



IOI OLEOCHEMICAL

TECHNICAL APPLICATIONS

SOFTENOL[®] 2100

Superior EPS Coating



SOFTENOL® 2100

Description:

Vegetable based EPS processing aid produced from edible fatty acids and glycerol

Appearance:

Microfine powder

Application:

Single component coating for Expandable Polystyrene products in construction, packaging and other related applications

CHARACTERISTICS	SOFTENOL® 2100	UNIT
Acid Value	max. 2	mg KOH/g
Saponification Value	155-170	mg KOH/g
Melting Point	approx. 60	°C
Particle size > 150 µm	max. 5	%
Particle size < 100 µm	min. 75	%

WHEN USING OUR SINGLE COMPONENT COATING FOR YOUR EPS APPLICATIONS

- Elimination of mixing steps – the substance can be used without any other additive
- Comparable or optimized results in product performance
- Less effort in quality control due to reduced number of different products
- Simplified storage handling
- Less complex order handling – no combination of several raw material availabilities required
- Product adjustments based on your EPS can provide performance increases like e.g. burning behaviour, water uptake or mechanical strength

YOUR RESULTING BENEFITS

- ✓ Reduction of total cost of ownership (TCO)
- ✓ Potential reductions in supply-chain-related greenhouse gas emissions may be achievable depending on process configuration
- ✓ Cost reduction compared to current coating systems over the whole process

Performance

EXPERIMENTAL DATA FOR PRE-EXPANSION AND MOULDING

- Pre-expansion time and mechanical strength results are compared with the standard coating of this EPS grade
- Comparison made under constant test conditions
- All examples show a comparable or optimized coating performance compared to the standard

EPS TYPE	BEAD SIZE [MM]	PENTANE	Results of new coating (single component) compared to results of standard coating (3-4 multi component system)	
			PRE-EXPANSION TIME	MECHANICAL STRENGTH
White EPS A	0.5 – 0.9	6 %	- 38%	+ 46 %
White EPS B	0.6 – 1.25	4 %	comparable	+ 10 %
White EPS C	0.7 – 1.0	6 %	comparable	+ 25 %
White EPS D	1.0 – 2.0	5 %	comparable	+ 10 %
Grey EPS A	0.8 – 1.4	5 %	comparable	comparable

REDUCED COATING CONCENTRATION

WHITE EPS C	COATING CONCENTRATION	BEAD SIZE [MM]	PENTANE	PRE-EXPANSION TIME	MECHANICAL STRENGTH
Standard coating (multi component)	0.33 %	0.9 – 1.3	6 %	comparable	comparable
NEW COATING (multi component)	0.18 %	0.9 – 1.3	6 %	comparable	comparable

WATER UPTAKE (ACCORDING TO DIN EN 12087)

WHITE EPS C	BEAD SIZE [MM]	PENTANE	COATING	WATER UPTAKE
Standard coating (multi component)	0.9 – 1.3	6 %	0.31 %	106 %
NEW COATING (multi component)	0.9 – 1.3	6 %	0.33 %	93 %

Performance

SURFACE EFFECTS DURING PROCESSING (expressed by Electron Microscope Pictures):

PRE-EXPANDED BEADS

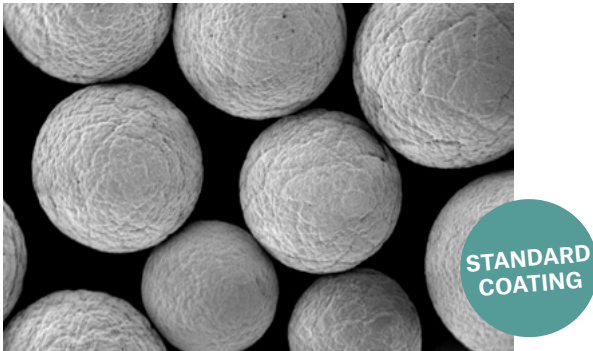


Figure 1: Prefoamed beads examples with customer **standard coating**. Visible pin holes and damages on the bead surface can cause poor fusion.

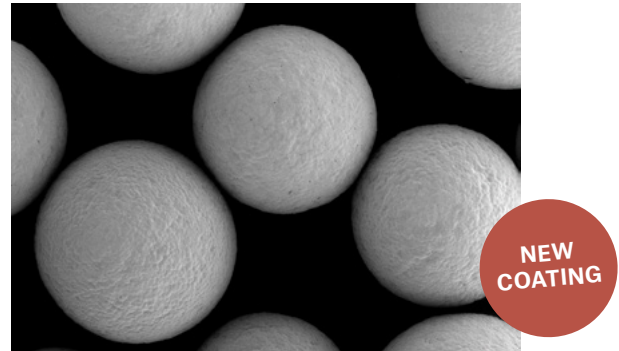


Figure 2: Prefoamed beads example with **new coating**. Reduced number of pin holes and surface damage providing better fusion results.

