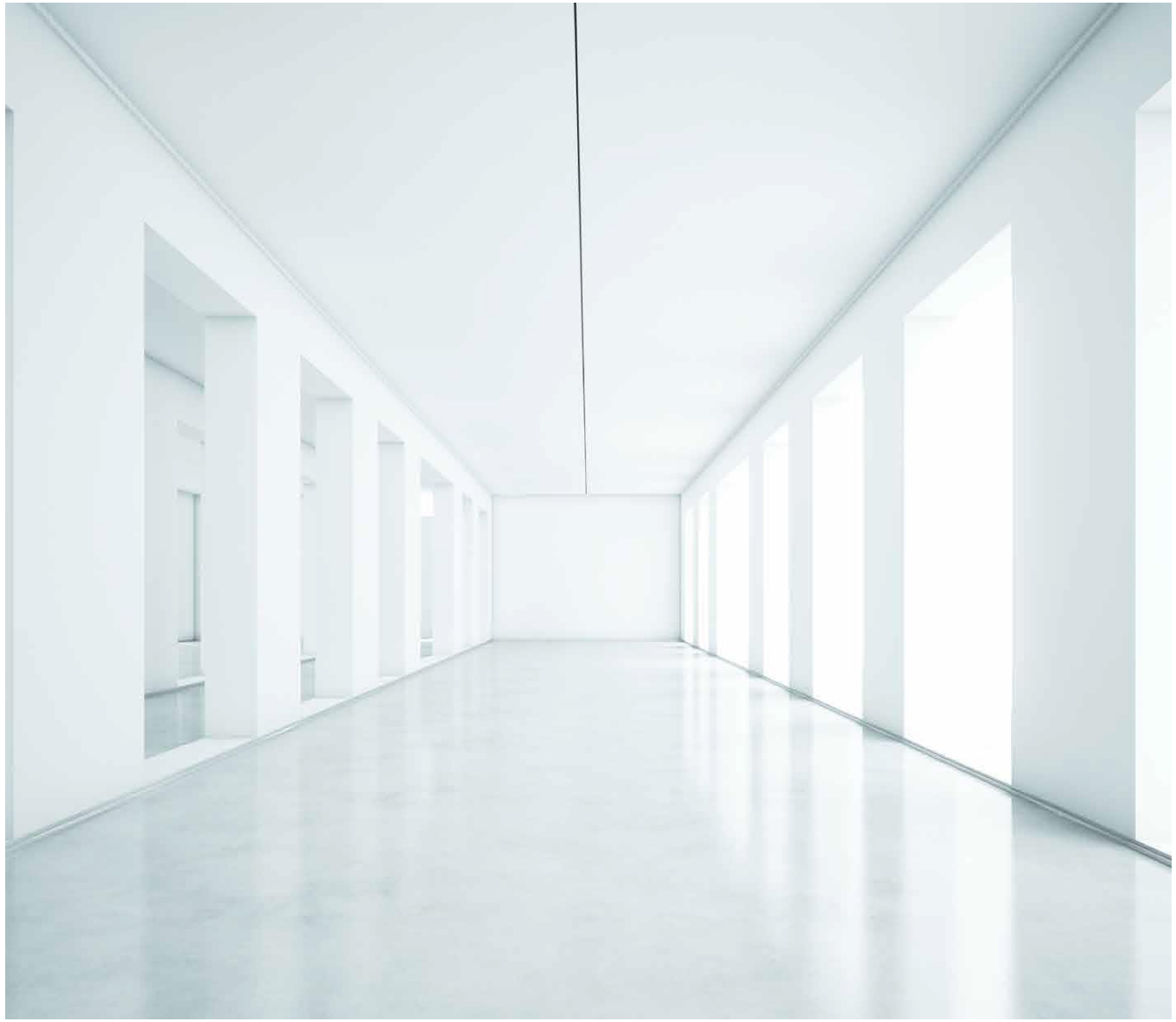
Optimizing Hiding Power in Architectural Paints

HUNGAROCOAT DiGiT 2021
10-11 February 2021



February 10th, 2021 |
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Architectural and Floor Coatings EMEA
Coating Additives

