soul into everything we do.

Because we love what we do: We LuV it. Since 1894.

Our competencies

We stand for comprehensive expertise in components for the specified fields of application. We are an independent distributor and experienced producer and generate synergies and possibilities in this way to respond very flexibly to your requirements.

LABORATORY

REGULATORY

PRODUCT MANAGEMENT

SALES

Contents

Products and Services

Polymer-based hollow microspheres, expandable

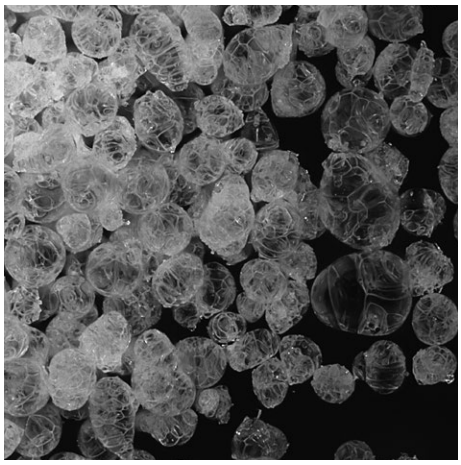
MATSUMOTO MICROSPHERES® expandable

Description

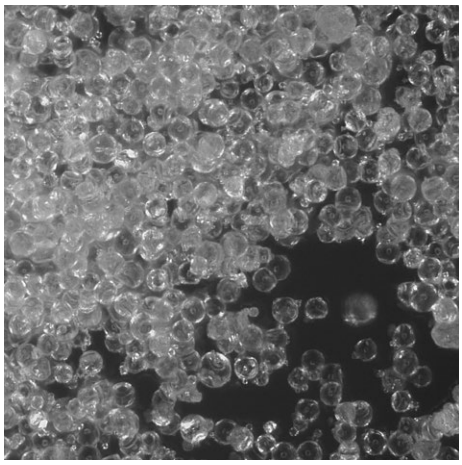
MATSUMOTO MICROSPHERES® expandable are polymer-based thermo-expandable microspheres with an average particle size of 5 to 50 µm, which are formed by encapsulating liquid hydrocarbon with a low boiling point in a shell of thermoplastic polymer. Various types are available, suitable for a wide temperature range, from low temperatures starting at about 80 °C up to extremely high temperatures of about 260 °C.

Application

Lightweight fillers for a wide range of applications in which a reduction in density, improvement in insulation as well as changes in mechanical properties and rheological properties are desired. The expandable hollow microspheres exhibit good temperature and solvent resistance, and exhibit comprehensive compatibility with a wide range of systems. The vast majority of MATSUMOTO MICROSPHERES® are available both dry (D-type) and wetted (unmarked) to best suit the application requirements.



Light microscope picture
MATSUMOTO MICROSPHERES® F190D
[Image width 0.35 mm]



Light microscope picture
MATSUMOTO MICROSPHERES® F190D
[Image width 4.50 mm]

Polymer-based hollow microspheres, expandable

MATSUMOTO MICROSPHERES® expandable

Products	Particle size [µm]	Temperature min. [°C]	Temperature max. [°C]	Solvent resistance
Products expanding at low temperatures				
F-35 / F-35D	10 – 20	70 – 80	100 – 110	●
HF-36 / HF-36D	10 – 16	70 – 80	110 – 120	●
HF-48 / HF-48D	9 – 15	90 – 100	125 – 135	● ●
FN-80GS / FN-80GSD	6 – 10	100 – 110	125 – 135	● ●
Products expanding at medium temperatures				
FN-100SS / FN-100SSD	6 – 10	120 – 130	145 – 155	● ● ● ●
FN-100S / FN-100SD	10 – 20	125 – 135	150 – 160	● ● ● ●
FN-77 / FN-77D	25 – 35	100 – 110	155 – 165	● ● ●
FN-83GSD	7 – 14	110 – 120	150 – 160	● ● ●
FN-82 / FN-82D	25 – 35	120 – 130	160 – 170	● ● ●
FN-78 / FN-78D	35 – 50	100 – 115	150 – 165	● ● ●
Products expanding at higher temperatures				
FN-100M / FN-100MD	20 – 30	125 – 135	165 – 180	● ● ● ●
FN-105 / FN-105D	35 – 45	120 – 135	175 – 185	● ● ●
FN-185L / FN-185LD	35 – 50	140 – 150	180 – 190	● ● ●
Products expanding at very high temperatures				
FN-190SSD	10 – 15	155 – 165	210 – 220	● ● ●
F-190D	30 – 40	160 – 170	210 – 220	● ● ●
F-230D	25 – 35	180 – 190	220 – 240	● ● ●
F-260D	20 – 35	190 – 200	250 – 260	● ● ●

The values given are typical values and therefore do not represent a specification.