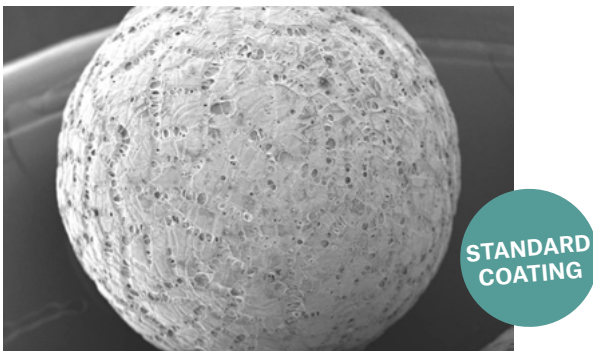


Figure 3: Pre-foamed bead example with customer **standard coating**.

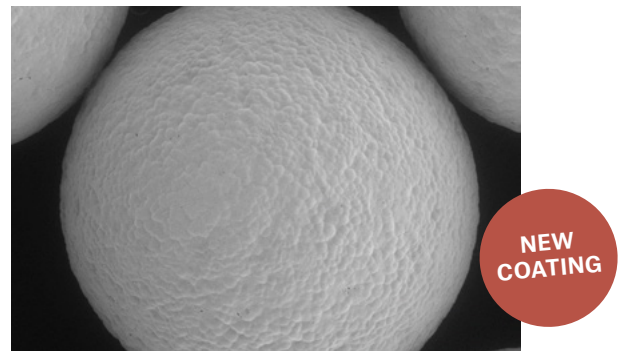


Figure 4: Pre-foamed bead examples with **new coating**.

FRACTURE SURFACES OF FUSED BLOCKS



Figure 5: Fracture surface/broken cells example with customer **standard coating**. The surface is clean, which means that the block was separated at the fusion line between the beads, inducing a poor fusion.

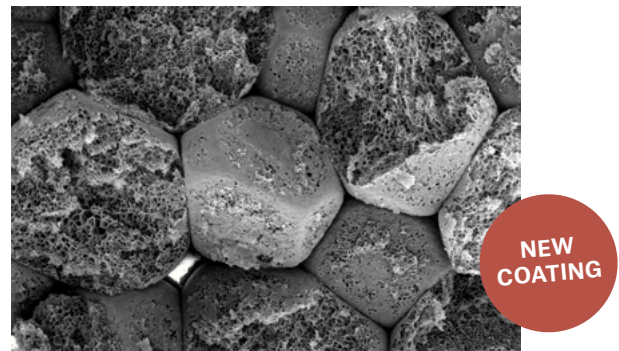
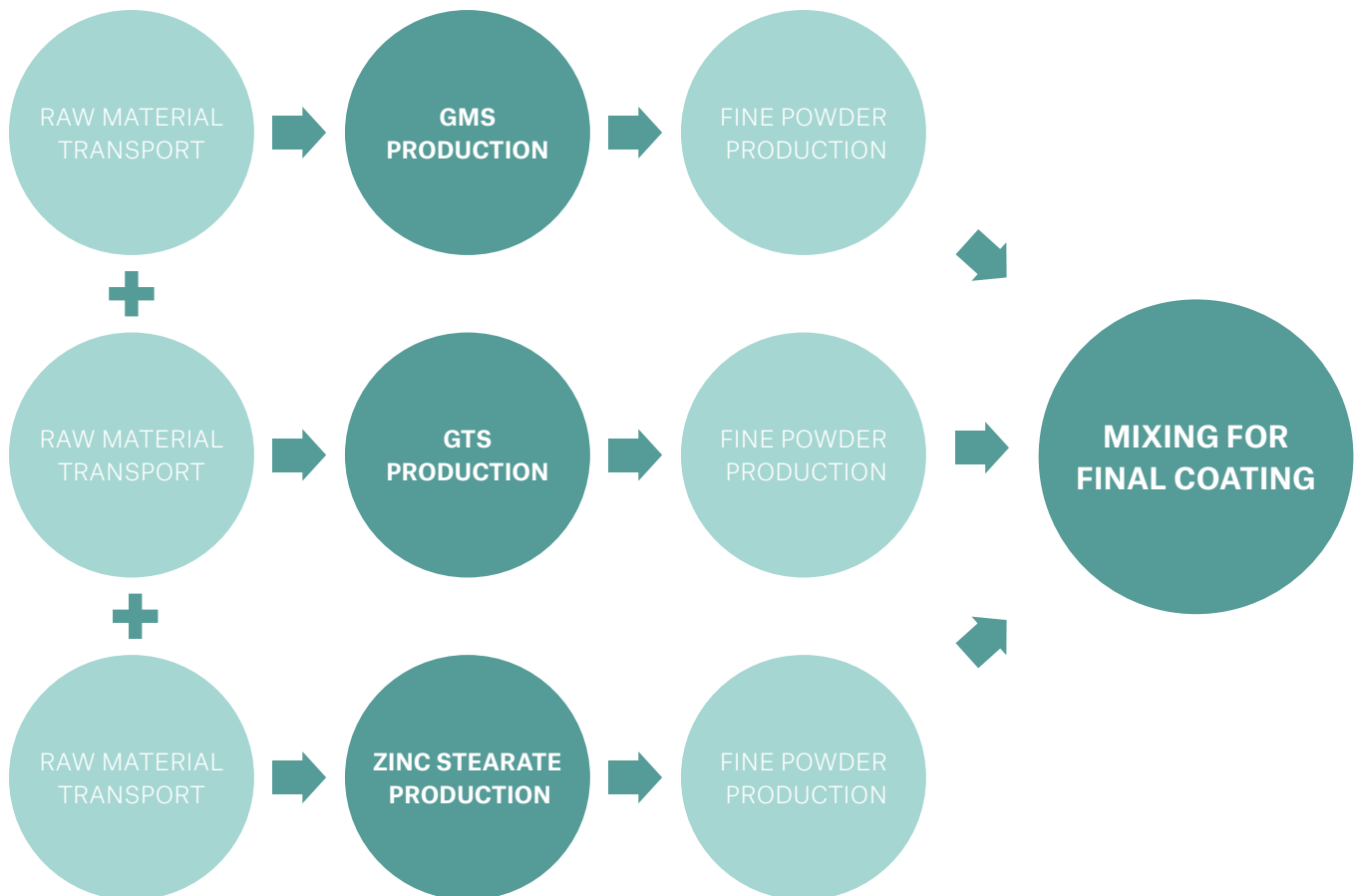