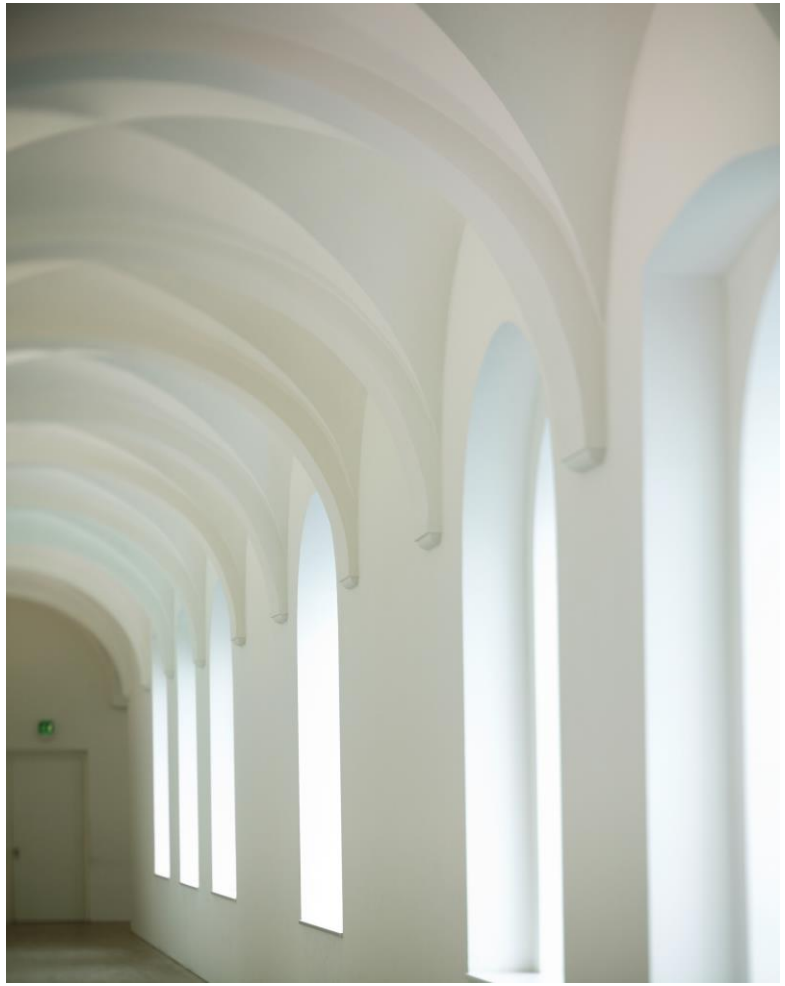
EVONIK
Leading Beyond Chemistry

Optimizing Hiding Power in Architectural Coatings

Hiding power

Hiding power is the ability of a paint or varnish to cover a background of contrasting color.

Hiding power depends on the layer thickness and can be specified as the quotient of the remission on a white and a black substrate.



Two Ways to Improve Hiding Power in Architectural Coatings

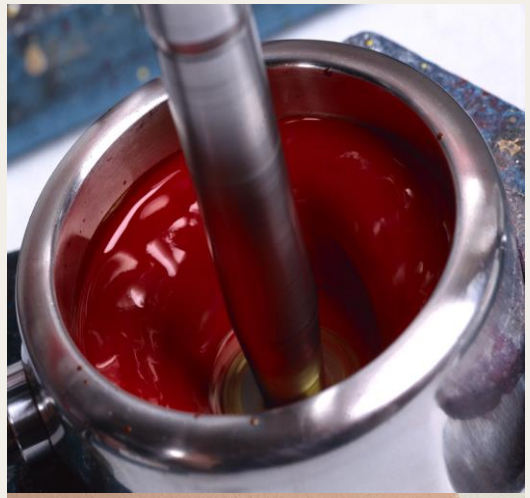
Coating Additives Solutions for Architectural Coatings

Additives for Dispersion Production

Additives for each step of dispersion paint production offer a variety of possibilities to improve the processing of paints & coatings

Specialty Fillers

TiO_2-Extenders based on Sodium Aluminum Silicates reduce raw material costs without affecting the overall paint properties



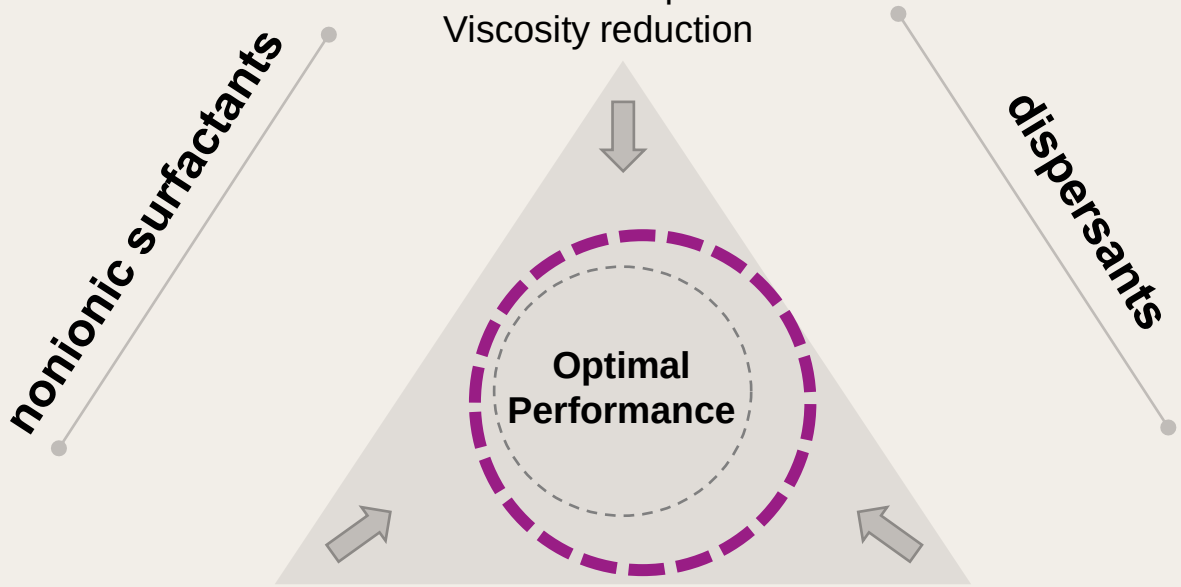
Hiding Power measurement on HTE

- Completly closed imaging box → no scattered light
- Defined and reproducible light parameters
  - exposure time, light-methode
- Shortest time between draw down and imaging: approx. 60 seconds
- Black/white close-up images (4096x3000 pixel)