Solvent resistance:
low: •
medium: ••
well suited: •••
recommended: ••••

Polymer-based hollow microspheres, expanded

MATSUMOTO MICROSPHERES® MBF, expanded

Description

Thermally expanded hollow microspheres as 50 % masterbatches.

Application

Blowing agent for extrusion and injection molding; as granules, very good handling and metering properties.

MATSUMOTO MICROSPHERES®, moistened expanded grades

Description

MATSUMOTO MICROSPHERES® of the F-E series are moistened, polymer-based hollow microspheres that make handling much easier and safer. The solids content is about 10 %. The specific weight is in the range of 0.02 to 0.04 g/cm³, which allows a significant reduction of the final product weight.

Application

Lightweight fillers for a wide range of applications where a reduction in density, improvement in insulation as well as mechanical properties and rheological properties are desired. The expanded hollow microspheres show good temperature and solvent resistance and exhibit broad compatibility with a wide variety of a wide range of systems. Pre-expanded microsphere grades do not require elevated process temperatures.

MATSUMOTO MICROSPHERES®, dry expanded grades

Description

MATSUMOTO MICROSPHERES® hollow microspheres of the F-DE series are pre-expanded, dry polymer-based hollow microspheres. The solids content is at least 97 %. The specific gravity is in the range of 0.010 to 0.035 g/cm³, as a result of which very light end products can be realized.

Application

MATSUMOTO MICROSPHERES® of F-DE are used in applications where a subsequent expansion of the hollow microspheres is not possible or undesirable.

Polymer-based hollow microspheres, expanded

MATSUMOTO MICROSPHERES® MBF, expanded

Products	Pellet size [mm]	Pellet density [g/cm³]	Temperature min. [°C]	Temperature max. [°C]
MBF-190EVA50	3–5 x 2–5	~ 0.9	130 – 140	185 – 195
MBFN-190SSPE	3–5 x 2–5	~ 0.9	160 – 170	210 – 220
MBFN-170EVA	3–5 x 2–5	~ 0.9	185 – 195	170 – 190
MBF-230PE	3–5 x 2–5	~ 0.9	180 – 190	220 – 230
MBF-260EVA	3–5 x 2–5	~ 0.9	190 – 200	250 – 260

MATSUMOTO MICROSPHERES®, moistened expanded grades

Products	Particle Size [µm]	Polymer	Effective Density [g/cm³]	Solids content [%]	Solvent resistance
F-30E	30 – 60	VC/AN-Copolymer	0.020 – 0.030	9 – 13	●
F-50E	40 – 60	Acrylnitril-Copolymer	0.020 – 0.040	11 – 16	● ●
F-65E	40 – 60	Acrylnitril-Copolymer	0.020 – 0.030	9 – 13	● ●

MATSUMOTO MICROSPHERES®, dry expanded grades

Products	Particle Size [µm]	Polymer	Effective Density [g/cm³]	Solids content [%]	Solvent resistance
FN-80SDE	20 – 40	Acrylnitril-Copolymer	0.020 – 0.030	≥ 97	● ●
F-65DE	40 – 60	Acrylnitril-Copolymer	0.025 – 0.035	≥ 97	● ●
F-80DE	90 – 130	Acrylnitril-Copolymer	0.015 – 0.025	≥ 97	● ● ●
FN-78DE	100 – 200	Acrylnitril-Copolymer	0.010 – 0.020	≥ 97	● ● ●

Solvent resistance:
low: •
medium: ••
well suited: •••

Polymer-based hollow microspheres, expanded

MATSUMOTO MICROSPHERES®, expanded hybrid

Description

MATSUMOTO MICROSPHERES® of the MFL series are hybrid hollow microspheres, which are used as a novel functional filler developed. They are polymer-based spheres that are coated with an inorganic powder.