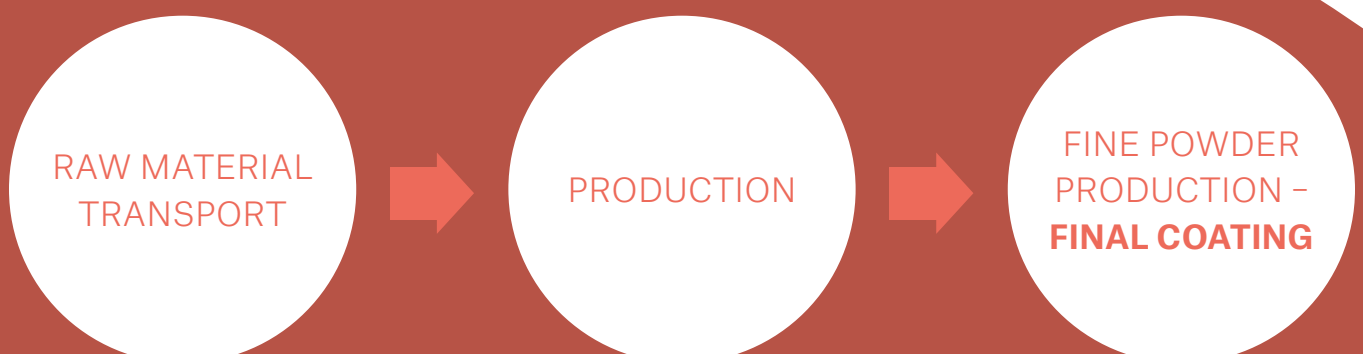
Figure 6: Fracture surface/broken cells example with **new coating**. The block was not separated at the fusion line but the beads were cracked which shows that the fusion result is of higher quality and strength.

Complexity

STANDARD COATING PRODUCTION PROCESS - 10 STEPS



NEW COATING PRODUCTION PROCESS - 3 STEPS



Product and Supply Chain Efficiency Benefits

THE SIMPLE OPTION

- ✓ Elimination of mixing steps – reduced energy consumption
- ✓ Minimized number of transport steps
- ✓ Reduced amount of packaging waste and disposal
- ✓ Positive effect in supply chain management due to less complex system
- ✓ Internal PCF assessments indicate reductions of up to 50% compared with selected conventional coating systems*

* Based on internal calculations. Detailed methodology available upon request.

Case Study

Situation:

European customer for EPS production incorporating recycled EPS facing issues with standard market material contacted IOI to ask for support and solution.

Capabilities leveraged:

- ✓ Knowledge about grey EPS involving recycled material
- ✓ Extensive coating know-how > 30 years
- ✓ Short-term development, production and supply of coating material

What we delivered:

Knowledge transfer and product development including manufacturing of 1 mt were provided within one month.

Result:

New generation coating showed best performance on customers EPS and one ton of product was supplied immediately. Customer could make the transition without any production constraints and will continue business relations with up to several tons per year.

New Coating Material Summary

- Simplified coating system leads to less overall complexity
- Product can be applied in different ways, not only dry coating
- New coating is very versatile with high potential for reducing number of recipes
- Product is suitable for grey, white, suspension, extrusion and recycled EPS grades
- Performance is similar or better compared to standard coatings
- Specific performance advantages are seen in mechanical strength and water absorption
- Potential reductions in product carbon footprint may be achieved depending on raw material origin, logistics and production setup.

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