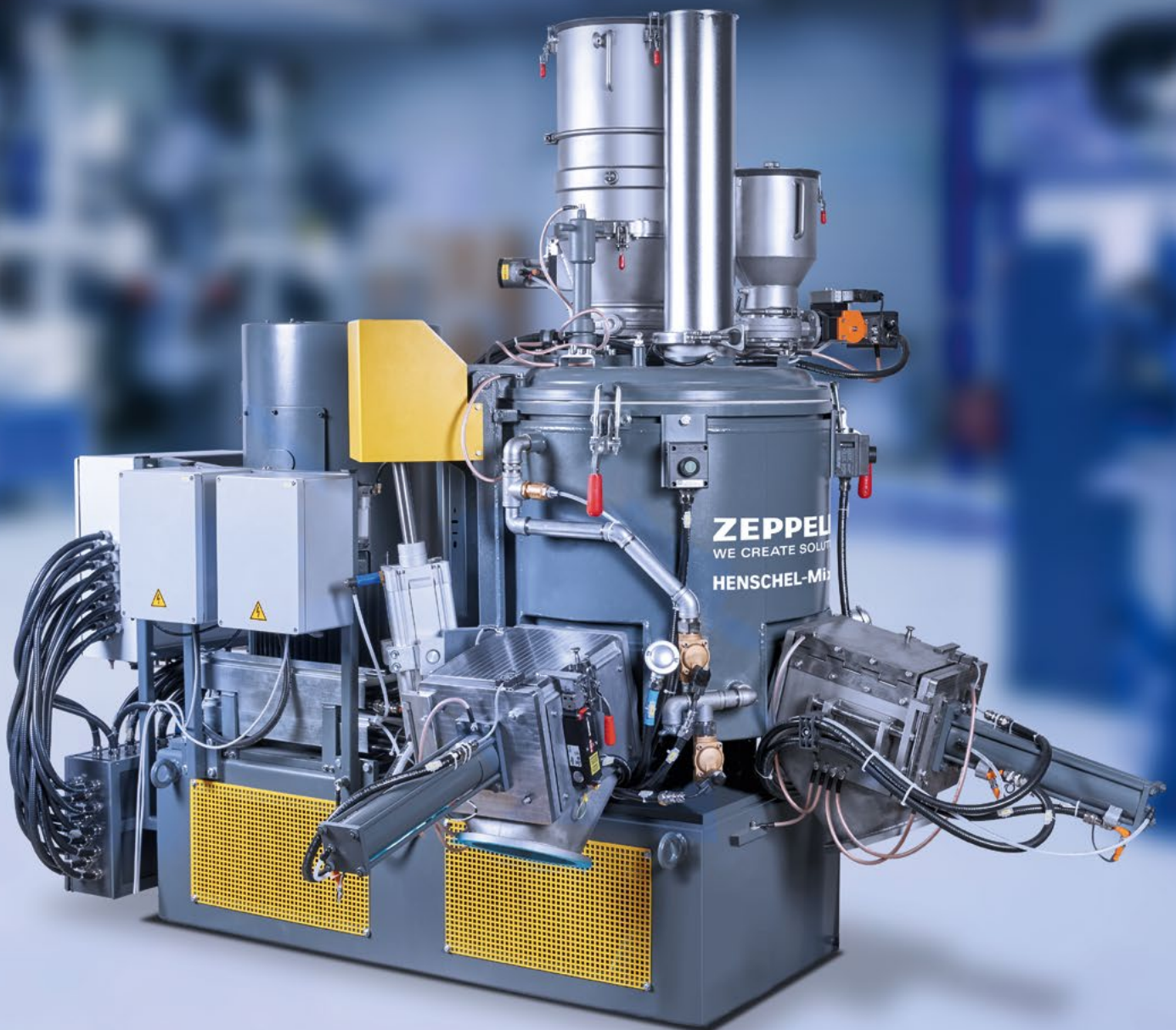


THE BENCHMARK IN BONDING TECHNOLOGY

# MIXING SYSTEMS FOR METALLIC POWDER COATINGS



[zeppelin-systems.com](http://zeppelin-systems.com)

 **ZEPPELIN**<sup>®</sup>  
WE CREATE SOLUTIONS

# THE STANDARD – WORLDWIDE

The production of metallic powder coatings using the bonding method requires highly sensitive processes. Zeppelin Systems provides the ideal basis for this – with its proven technology and process engineering that is regarded as the standard worldwide. For consistently high, reproducible and cycle-stable quality.

## ZEPELIN SYSTEMS HAS PERFECTED BONDING

Zeppelin Systems offers the most precise, gentlest, and most reliable bonding system in the world – drawing on decades of experience. Our precisely defined process technology and bonding-optimized product characteristics guarantee process reliability, virtually loss-free production, and outstanding processing quality. The HENSCHTEL-Mixer® type Process Mixer MB produces brilliant, non-segregating, and color-consistent coatings that are ideal for metallic powder coatings (for fields such as the automotive industry) – giving you a competitive advantage.