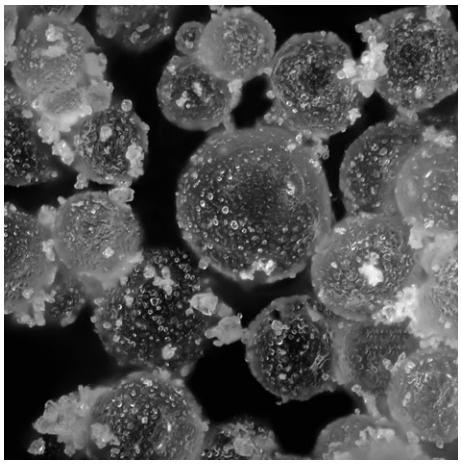
Application

MATSUMOTO MICROSPHERES® MFL have a high elasticity and resistance, so that they can be used even when incorporated under high pressure. The surface coated with inorganic powder enables strength-increasing anchoring of the hollow spheres in the matrix used in each case.

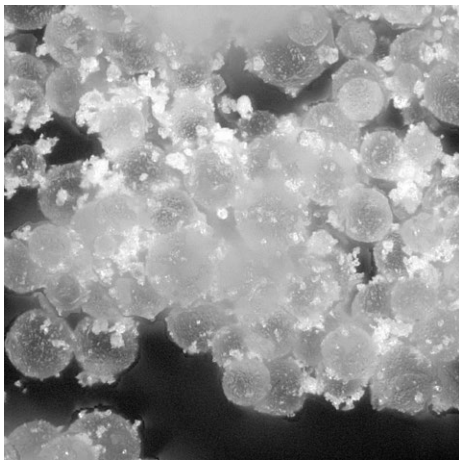
MATSUMOTO MICROSPHERES®, expanded hybrid

Products	Particle size [µm]	Coating	Effective density [g/cm³]	Temperature resistance [°C]	Characteristic
MFL-81GTA	10 – 30	Talc	0.20 – 0.26	130 – 140	Very fine surface
MFL-81CGA	10 – 30	Calcium Carbonate	0.20 – 0.26	130 – 140	Very fine surface
MFL-SEVEN	20 – 40	Calcium Carbonate	0.11 – 0.17	130 – 140	Very fine surface
MFL-HD30CA	20 – 40	Calcium Carbonate	0.11 – 0.17	140 – 150	High pressure resistance
MFL-HD60CA	50 – 70	Calcium Carbonate	0.10 – 0.14	140 – 150	High pressure resistance
MFL-100MCA	60 – 70	Calcium Carbonate	0.10 – 0.14	150 – 160	High pressure resistance
MFL-110CAL	90 – 120	Calcium Carbonate	0.06 – 0.10	160 – 170	Ultra light
MFL-UPR60	50 – 75	Calcium Carbonate	0.10 – 0.14	140 – 150	High pressure resistance

The values given are typical values and therefore do not represent a specification.



Light microscope picture
MATSUMOTO MICROSPHERES®
MFL UPR-60 [image width 0.49 mm]



Light microscope picture
MATSUMOTO MICROSPHERES® MFL UPR-60
[Image width 1.73 mm]

Cenospheres – hollow ceramic microspheres

OMEGA-SPHERES®, White

Description

OMEGA-SPHERES® W are marked by a particularly high thermal resistance, low iron content and a white colour. They are available in different distribution particle sizes.