→ Constant conditions

Dispersing Concept

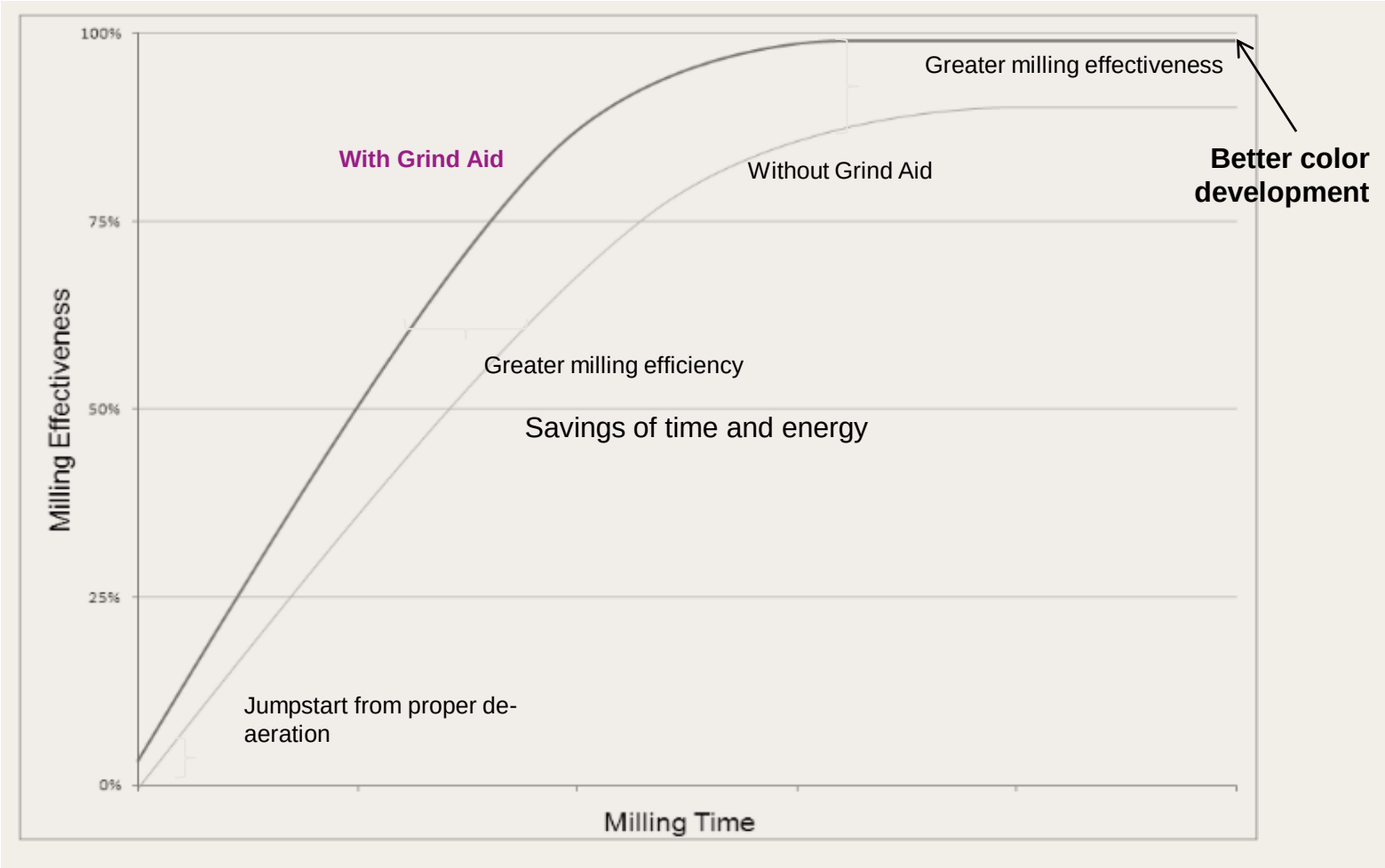
B: intermediate stabilizing
Color development
Milling efficiency
Letdown compatibilization
Viscosity reduction

