Coathylene® Polymer Powders

Enhanced processing efficiency of Glass fiber reinforced plastics

Improved dimensional stability – Improved surface finish and appearance – Anti-Shrink additive for low profile

Coathylene® fine powders are manufactured for specific applications. Our unique manufacturing processes along with our long-term expertise enables the fine tuning of our products, making them highly suitable for demanding applications.

For various applications like SMC, BMC or pultrusion compounds, Axalta offers high performance thermoplastic powder additives based on proprietary polymer chemistries and a unique precipitation (chemical micronization) process enabling the production of ultra-fine powders (median range 12 – 22 µm).

The combination of Axalta micronization technology with polymer modification expertise brings innovative solutions improving materials, and processes.

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Coathylene® powders are made from pure thermoplastics. No additives are used in the manufacturing process. The manufacturing process of Coathylene® is ISO 9001 and ISO 14001 certified.

Coathylene® powders are compatible with all types of SMC and BMC formulations. Depending on the shape of the part and the type of pigment and fillers, the amount of **Coathylene® added to the formulation ranges between 2 and 8%.**

Typical BMC formulation used in the following trial example:

Product	Type	Mass %
Resin	UP	21.2
Filler	$CaCO_3$	50 %
Initiator	TBPEH	0.3 %
Release agent	Zinc Stearate	1 %
Anti-Shrink additive		3 – 6 %
Inhibitor	Parabenzoquinone	0.01 %
Reinforcement	Glass fibers	20 %
Pigment	Carbon black	1.5 %

Compound viscosity

Formulation	*Anti-Shrinkage Additive*	Viscosity [cP] (23°C)
0	No	$2.25\ 10^6$
1	6 % PS liquid	$1.91\ 10^5$
2	3% PS liquid + 3% HA1681	$1.40\ 10^6$
3	3% SL 0425 + 3% HA1681	$7.78\ 10^6$
4	3% HA1681	$4.67\ 10^6$

Reduce water absorption

Because of its hydrophobic nature, the **Coathylene® HA series** reduces water absorption by SMC – BMC pieces.

*7 days at 23°C

Anti-Shrinkage Additive	Water Absorption* (%)
6 % PS liquid	0.30
3% SL 0425 + 3% HA1681	0.18
3% HA1681	0.21
3% Comparable Product	0.26
No additive	1.70

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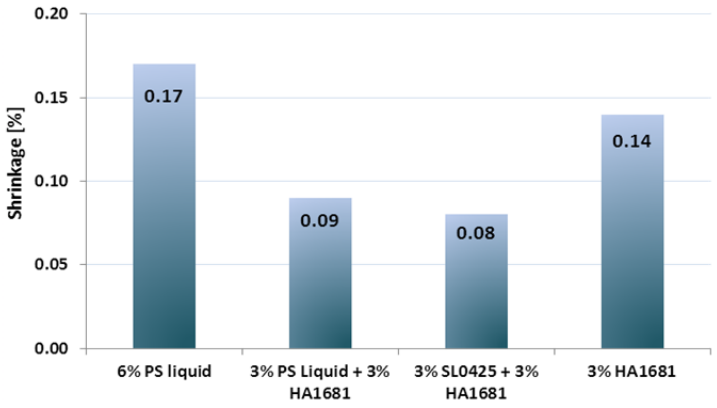
Controlled/reduce shrinkage

Controlled shrinkage is really important in SMC – BMC. **Coathylene®** reduces shrinkage compared to liquid styrene by 50%. It also **improves dimensional stability** surface finish and appearance as well as **reduces the formation of micro-cracks**.

*Tests done at 20°C - 50% moisture

Average Shrinkage on compresses sheet



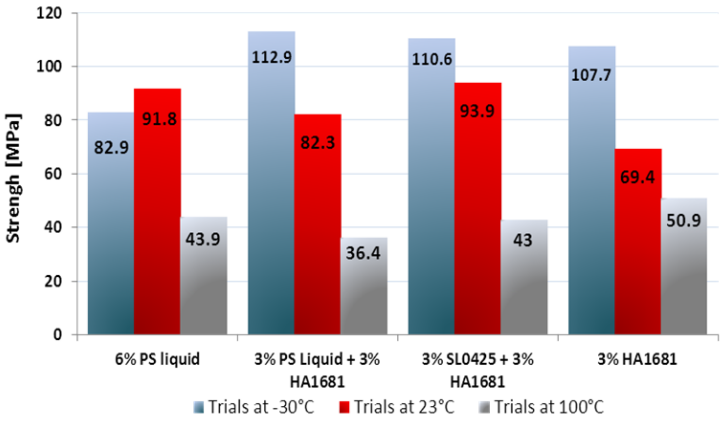
Improves mechanical properties and resistance to low temperatures

Compared to liquid styrene, **Coathylene® improves Tensile strength** at both low and high temperatures*.