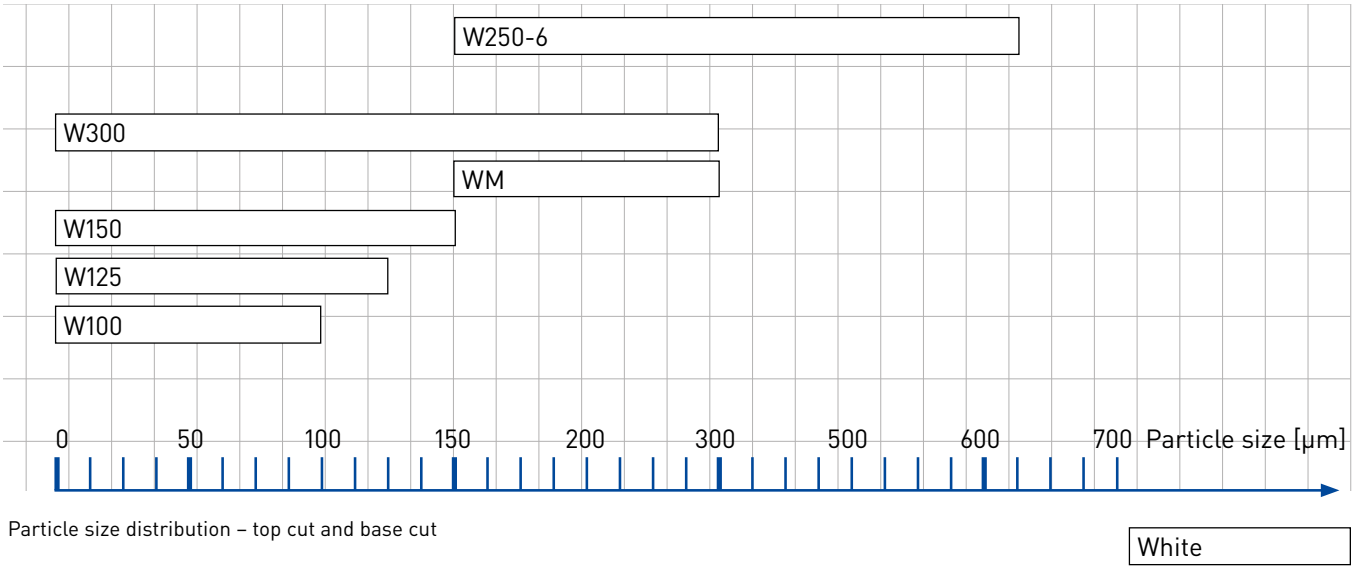
Application

Because of their particularly high heat resistance, OMEGA-SPHERES® W are preferentially used in the refractory and foundry industries. The white colour allows their use in aesthetically demanding applications such as decorative plasters and wall paints.

Products	Particle size [µm]	Bulk density [kg/m³]	Crush strength [Mpa]	Temperature max. [°C]
OMEGA-SPHERES® W150	0 – 150	410	25	1,600
OMEGA-SPHERES® W300	0 – 300	410	25	1,600
OMEGA-SPHERES® WM	150 – 300	390	25	1,600
OMEGA-SPHERES® W250-6	250 – 700	400	25	1,600

The stated values correspond to typical values and hence do not represent a specification.

OMEGA-SPHERES® and THERMO-SPHERES® Overview



Particle size distribution – top cut and base cut

Cenospheres – hollow ceramic microspheres

THERMO-SPHERES®, White

Description

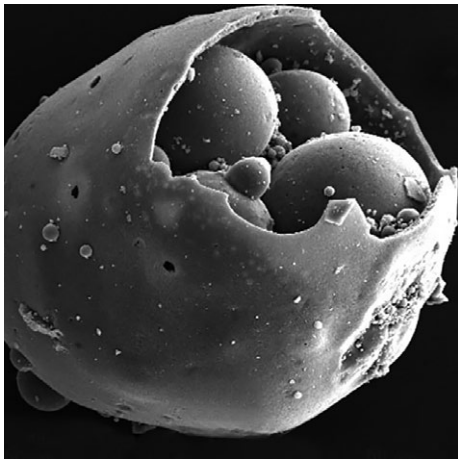
THERMO-SPHERES® W are white, high quality hollow ceramic microspheres < 150 µm, which are characterised by a high degree of fineness as well as a particularly high mechanical strength. The products are pre-dried and usable for foundry industry. The white colour allows their use in aesthetically demanding applications such as decorative plasters and wall paints.

Application

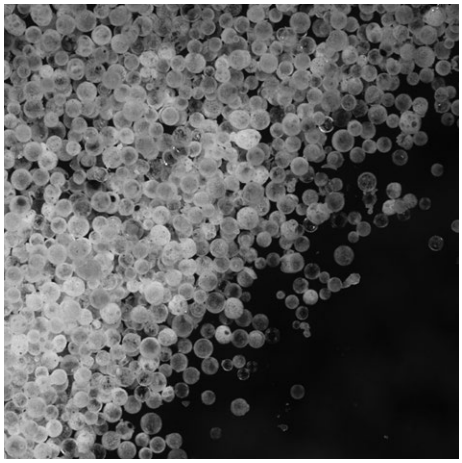
THERMO-SPHERES® W are used in bright applications which require the use of the smallest possible microspheres or make high demands on surface quality. This includes applications in addition to the use in paints and coatings, surfaces as well as special casting compounds and adhesives where a high whiteness is advantageous.