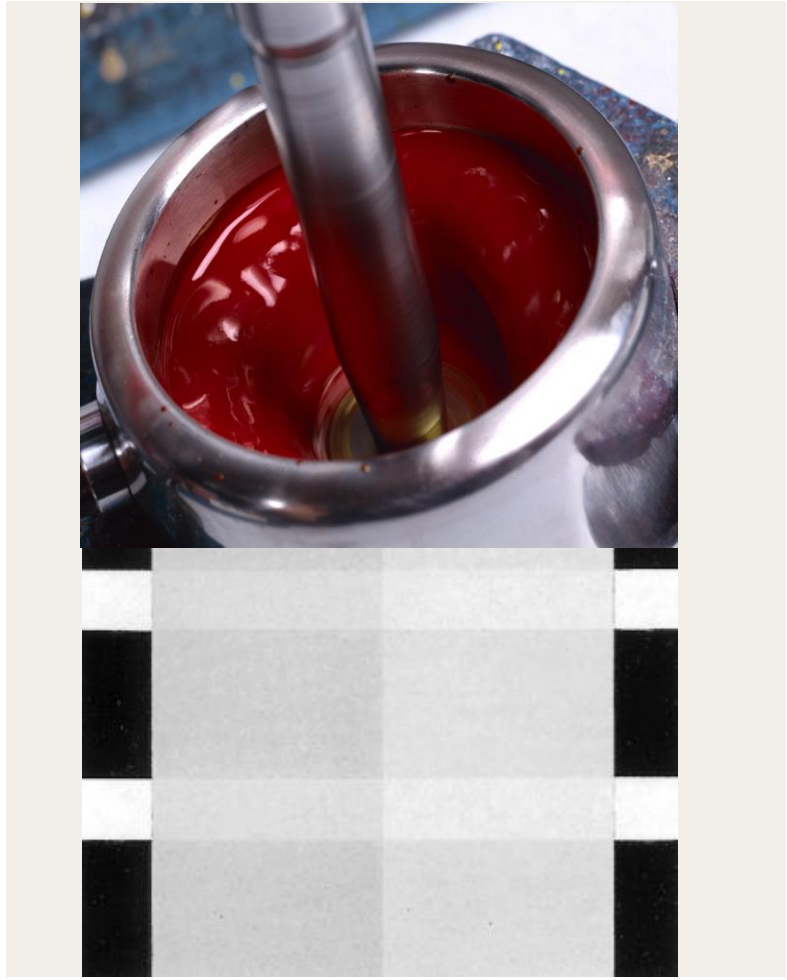


A: Dynamic Wetting
Dry pigment wetting
Agglomerate de-aeration

C: long term stabilizing
Color Stability
Viscosity Stability
Flocculation control

Grind Aid Benefits: Better milling efficiency





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Grind Aid Surfactant – Faster wetting

Fast and strong pigment wetting

Results Polyphosphate

Results CARBOWET® GA' series

Test set-up:

A pre-mix of water and additives is prepared by hand-mixing using a spatula. Then the pigments and fillers added to the liquid pre-mix and mixed by hand.

Additive dosage:
0.5% on total paint formulation

Evaluation:
The fluidity of the paste containing Carbowet® GA100 demonstrate the benefits of dynamic pigment wetting

3 New wetting and dispersing additives

TEGO®
Dispers 711 W

TEGO®
Dispers 712 W

TEGO®
Dispers 717 W

Solution

Carbon Black Inorganic Organic Matting Agents Filler

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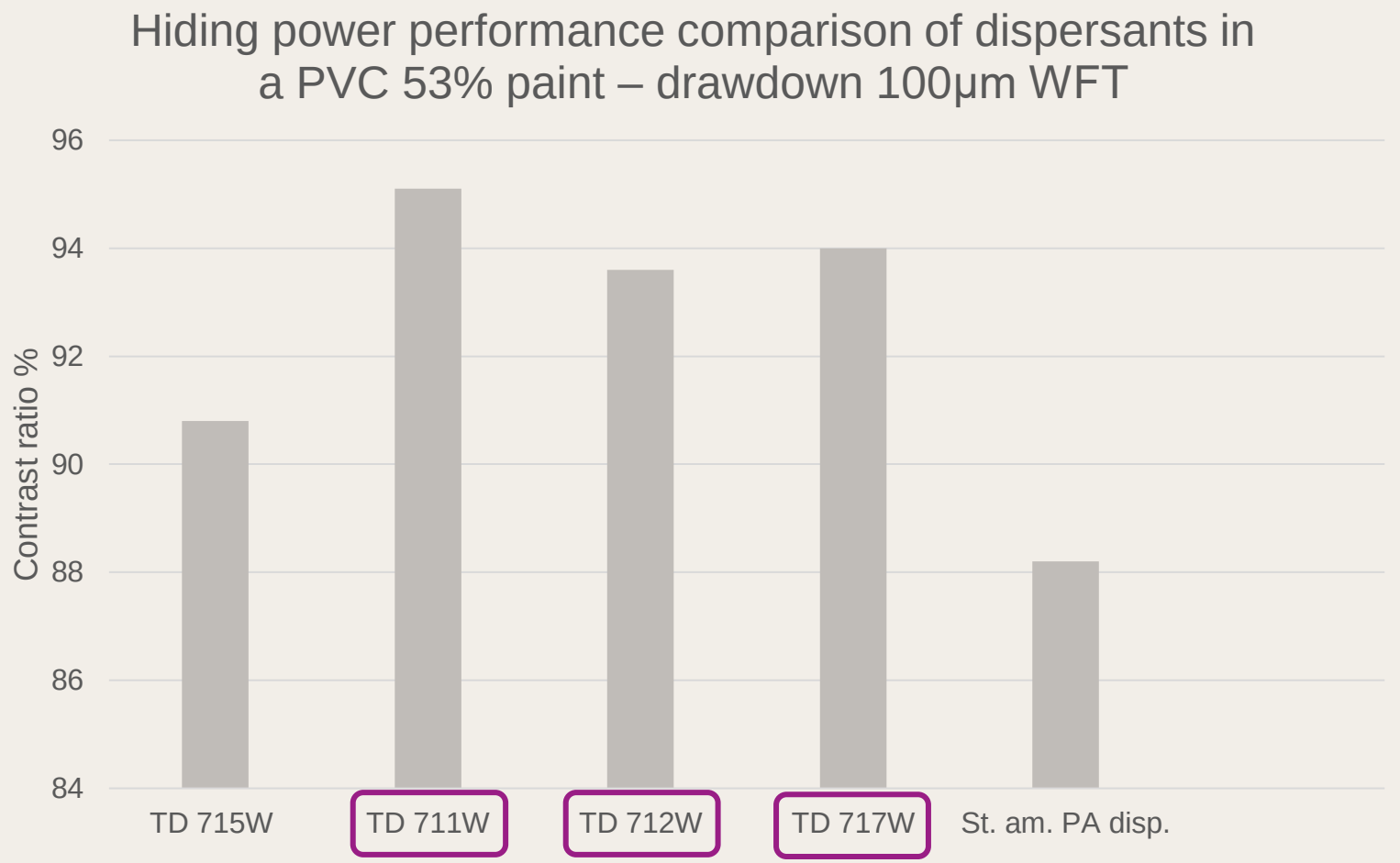
TEGO® Dispers 711W, 712W and 717W provide very good hiding power



