BONDING AT ITS BEST
Mixing systems for metallic powder coatings

Mixing Technology

www.zeppelin-systems.com
**HIGHEST QUALITY**

Producing bonded metallic powder coatings requires highly sensitive processes. First-class, consistently high quality with circulation stability is not obtained by chance, but with Zeppelin’s proven technology and perfected process engineering.

Global leader

Decades of experience were necessary to create the world’s most accurate, gentle and reliable system for the bonding process. Our very specific technology combined with product features optimized for bonding ensure absolute process reliability, nearly loss-free production and excellent processing quality of the mixture.

Zeppelin’s HENSCHEL-Mixer®, type process mixer is particularly suitable for the bonding process of glossy metallic powder coatings such as those used in the automotive industry and is now available with optimized design characteristics.

Optimal features

The process mixer features an elaborate temperature control system with 4 cooling zones: drive shaft, mixing tool, double jacket and bottom shell. The system creates a positive agglomeration of the mix and prevents residues from settling in the vessel and onto the tool. Temperature measuring points at various locations ensure precise compliance with the process while the bearing temperatures of the mixing tool shaft are constantly monitored. Control of residual oxygen content and nitrogen inerting comply with the required explosion protection measures.

The entire bonding process can be controlled extremely precisely and offers certified and absolute process reliability. Your advantages: premium quality, efficient production, constant brilliant powder coatings — short amortization period of your plant.

Advantages at a glance:
- Trusted technology – global leader
- Guaranteed reproducible quality
- Controlled and absolute process reliability
- No segregation after the process due to complete bonding
- First class brilliance and consistent color quality
- Comprehensive range of accessories
- Explosion protection for safe operation

Step by step to perfect quality

**Process step 1**

Plain powder coating is poured into the mixer. In order to dose the precise amount of nitrogen, the oxygen content is continuously monitored (redundant sensors optional) and the nitrogen inerting is adjusted.

**Process step 2**

Friction induced energy input heats the mixture until the ideal Tg (softening point temperature / glass transition temperature) of the resin is reached. The effect pigments can now be added.

**Process step 3**

The temperature will be kept constant for a defined period until the pigment powder is bonded to the resin.

**Process step 4**

The mixture is then cooled gently to avoid excessive agglomerates from building up. Cooling can take place in the process mixer (at intensive cooling) as well as in a downstream cooling mixer, which also enables filling degrees of up to 85%. This process ensures excellent product quality with optimal processing properties.

**Better mixing with know-how**

The design characteristics of the process mixer have been further enhanced for the specific requirements of effect powder coatings. A very demanding process is required to obtain a premium quality mixture. In the bonding process, the softening point temperature of the resin — to which the effect pigment adheres — is key. The temperature slot at which the texture of this substrate goes from powder to a doughy mass is very narrow. If it has not been reached, the downstream production cycle will be unstable.

**Unique cooling concept**

Heat is generated by friction during the intensive mixing. These temperature fluctuations are regulated by the individual cooling zones in the mixer. Each cooled module can be regulated and cooled separately. No other mixer comes as close to glass transition temperature as Zeppelin’s HENSCHEL-Mixer®. The result is first-class processing quality of these valuable powder coatings.

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**Technical data**

<table>
<thead>
<tr>
<th>Type</th>
<th>Charge</th>
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</thead>
<tbody>
<tr>
<td>Laboratory mixer</td>
<td>1.6 – 3.5 kg</td>
</tr>
<tr>
<td>Production mixer combination</td>
<td>25 kg</td>
</tr>
<tr>
<td>MB 75 / KM 150</td>
<td>75 kg</td>
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<tr>
<td>MB 350 / KM 150</td>
<td>130 kg</td>
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<tr>
<td>MB 500 / KM 1750</td>
<td>180 kg</td>
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<tr>
<td>MB 800 / KM 2200</td>
<td>280 kg</td>
</tr>
<tr>
<td>MB 1000 / KM 2200</td>
<td>400 kg</td>
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</tbody>
</table>

Throughput: 4 batches/hr. at combined operation
2 batches/hr. with process mixer at intensive cooling
Discharge with cleaning kit
Swivel design discharge cylinder and hinged cover plate for easier cleaning

Piggement hopper
The feed hoppers are ideal for the bonding application: they are designed according to the amount and pourability of the pigments to be added, offer very good residual discharge, are easy to clean and can be handled safely during transport

Process mixer

Discharge with cleaning kit
Swivel design discharge cylinder and hinged cover plate for easier cleaning

Cooler mixer

Discharge with cleaning kit
Swivel design discharge cylinder and hinged cover plate for easier cleaning

Pneumatic hinged lid with deflector
Hinged design for easier cleaning

Residual oxygen meter

Mixing tool
Special self-cleaning one-piece mixing tool with water cooling through the drive shaft right to the tips of the tool blades

Discharge with cleaning kit

Pigment hopper

Mixing tool
Special mixing tool for particularly gentle cooling of the mixture

Hinged lid
Electrically operated to open at 2/3 of the lid for fastest cleaning when changing recipes while maintaining connection to the process mixer

Process mixer

Mixing tool
Special self-cleaning one-piece mixing tool with water cooling through the drive shaft right to the tips of the tool blades

Residual oxygen meter

Process mixer

Cooler mixer

Discharge with cleaning kit
Swivel design discharge cylinder and hinged cover plate for easier cleaning

Hinged lid
Electrically operated to open at 2/3 of the lid for fastest cleaning when changing recipes while maintaining connection to the process mixer

Combination of process mixer and cooler mixer
Laboratory mixer
Perfect bonding quality in laboratory scale for your color development and production upscaling