Products	Particle size [µm]	Bulk density [kg/m³]	Crush strength [Mpa]	Temperature max. [°C]
THERMO-SPHERES® W100	0 – 100	400	25	1,600
THERMO-SPHERES® W125	0 – 125	400	25	1,600

The stated values correspond to typical values and hence do not represent a specification.



THERMO-SPHERES® W125
[Image width 130 µm]



Light microscope picture
THERMO-SPHERES® W75
[Image width 4.50 mm]

Multi-cellular expanded glass granules

OMEGA-BUBBLES® C – Ultra White

Description

OMEGA-BUBBLES® C are multicellular expanded glass granules. The high whiteness can help to reduce the addition of titanium dioxide in cementitious formulation. For aesthetic applications like acoustic construction or ceilings the ultra-white lightweight fillers meet today's spirit of time. OMEGA-BUBBLES® C being based on selected recycled glass. Using these products is sustainable and environmentally friendly and can reduces your green CO_2 footprint in later disposal issues.

OMEGA-BUBBLES® C are available in the grain sizes customary on the market for the construction and insulation industry.

OMEGA-BUBBLES® C Type Overview

Products	PSD (D10-D90)[1] [mm]	Grain gross density [kg/m³]	Bulk density [kg/m³]
OMEGA-BUBBLES® C® - XS	0.1 – 0.3	400	570
OMEGA-BUBBLES C® - S	0.25 – 0.5	340	520
OMEGA-BUBBLES C® - M	0.5 – 1.0	270	420
OMEGA-BUBBLES C® - L	1.0 – 2.0	230	370
OMEGA-BUBBLES C® - XL	2.0 – 4.0	200	340

[1] Typical values - no specification

Light microscope picture
OMEGA-BUBBLES® C

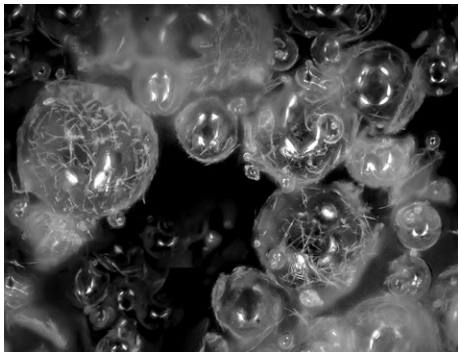
Light microscope picture
OMEGA-BUBBLES® C

Micro hollow glass spheres

Q-CEL®

Description

Q-CEL® are sodium borosilicate glass based hollow micro glass spheres which serve as a functional lightweight filler. An important property is their high mechanical resistance. The various Q-CEL® grades differ in density, particle size and compressive strength. Products with optimized particle size distributions can be selected if particularly high shear forces are required.



Light microscope picture
Q-CEL® 6019 [Image width 0.49 mm]

Application

Q-CEL® are used as weight-reducing fillers, for example, in paints and coatings, composites, potting and filling compounds, construction chemicals, syntactic foams, friction and brake linings, and many other applications. Q-CEL® 6014 is recommended for all resin systems where low viscosity and low shear forces are dominate. For medium shear environments, Q-CEL® 6019, 7019, 7023S and 5028 should be used. Q-CEL® 6717 and 6019S have reduced particle sizes and are used in applications with aesthetic surfaces.