Better hiding power than benchmark dispersant at 0.3% use level

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ZETASPERSE® 179

- Steric stabilization
- Improved dispersion stability
- Lower dispersion viscosities allowing higher pigment loadings
- Enhanced letdown compatibility and color acceptance
- No added APE's or solvents
- No VOC's per European and US regulations
- No added silicone, silica or fluorinated materials

Solution

Carbon Black Inorganic Organic recoatable

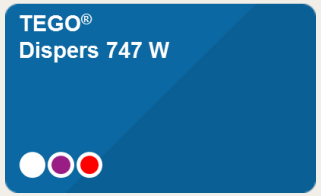
Specifications

Active matter 70%

Nonionic stabilizing surfactant and wetting agent

VOC: approx. 0%(ASTM D6886-14)

Ideal combination:



Regulations

Global Chemical Inventory Status:
EINECS, TSCA, DSL, ENCS, AICS, ECL, PICCS, IECSC, TCSI

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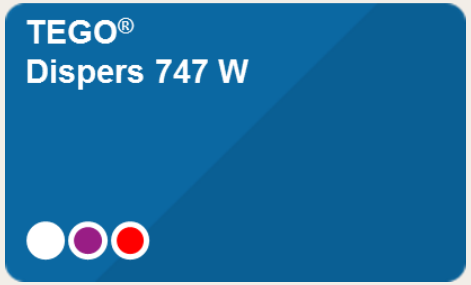
TEGO® Dispers 747 W

- Economical wetting and dispersing additive for waterborne formulations
- For very good stabilization and high color strength with inorganic pigments, especially with iron oxide pigments
- For use in mill base of emulsion paints and architectural paints



Solution 100% Product/Concentrate

Carbon Black Inorganic Organic Matting Agents Filler

Specifications

Active matter 35 %

Effectivity > Compatibility

Aqueous solution of a copolymer with groups of high pigment affinity

VOC: approx.0.1 g/l(DIN ISO 11890/2)

Ideal combination:

Regulations

Global Chemical Inventory Status:
AICS, EINECS, ECL, TSCA, NZIOC, TCSI, PICCS, DSL

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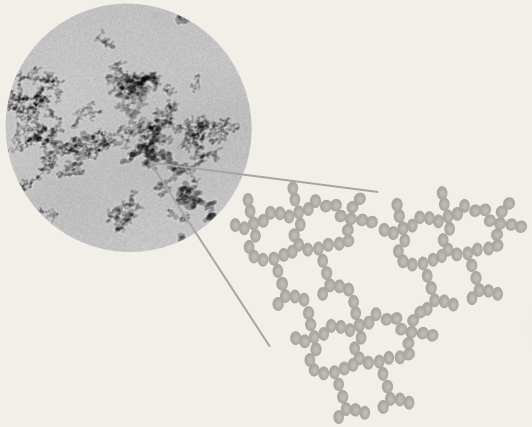
SIPERNAT® - Specialty Extenders

