POWDER COATING ADDITIVES
Powder Coatings

Powder Coatings can be considered one of the youngest coating technologies, with a history of only about 60 years. However, no other technology went through so many different innovative stages. Today, Powder Coatings have got to be real all-rounders: they need to resist heavy strains, such as scratching, rubbing and withstand long-term forces, such as sunlight, heat and cold.

Besides measurable values, the subjective perception of the customer is playing a major role – the senses of the customers want to be activated. Optical effects, such as gloss or matting let the coating look better, haptic effects, such as soft feel, enhance the products and provide a competitive edge. Different surface structures activate the customer’s sense of touch.

CERETAN wax additives will help to meet these steadily growing demands. Just as the final products, our additives need to fulfill equally high requirements: they should aid in and optimize the production process. They need to be easy to use. They should preferably only be a small portion of the overall formulation. They need to assure a constantly high quality. Our round micronized CERETAN waxes will fulfill your demands and help you to inspire your customers to reach for outstanding performance. This brochure will help you find the best suitable products and optimize your Powder Coating.

Waxes for Powder Coatings

Powder Coatings mainly consist of resins, pigments, filler and additives. Waxes belong to the category of additives and have multiple functions. They are being used for:

» Improving surface properties
» Improving the application during the coating process
» Processing aid
» Reducing damage during transport and storage

Effectiveness of micronized waxes

In the past, customers used waxes as powders with an average particle size of 200–500 μm for the production of Powder Coatings. Analytical chemists were of the opinion that the waxes would eventually melt and therefore optimal homogenization would be achieved. Detailed analyses of defects such as fogging, irregular gloss and rough surfaces showed that such irregularities could be avoided by perfect dispersion of all components. This conclusion leads to the fact that micronized waxes with an average particle size of 5–10 μm are more suitable for the dispersion than the formerly used powder waxes.
Non micronized vs. micronized waxes

Waxes, especially micronized waxes, have a great influence on the cost efficiency of the production of Powder Coatings. Micronized waxes melt earlier and therefore wet the pigment and fillers for a longer time span. The result is improved lubrication during the extrusion as well as the improved wetting of the pigments, resulting in superior color output.

Lab tests have proven that the use of micronized waxes reduces the electric power consumption. Flexible parts last longer and therefore the costs for maintenance and repairs are reduced, even with higher throughput.

Production Process

Micronized waxes offer advantages to various production steps of Powder Coatings. In the following graph you can see that the areas highlighted in green are positively affected by the use of micronized waxes. In the so called pre-mixing stage the waxes offer advantages as a processing aid, such as better pigment dispersion and as lubricant during extrusion. In the post-adding stage the wax contributes additional surface properties for the end user, such as scratch and abrasion resistance.

Waxes as processing aids

In order to obtain the best results, it is necessary to add the wax at the beginning of the production stage. This will ensure a homogeneous dispersion of all components, including improved pigment wetting, hence better color output. The properties of the final coating are enhanced by even distribution of the components within the surface.

A subsequent addition is only recommended for special cases since it is very difficult to disperse a very small amount of wax homogeneously.

Pre-mix or post-add

A very standard question regularly comes up regarding the addition of waxes – pre-mix or post-add? MÜNZING Micro Technologies recommends using waxes in the pre-mix in order to get the full advantages as a processing aid. All CERETAN waxes for Powder Coating applications can also be used in post-addition, however, it is necessary to have very good homogenisation equipment to assure a homogeneous mixture.

1. Weighing
2. Mixing
3. Dosing
4. Extruder
5. Cooling
6. Pre-Breaking
7. Milling
8. Post adding
POWDER COATING

Flexibility of Use

CERETAN round micronized waxes cause only very little electrostatic charge in comparison to traditional milled waxes. The unique spraying technology leads to a superior suitability for use in both kinds of spray application, either by Corona or Tribo spraying gun.

**Improved surface properties**
A homogeneously dispersed Powder Coating optimises the surface with following properties:
- Gloss / Matting
- Degassing
- Scratch resistance
- Surface texture

At the same time, also the secondary properties like internal porosity (bubbles) or cleaning properties (with solvents such as white spirit) show improvements.

**Improved performance with substantial cost savings**
Joint developments of MÜNZING together with major Powder Coatings producers have shown and proven that the CERETAN micronized waxes provide better results by using a lower addition level (10–20 %) of waxes in the Powder Coating formulation. CERETAN waxes do improve the Powder Coating production as well as the surface properties of the finished Powder Coating, while saving raw materials – hence, CERETAN products can be considered eco-friendly.