Products	Effective Density [g/cm3]	Average Particle size [µm]	Particle Size [µm] (Malvern)	Pressure Resistance Isostatic [Psi]	Pressure Resistance Isostatic [Mpa]
Q-CEL® 300	0.21	90	5 – 200	500	3.4
Q-CEL® 6014	0.14	85	5 – 200	250	1.7
Q-CEL® 6019	0.19	75	5 – 175	500	3.4
Q-CEL® 6019S	0.19	70	5 – 150	500	3.4
Q-CEL® 5020FPS	0.2	45	5 – 90	500	–
Q-CEL® 6717	0.19	52	5 – 105	500	3.4
Q-CEL® 5028	0.25	75	5 – 120	750	5.2
Q-CEL® 6028	0.28	70	5 – 150	750	–
Q-CEL® 6036	0.36	60	5 – 125	1,000	6.8
Q-CEL® 6042S	0.42	50	5 – 90	2,000	13.8
Q-CEL® 6048	0.48	50	5 – 100	3,000	20.7
Q-CEL® 5070S	0.7	35	10 – 100	3,500	24.2
Q-CEL® 5019	0.19	72	5 – 150	500	–
Q-CEL® 5032S	0.32	63	5 – 150	1,000	–
Q-CEL® 7019	0.19	80	5 – 150	500	3.4
Q-CEL® 7023S	0.23	85	5 – 135	750	5.2
Q-CEL® 7028	0.27	75	5 – 120	1,000	–
Q-CEL® 7036	0.36	63	5 – 125	1,000	–
Q-CEL® 7040S	0.4	54	5 – 100	2,000	13.8

The values given are typical values and therefore do not represent a specification.

Micro hollow glass spheres

SPHERICEL®

Description

SPHERICEL® are borosilicate glass-based hollow microspheres manufactured in a special process, which serve as a functional filler. In addition to a very high mechanical resistance, SPHERICEL® micro hollow glass spheres are hydrophobic and, in comparison to other hollow spheres, exhibit a significantly increased resistance to aqueous media. SPHERICEL® grades differ in density, particle size and pressure resistance, so that they can be selected specifically for the application and the associated requirements.

Application

SPHERICEL® micro hollow glass beads are used as lightweight fillers in high-quality syntactic foams, paints and coatings, fillers, potting and molding compounds. In friction and brake linings as well as abrasives. SPHERICEL® micro hollow glass beads can be used as pore formers. The exceptionally high mechanical resistance also allows the use in compound or composite materials, such as SMC / BMC as well as plastic compounds.

SPHERICEL®

Products	Effective density [g/cm³]	Average Particle size [µm]	Particle Size [µm] (Malvern)	Pressure Resistance Isostatic [Psi]	Pressure Resistance Isostatic [Mpa]
SPHERICEL® 110P8	1.1	12	2 – 25	10,000	69

The values given are typical values and therefore do not represent a specification.

Solid ceramic microspheres

OMEGA-SIL®

Description

OMEGA-SIL® are solid aluminium silicate spheres which have a very high compressive strength. The OMEGA-SIL® SPECIAL* product range consists of aluminium silicates that are processed in an additional processing step sifted. This particularly sharp separation of the top cut results in aesthetic applications to smoother surfaces.

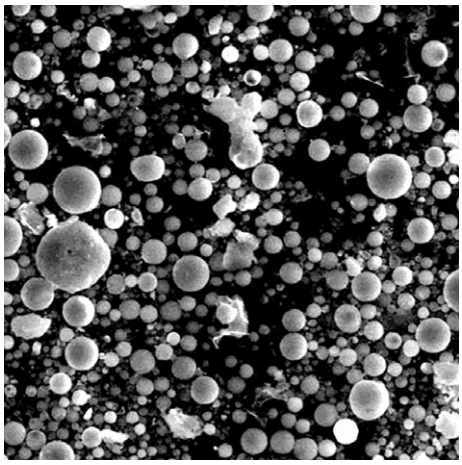
Application

Due to the lower specific surface the use of OMEGA-SIL® in paints and coatings allows a higher degree of filling. OMEGA-SIL® shows in cementitious systems pozzolanic reactivity. The inside microcrystalline structure results in a significant increase of mechanical strength.

OMEGA-SIL®

Products	D50 [µm]	D95 [µm]	Effective density [g/cm³]	Bulk density [kg/m³]
OMEGA-SIL® XS	3.5	9.5	2.51	780
OMEGA-SIL® S	4.5	11.5	2.48	800
OMEGA-SIL® M	6.5	30.0	2.40	870
OMEGA-SIL® L	12.5	75.0	2.39	880
OMEGA-SIL® XL	50.0	200.0	2.25	1,090
OMEGA-SIL® XS SPECIAL	3.5	9.5*	2.51	780
OMEGA-SIL® S SPECIAL	4.5	11.5*	2.48	800
OMEGA-SIL® M SPECIAL	6.5	30.0*	2.40	870

Product items shown with an asterisk * describe top cut (d98) modified versions for aesthetical surfaces.
The stated values correspond to typical values and hence do not represent a specification.