AEROSIL®

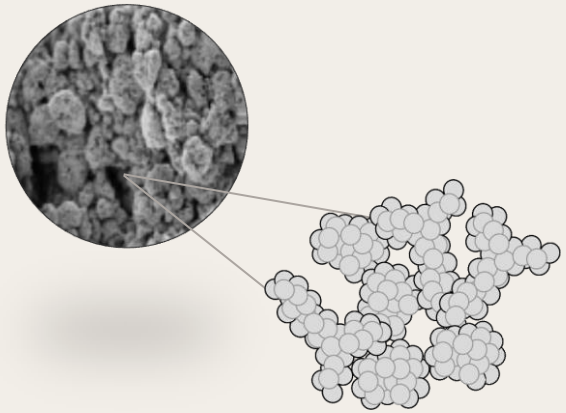


Key Driver: Aggregate Structure

Entirely open structure with a high level of surface functionality

- Functions
  - Thickening

ACEMATT®

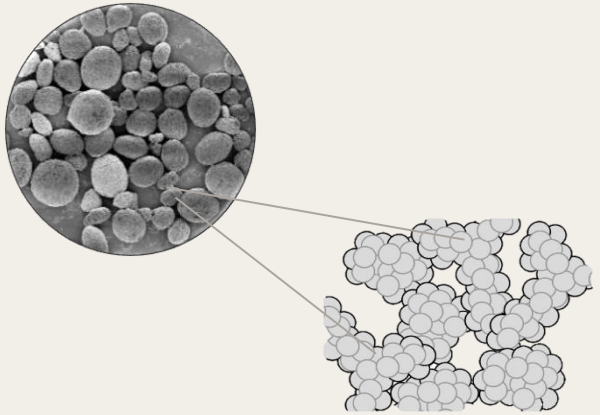


Key Driver: Surface Modification

Porous structure of interconnecting conduits

- Functions
  - Matting

SPHERILEX®

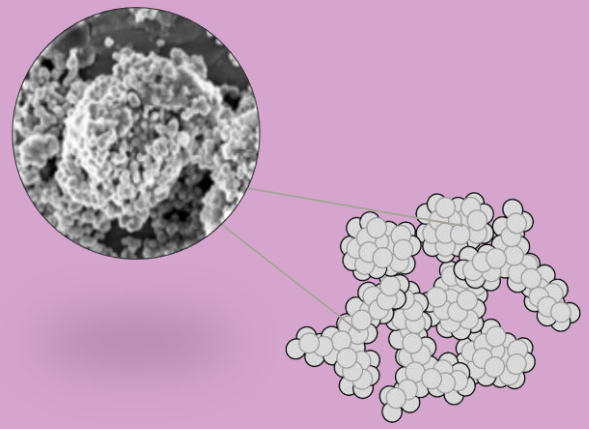


Key Driver: Particle Morphology

Spherical particle shape

- Functions
  - Burnish Resistance

SIPERNAT®

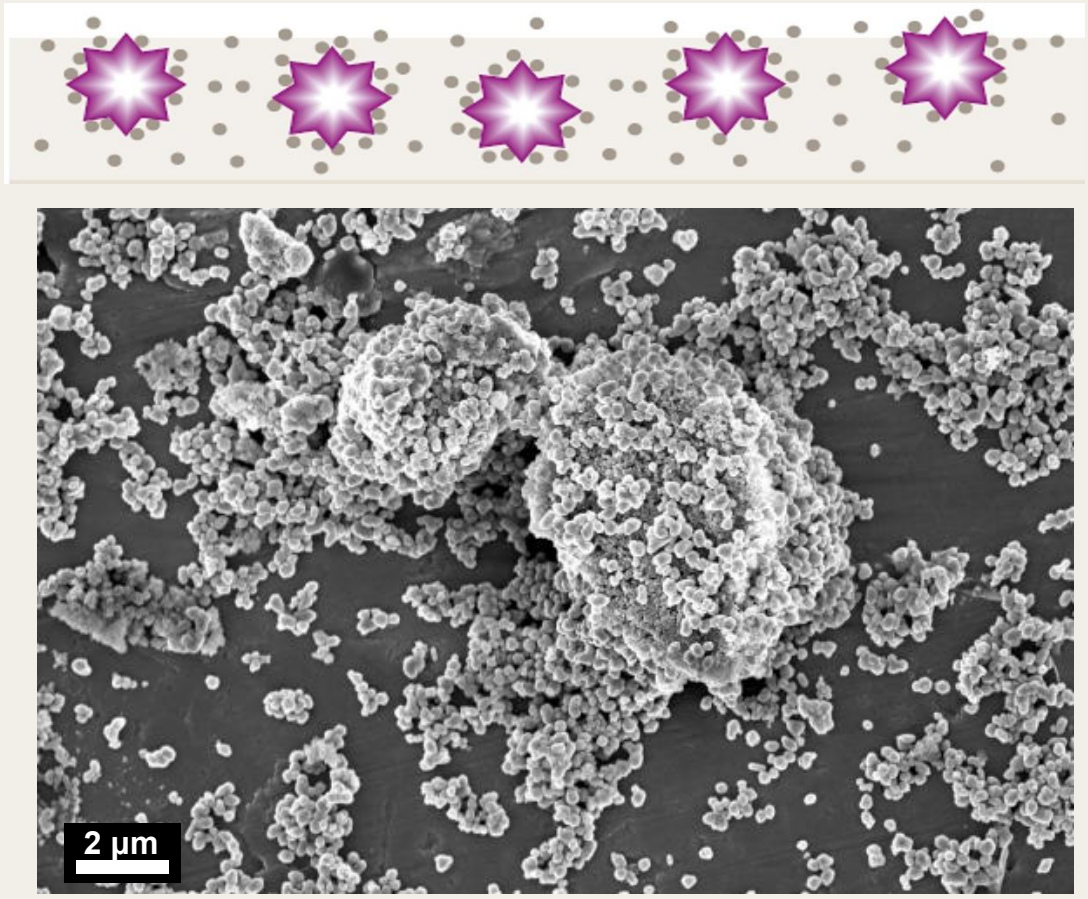


Key Driver: Particle Morphology

Porous structure

- Functions
  - TiO2 spacing

Specialty Extender Spacing Effect



TiO2 has an affinity for the surface of Specialty Extenders

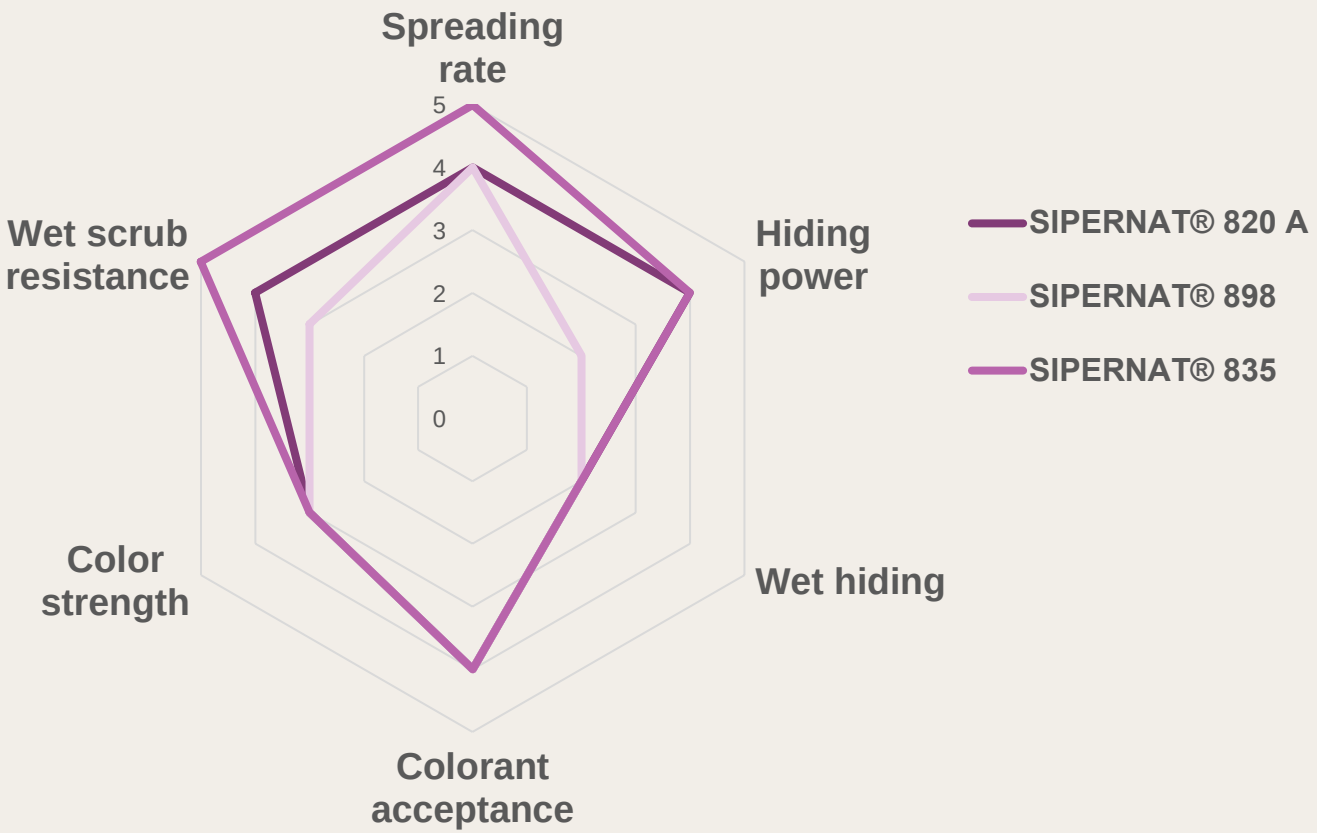
Minimized crowding effects and optimized inter-particle distance