Powder coatings are extremely temperature-sensitive and place high demands on processing. The process mixer has been specifically developed for them: four cooling zones (drive shaft, mixing tool, double jacket, and bottom shell) ensure optimal agglomeration and prevent deposits. Precise temperature measurement points guarantee process compliance. In addition, the system monitors bearing temperatures and residual

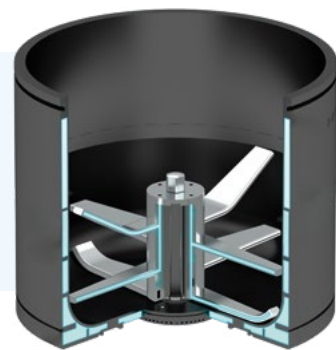
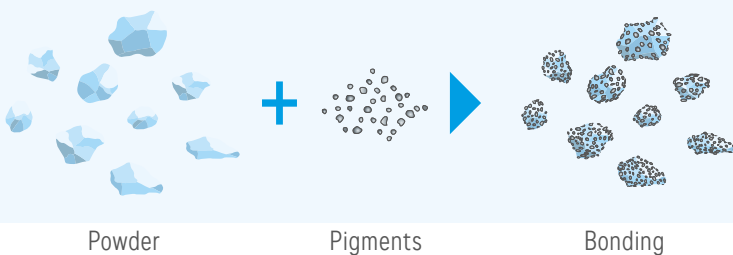
### YOUR BENEFITS AT A GLANCE

- Proven technology – the leader worldwide
- Automatic Tg detection
- Guaranteed, reproducible quality
- Controlled, absolute process reliability
- Zero segregation after processing due to complete bonding
- Outstanding brilliance and consistent color quality
- Extensive range of accessories
- Explosion protection for safe operation

oxygen levels and enables nitrogen inerting, which is essential for explosion protection measures.

The entire bonding process can be controlled with the highest precision and provides absolute, certified process reliability. You benefit from first-class quality, efficient production, consistently brilliant powder coatings and a short payback time for your system.

## POWDER COATING



Expertise: highest processing quality, maximum pigment protection, agglomeration prevention

# HOW METALLIC POWDER COATINGS ARE PRODUCED

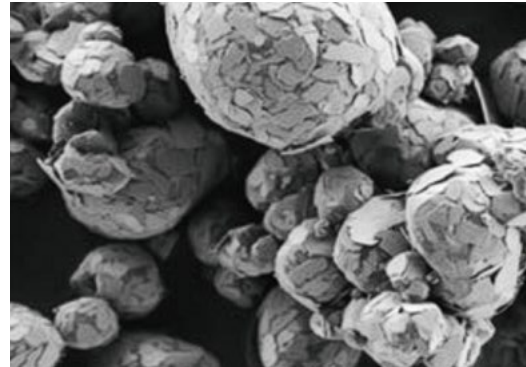
Expertise creates perfection: the special bonding process ensures the highest processing quality and maximum pigment protection as well as preventing agglomeration. Achieving first-class mixed material quality calls for a well-controlled process in a suitable mixer. The design features of the process mixer MB have therefore been optimized specifically for effect powder coatings.

## THE PROCESS MIXER MB – CLOSER TO THE T<sub>G</sub>

The glass transition temperature (T<sub>g</sub>) of the resin on which the effect pigments are deposited is crucial in bonding. The temperature range in which the consistency of this carrier material changes from powder to a pasty mass is very narrow. If it is not reached, the subsequent production cycle will not be stable. No other mixer gets as close to the glass transition temperature as the HENSCHEL-Mixer® type Process Mixer MB.

## UNIQUE COOLING CONCEPT

Friction during intensive mixing generates heat. Exact control of the individual cooling zones regulates the process precisely. All the cooled modules can be logged and cooled separately. The result is powder coatings with first-class processing qualities.



Microscope image of a metallic powder coating

## TECHNICAL DATA

	Type	Batch size
<b>Laboratory mixer</b>	MB 10	1,6 – 3,5 kg
	MB 75	25 kg
	MB 200 / KM 350	75 kg
<b>Production mixer combination</b>	MB 350 / KM 1050	130 kg
	MB 500 / KM 1750	180 kg
	MB 600 / KM 1750	220 kg
	MB 1000 / KM 2200	400 kg

Throughput: 4 batches/h in combined operation  
2 batches/h when using the process mixer with intensive cooling

## STEP-BY-STEP TO PERFECT QUALITY

### PROCESS STEP 1

Powder coating is loaded into the mixer, and the mixer is inerted with nitrogen. Continuous measurement of the O<sub>2</sub> level ensures safe operation, which also keeps nitrogen consumption to the necessary minimum.

### PROCESS STEP 2

Friction heats the mixture to the optimum point close to the glass transition temperature (T<sub>g</sub>). The effect pigments are added.

### PROCESS STEP 3

The process is controlled in such a way that the pigment bonds optimally to the resin.

### PROCESS STEP 4

Gentle cooling of the mixture minimizes the formation of agglomerates. Cooling takes place either directly in the process mixer (when using intensive cooling) or in a downstream cooling mixer. The cooling mixer also accommodates a filling degree of up to 85% and can therefore handle several batches. The cooling of the mixture guarantees excellent product quality with optimal processing characteristics.