Omega-Sil® XS,
REM picture, length of picture 0.1 mm

Thermoplastic, nanoporous Polymer Foams for DRY LIQUIDS

LUVOFIL® DL-A 100
for DRY LIQUID and SLOW RELEASE applications

Nanoporous polymer foams are the perfect carriers for a multitude of lipophilic liquids. LUVOFIL® DL-A 100 can absorb more than six times its weight in liquid depending on the chemical nature, polarity, and viscosity of the liquid.

LUVOFIL® DL-A 100: Liquid Carrier for Extrusion Processes, Dry Liquids & Drymix Systems

The nanoporous structure leads to extraordinary carrier capacity for a multitude of liquids. Possibility to absorb more than 600 w%. Depending on chemical nature, polarity, and viscosity of the liquid

Advantages

- **Easy dosage**
- **Safe handling**
- **No liquid leaking or migration**
- **Excellent distribution of the liquid component**
- **No inorganic residues**
- **Full liquid transfer into matrix**

Liquid Carrier for Slow Release Applications

The nanoporous structure exhibits extraordinary carrier capacity for a variety of liquids.

LUVOFIL® DL-A 100	Conventional Capsule
Simple processing	**Complex processing**
• Self-loading • No additional substances required • Loading within seconds	• Complex loading process • Expensive equipment required • Preparation time of several hours
High performance	**Standard performance**
• Extraordinary capacity • Long-lasting release • Reloadable	• Medium to low capacity • Rapid release • Not reusable

Lightweight fillers overview

Lightweight fillers

	Paints and coatings	Printing inks	Construction chemistry	Adhesives and sealants	Refractory and foundry	Friction and brake linings	Ceramics
MATSUMOTO® – Polymer-based hollow microspheres, expandable	●		●	●			
MATSUMOTO® – Polymer-based hollow microspheres, expanded	●		●	●			
OMEGA-SPHERES® – Cenospheres – hollow ceramic microspheres > 150 µm	●		●	●	●	●	●
THERMO-SPHERES® – Cenospheres – hollow ceramic microspheres < 150 µm	●		●	●	●	●	●
OMEGA-BUBBLES® C – Multi-cellular expanded glass granules	●		●	●			●
OMEGA-SIL® – Solid ceramic microspheres	●	●	●	●	●	●	●
SPHERICEL® micro hollow glass beads	●	●	●	●		●	
Q-CEL® micro hollow glass beads	●	●	●	●		●	
LUVOFIL® DL-A 100, Thermoplastic, nanoporous Dry Liquid system	●	●	●	●			

What else can we do for you?

This supply programme presents our comprehensive offer of high-performance special products. This includes professional quality assurance and equally smooth and efficient logistics – that's a matter of course. But we can offer more because LEHVOSS can rely, in addition, on an unusual diversity of possibilities, experience and solution competencies. We apply this flexibly to offer target-oriented services.

Targeted optimisation of product properties?
Regardless of the properties you are striving for in respect of your product, you can expect us to provide competent solutions concerning the selection of appropriate raw materials.

Change dosage properties?
Process powders dust-free and use special packaging and containment solutions – even allegedly small alterations can save money and time in your production process.

Test new components and processes?
Thanks to our excellently furnished application technology and development laboratory and decades of experience, we can examine many questions in depth under realistic conditions.

Modify physical properties?
Transform liquids into solids and the other way round – if you want to have certain product properties for your processes changed, the solution is possibly already waiting for you.

Simplify production steps?
For instance by premixing individual components or by using full raw material packages.
Contact us to simplify your production with a selective customisation of our products.

Individual configurations?
Whether you integrate specific additives into a proven matrix or want to test completely new combinations – we support you with our experience and competency.

Develop unconventional solutions?
Why not think "outside the box"? We will be particularly pleased to talk about unusual ideas with you.

No matter whether customised containment and packaging variants, individually adjusted material properties or optimisation potentials in your production flow are concerned, the LEHVOSS Team supports you with equally efficient and individual solutions in reaching your goals.

Talk to our experts.

Scan or click the code for contact details.

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We LUV it.

www.lehvoss.com

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