SIPERNAT® and ZEOLEX ® with different benefits besides TiO_2 replacement

Property	SIPERNAT® 820 A	SIPERNAT® 898	SIPERNAT® 835
Chemistry	Sodium Aluminum Silicate	Sodium Aluminum Silicate	Sodium Magnesium Aluminum Silicate
Average agglomerate particle size [1]	7.0 µm	6.0 µm	5.0 µm
Specific surface area (BET)	85m^2/g	130m^2/g	80m^2/g
pH value, 20% in water	10	7	6
DOA absorption	155ml/100g	85ml/100g	110ml/100g

1) laser defraction method d_{50}

Performance in Exterior Facade Coating



Test formulation – Europe

Exterior facade coating

PVC: ~75%
Binder: styrene acrylic binder

TiO_2-content: 7.5%

Specialty Extender: 10-30% (v/v% of TiO_2 content)

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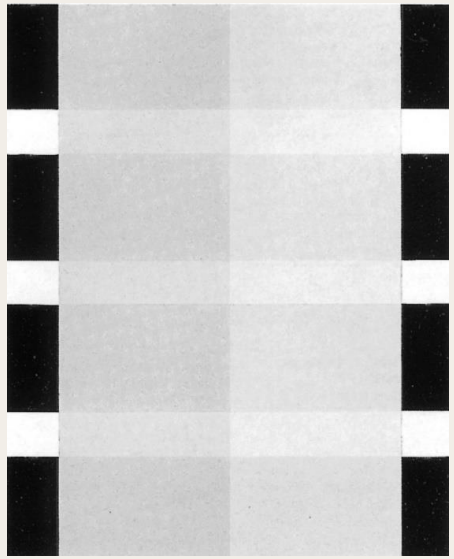
Improved hiding power with SIPERNAT® 820 A