# PROCESS MIXER MB

## 01 PIGMENT HOPPER

Optimally designed for adding pigments, excellent residual emptying, easy to clean, and safe handling during transportation



## 02 PNEUMATIC HINGED LID

Hinged design for easier cleaning



## 03 RESIDUAL OXYGEN MEASUREMENT

Continuous monitoring of the residual oxygen level



## 04 DISCHARGE WITH CLEANING KIT

Swivel design discharge cylinder and hinged cover plate for easier cleaning



## 05 MIXING TOOL

Special cooled, self-cleaning mixing tool in a monobloc design



# PROCESS MIXER MB AND COOLING MIXER KM: THE PERFECT COMBINATION

01



## COOLING MIXER KM

### 01 2/3 HINGED LID

Hinged lid (electrically operated) for opening two-thirds of the lid without dismantling the attachments for the fastest possible cleaning

### 02 MIXING TOOL

Special mixing tool for extra-gentle cooling of the mixture

### 03 DISCHARGE WITH CLEANING KIT

Swivel design discharge cylinder and hinged cover plate for easier cleaning

03



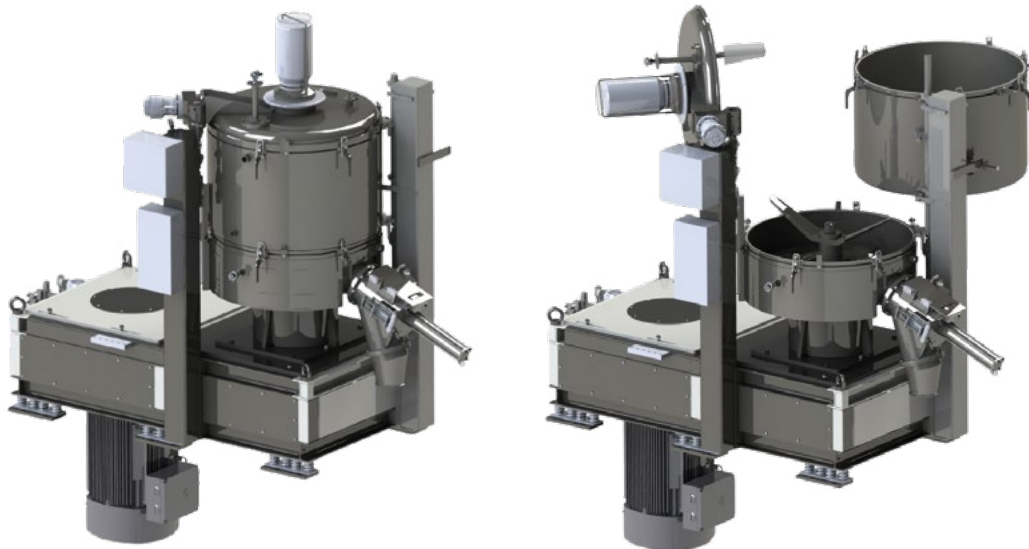
02



# SAVE TIME WITH THE TRANSBONDER DESIGN

By providing much easier access to the mixing chamber, the Transbonder design significantly shortens cleaning and maintenance times. The mixer lid is raised using the control system and manually swiveled to the side. Tilting the lid allows for very convenient cleaning of the inside. The complete upper part of the two-part mixing vessel is also raised using the control system and manually swiveled to the side. This gives the operator optimal access for cleaning the mixer.

The mixing vessel wall and bottom shell are double-jacketed, which guarantees optimum cooling even in the Transbonder design. Once the cleaning or maintenance work has been completed, both the upper part of the vessel and the mixer lid can be swiveled back into position, lowered, and locked using the toggle clamps.



Henschel-Mixer® in the Transbonder design

## 60% FASTER CLEANING – A CASE STUDY:

- A mixer in the Transbonder design can be cleaned in three hours by a single operator. There is no cross contamination between the different coatings produced.
- To clean a conventional mixer, one operator needs eight hours. What's more, completely contamination-free cleaning cannot be guaranteed, as some parts of the vessel are very difficult to reach.



# IDEAL FOR TESTING – THE LABORATORY MIXER MB 10

The HENSCHEL-Mixer® type Laboratory Mixer MB 10 has been specially developed for the bonding of powder coatings and is suitable for developing test mixtures in laboratories and technical centers and for producing small quantities. It offers the same functions as the production machines in the MB series for optimum product quality when bonding powder coatings.

- Zero segregation due to complete bonding
- Cooled mixing tool and mixing vessel
- Fully automatic Tg detection

With this range of functions, the MB 10 provides the ideal framework for the new and further development of different recipes – and hence a sound foundation for upscaling to production.

## OVERVIEW OF THE MB 10:

- Batch size: 2-3 kg
- Cooled multizone mixing vessel
- Cooled mixing tool
- Pigment hopper for adding pigments/additives during the mixing process
- Nitrogen inerting with residual oxygen measurement
- ATEX certified for safe operation
- Intuitive user interface





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