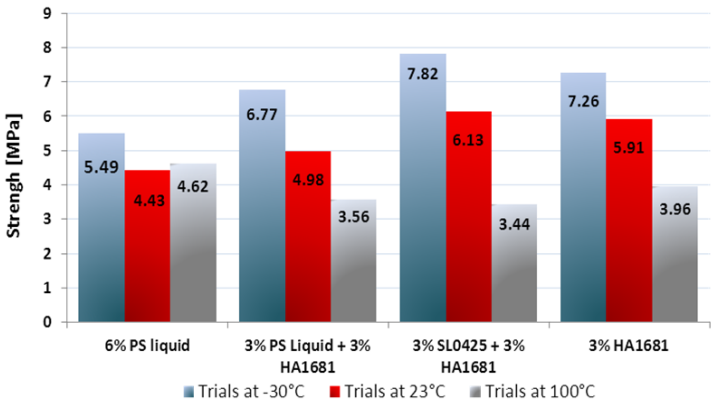
Thermoplastic behavior of **Coathylene® improves impact resistance and strength before failure** of the BMC**.

* ISO 14125
** ISO 6603-2

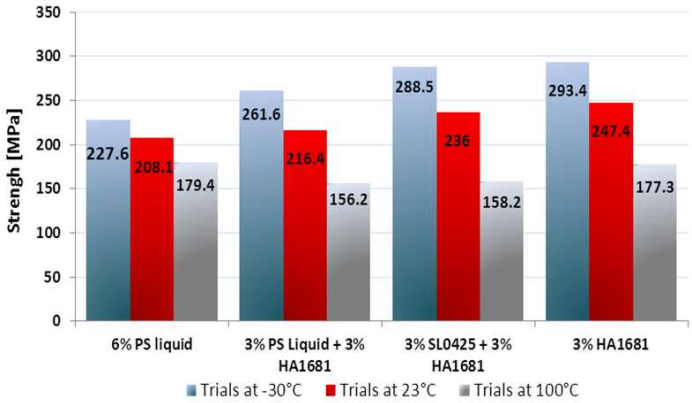
Tensile strength ISO 14125



Flexural strength - Impact Multi axis



Maximum strength - Impact Multi axis



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Coathylene® powder additives are recommended for use in SMC, BMC and pultrusion compounds, and allow manufacturers to:

- **Control/reduce shrinkage**
- **Improve dimensional stability**
- **Improve mechanical properties**
- **Improve surface finish and appearance**
- **Improve pigment dispersion**
- **Improve low temperature resistance**
- **Reduce formation of micro cracks**
- **Reduce stress cracking**
- **Reduce water absorption**

BMC parts with Coathylene®

Overview of the recommended grades*:

* Typical properties, not to be considered as specifications

Grade	*Polymer*	*Melt Flow Index (190℃/2.16kg)*	*DSC peak* [℃]*	*Particle Size distribution*
Coathylene® HA 2454	LDPE	7	112	95-100% < 75 microns
Coathylene® HA 1682	LDPE	70	105	95-100% < 75 microns
Coathylene® HA 1681	LDPE	70	105	98-100% < 75 microns
Coathylene® SL 0425	PS	30	--	98-100% < 315 microns
Coathylene® SM 0425	PS	30	--	98-100% < 400 microns

*Melting peak in °C measured by differential scanning calorimetry

Case study: Substitution of styrene granules

Coathylene® SL 0425 is a PS powder which can partially substitute liquid styrene as an anti-shrink additive. Instead of time consuming pre-mix and dissolution steps of polystyrene granules in styrene for low shrink formulations, **Coathylene® SL 0425** can easily replace polystyrene granules. Around 75% of the dissolution time can be avoided simply by mixing a **Coathylene® SL 0425**/ liquid styrene/ resin compound.

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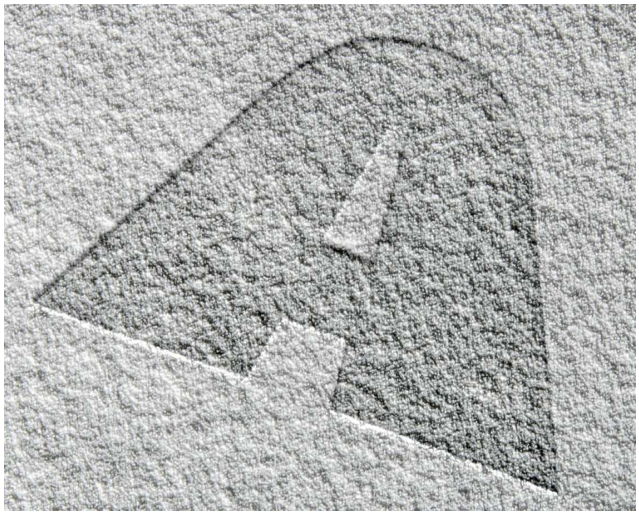

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Axalta Polymer Powders offers a wide range of powder coatings and micro-powder additives based on many different polymer chemistries. Do not hesitate to contact us to discuss your specific requirements.