Spreading rate

Test Set Up

- PVC 75%
- Exterior coating
- 10-20% (volume) replacement of TiO2



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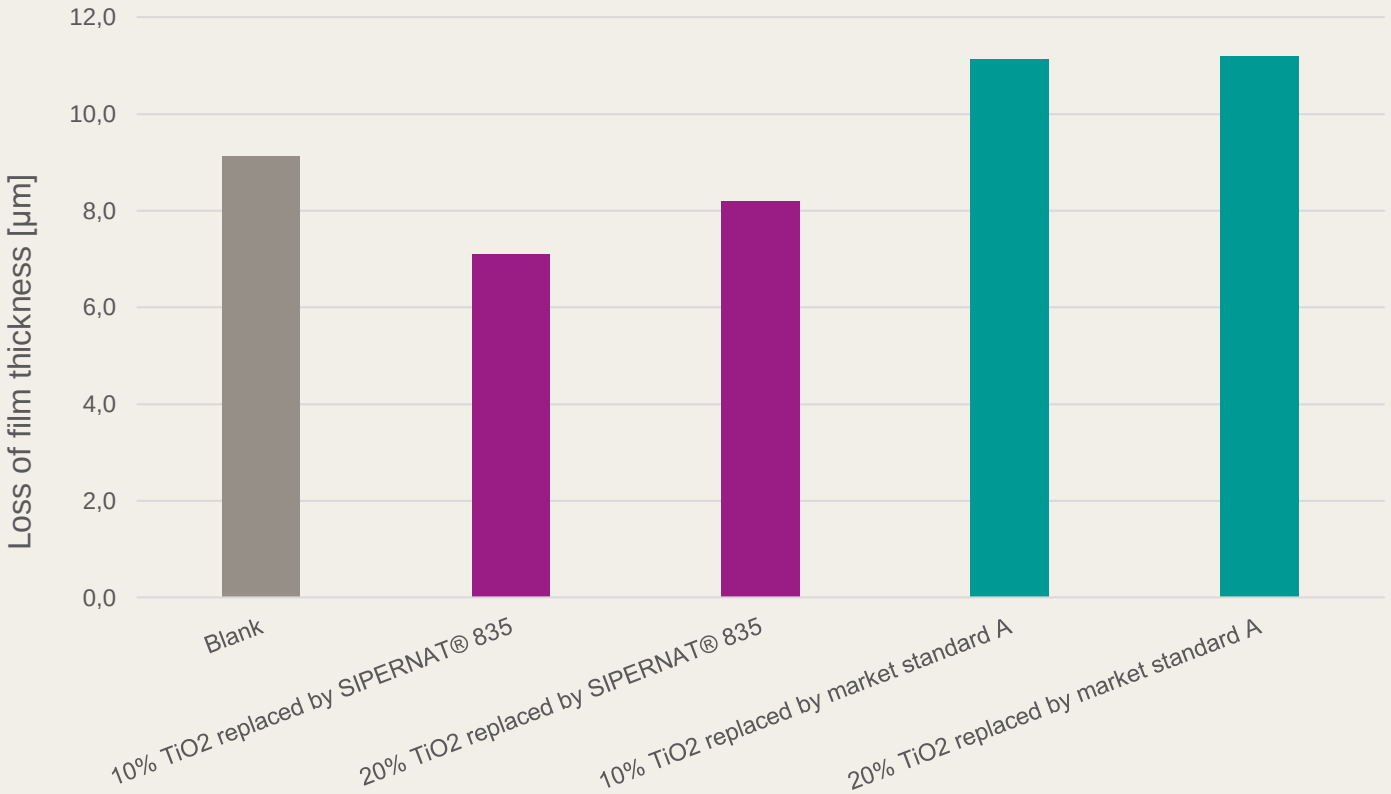
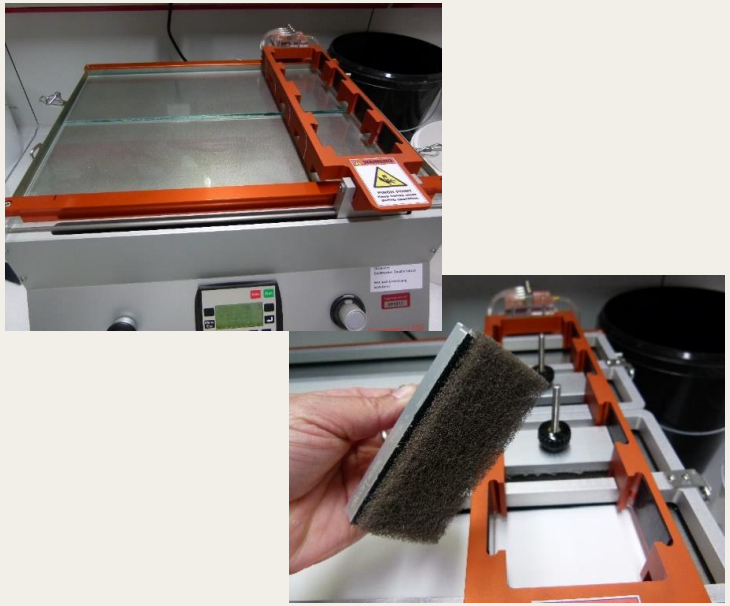
SIPERNAT® 835 improves wet scrub resistance

Wet scrub resistance



Test Set Up

- PVC 76%
- Exterior coating
- 10-20% (volume) replacement of TiO2



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Benefits of using SIPERNAT®

Perfect dispersion of primary Pigment through effective spacing

- Optimization of TiO2 to maximize opacity
- Enhanced whiteness compared to natural fillers
- Optimization of formulation cost

Other Benefits

- Easy to disperse compared to common extenders - Unique morphology and soft particles help easy to grind and wet-ability
- Improved or maintained scrub resistance
- Increased color strength with lower TiO_2 content

Formulation advice

TiO_2 has twice the density of the SIPERNAT®

Wt / Wt replacement results in additional volume gain
Replacement of TiO_2 by volume

Questions – Get in Contact with us

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Coating Additives

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