**WAX PROPERTIES**

<table>
<thead>
<tr>
<th>Product</th>
<th>Type of wax</th>
<th>Drop point °C</th>
<th>Density of the wax g/cm³</th>
<th>Viscosity of the wax mPas</th>
<th>Particle size D₉₀ μm</th>
<th>D₅₀ μm</th>
</tr>
</thead>
<tbody>
<tr>
<td>CERETAN MA 7008</td>
<td>EBS</td>
<td>143–151</td>
<td>0,98–0,99</td>
<td>20–40</td>
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<tr>
<td>CERETAN MA 7020</td>
<td>EBS</td>
<td>143–151</td>
<td>0,98–0,99</td>
<td>20–40</td>
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<td>8</td>
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<tr>
<td>CERETAN ME 0980</td>
<td>Non polar Polyethylene</td>
<td>110–120</td>
<td>0,94–0,96</td>
<td>10–0</td>
<td>80</td>
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<tr>
<td>CERETAN MF 5108</td>
<td>PTFE</td>
<td>320–340 **</td>
<td>2,15–2,25</td>
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<td>8</td>
<td>5</td>
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<tr>
<td>CERETAN MF 5715</td>
<td>PE/PTFE</td>
<td>108–118</td>
<td>0,94–0,95</td>
<td>20–60</td>
<td>15</td>
<td>8</td>
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<tr>
<td>CERETAN MP 2120</td>
<td>Polypropylene</td>
<td>156–164</td>
<td>0,87–0,89</td>
<td>100–200</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>CERETAN MP 2180</td>
<td>Polypropylene</td>
<td>156–164</td>
<td>0,87–0,89</td>
<td>100–200</td>
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<td>CERETAN MT 9120</td>
<td>Fischer Tropsch</td>
<td>112–120</td>
<td>0,94–0,98</td>
<td>10–20</td>
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<td>7</td>
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<tr>
<td>CERETAN MX 2919</td>
<td>Functional blend</td>
<td>140–146</td>
<td>0,93–0,95</td>
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<tr>
<td>CERETAN MX 9718</td>
<td>Functional blend</td>
<td>134–142</td>
<td>0,96–0,98</td>
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<tr>
<td>CERETAN MX 9820</td>
<td>Polyolefine</td>
<td>111–119</td>
<td>0,94–0,95</td>
<td>20–60</td>
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</table>

** = Melting point

* The composition of the Powder Coating used was as follows: Polyester/Epoxy 70:30, Resin/Pigment 65:35 (pigment content: neutral filler and Titanium Dioxide, respectively Carbon Black Pigments)
Crockmeter-Test *
During the CROCKMETER Test (abrasion and rubbing test) the high quality of CERETAN waxes has been proven. In comparison to the reference sample, the surface impact (such as card board or Styrofoam) is highly reduced or there is no impact (no visible impact) at all. The results are as follows:
» CERETAN MF 5715 good
» CERETAN MXF 9820 D better
» CERETAN MXD 3920 excellent
(no impact/no sanding mark visible)

Taber-Abraser-Test *
In comparison to the reference sample the CERETAN MF 5715 achieved very good results during the Taber Abraser testing. The CERETAN MXF 9820 D shows the best results.
» CERETAN MX 9820 good
» CERETAN MF 5715 better
» CERETAN MXF 9820 D best
For testing our CERETAN MXD 3920, the Taber Abraser test is not the recommended testing-method, due to the fact that the product with a coating of diamond-like hardness heavily abrades the ceramic wheel of the Taber Abraser giving false hardness results.

<table>
<thead>
<tr>
<th>Degassing</th>
<th>Matting</th>
<th>Scratch resistance</th>
<th>Abrasion resistance</th>
<th>Surface hardness</th>
<th>Slip</th>
<th>Structure</th>
<th>Anti Graffiti</th>
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</table>

- **Recommended**
- ***Highly recommended***
CERETAN coated waxes

The unique MÜNZING spraying technology enables us to coat additives on the surface of our round micronized waxes. The coating of micronized waxes offers various advantages to the customer:

» Two products in one
» Difficult to disperse additives can be dispersed easily
» The amount of additives can be reduced
» The amount of wax can be reduced
» Improved performance of the additive
» Reduced number of production steps
» Additives are evenly distributed
» No settling of additives

MÜNZING recommends especially for Powder Coatings the following coated waxes which have proven their high efficiency:

» CERETAN MAB 7055
  Amide wax coated with Benzoin, this product enables you to reduce the amount of Benzoin contained in your Powder Coating and provides excellent flow and leveling by reduced yellowing.

» CERETAN MXF 9820 D
  PTFE coated functional blend, which helps to reduce the amount of PTFE used in your system by more than 10%. It provides better clarity and improved surface properties due to immediate performance of PTFE on the surface.

### CERETAN coated waxes

<table>
<thead>
<tr>
<th>Product</th>
<th>Type of wax</th>
<th>Coating</th>
<th>Drop point °C</th>
<th>Density of the wax g/cm³</th>
<th>Viscosity of the wax mPas</th>
<th>Particle size D50 μm</th>
<th>D99 μm</th>
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<tbody>
<tr>
<td>CERETAN MAB 7055</td>
<td>EBS Benzoin</td>
<td>135–145</td>
<td>0.98–0.99</td>
<td>20–40</td>
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<td>CERETAN MXF 9899</td>
<td>Functional blend PTFE</td>
<td>108–118</td>
<td>0.94–0.95</td>
<td>20–60</td>
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<td>CERETAN MXF 2999</td>
<td>Functional blend PTFE</td>
<td>140–146</td>
<td>0.93–0.96</td>
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<tr>
<td>CERETAN MTZ 9335</td>
<td>Fischer Tropsch Zinc</td>
<td>108–116</td>
<td>0.94–0.95</td>
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<tr>
<td>CERETAN MXD 3920</td>
<td>Functional blend Coating of diamond-like hardness</td>
<td>138–146</td>
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<td>0.94–0.95</td>
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### Safety data

Further information about all mentioned products can be found in the corresponding Material Safety Data Sheet. Moreover, information concerning hazard class designation, safety measures, exact handling and storing as well as information on disposal regulations can be found in the MSDS.
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### COATED WAX PROPERTIES

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<th>Slip</th>
<th>Structure</th>
<th>Anti Graffiti</th>
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- **Recommended**
- **Highly recommended**

» **CERETAN MXD 3920**
Functional blend with a coating of diamond-like hardness, which provides superior surface hardness. It is harder than pure PTFE and can be used in lower amounts.

» **CERETAN MTZ 9335**
Zinc-compound coated wax, which provides excellent matting at higher curing temperatures starting from 180–230 °C, where standard matting agents fail.