

Minerals solutions for high demanding decorative paints

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Outlook

- Introduction
- Matting agents - Matting and other important properties
- ClearLite - 2 in 1 additive for matt and satin clearcoats
- Steashield 10 - Ultra lamellar talc for barrier coatings
 - Decorative Paints - Stain blocking
 - Industrial coatings - Corrosion protection

The world leader in mineral-based specialties for industry

■ Countries where Imerys has sales

>15,000 customers

17,800 employees¹

Sales in 142 countries

€4.6bn revenue



¹ 2018 figures



Our market-focused business model



**PERFORMANCE
MINERALS EMEA**
(~ €1.1 bn)



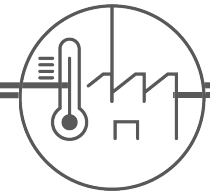
**PERFORMANCE
MINERALS AMERICAS**
(~ €900 m)



**PERFORMANCE
MINERALS APAC**
(~ €500 m)



**REFRACTORY ABRASIVES
& CONSTRUCTION**
(~ €1.2 bn)



**HIGH TEMPERATURE
SOLUTIONS**
(~ €900 m)

- **Plastics, Rubber, Paints & ACS** (Adhesives, Caulk & Sealants)
- **Ceramics**
- **Filtration & Life Sciences**
- **Paper & Board**
- **Mobile Energy**

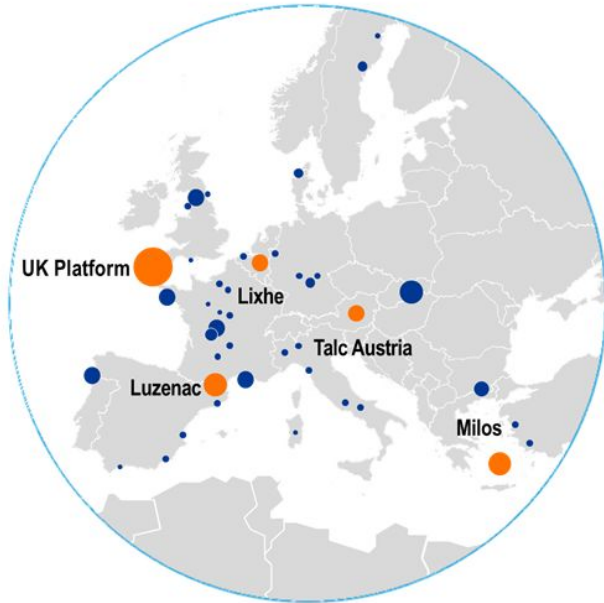
- **Refractory Producers**
- **Abrasives**
- **Building & Infrastructure**
- **Iron & Steel**
- **Foundry**
- **Thermal**

Support Functions

Performance Minerals EMEA at a glance

KEY ASSETS

- Top 5 sites (Sales)



€1.1bn
Sales



3700
Employees



15
Minerals



80
Number of
sites



+6000
Customers
served



24
Countries



7
Key applications served,
representing close to
100+ applications



4
Technology
centers

Imerys Minerals for Paints & Coatings

- Imerys has the widest portfolio of minerals available to Paints & Coatings manufacturers
- Refining and engineering of these minerals influence
 - Size,
 - Shape,
 - Structure &
 - Surface Chemistryto obtain the exact properties to meet the requirements of the final application.



GCC



PCC



Talc /
Leucophyllite



Perlite



Mica



Kaolin



Diatomaceous Earth (DE)



Wollastonite

Requirements on matting agents

Requirements

- Effective matting & structuring
- No influence on the opacity / increase in opacity
- Viscosity - processability and storage stability
- Optimal mechanical properties
 - Abrasion resistance
 - Reduction of cracks

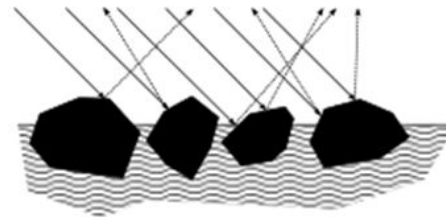
Typical Matting Agents

- Calcium Carbonate
- Talc
- Leucophyllite
- Diatomaceous Earth (DE)
- Perlite

Parameter

- Particle size & distribution (>15 μm -> mm)
- Morphology (platy)
- Porosity (aggregated)
- Oil absorption

On **Matt paints** most of the light diffuses in a range of angles



High performance matting agents

Influence the surface structure to achieve matting but also

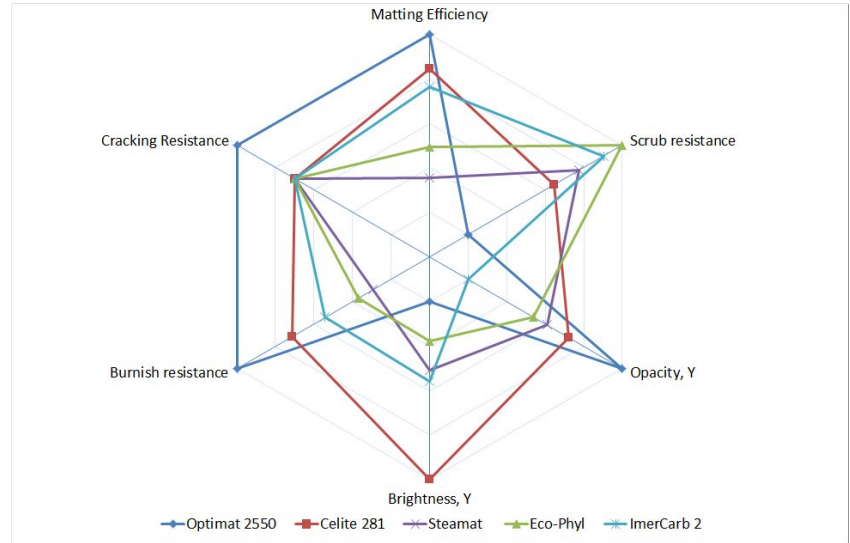
- Opacity,
- Brightness,
- Scrub resistance &
- 'Smoothness'



Matting

| Product | Type | Brightness ISO R457 | D50 [^] , μm | OA, g/100g |
|--------------|---------------|---------------------|-----------------------|------------|
| OpTiMat 2550 | Perlite | 82 | 25 ^{^^} | 220 |
| Celite 281 | Flux Calc DE | 94 | 17 | 130 |
| Steamat | Talc | 81* | 28 | 30** |
| ECO-PHYL | Leucophyllite | 72* | 38 | NA |
| ImerCarb 2 | GCC | 93* | 25 | 18 |

*Y-value **mL/100g ^{^^}Sedigraph ^{^^}Laser



PVC 77.3 %, Matting agent 5 wt-%, TiO₂ 8 wt-%, Filler 42 wt-%, binder VAE

ClearLite® - High transparency and cost savings for matt wood finishes

ClearLite®, IMERYS latest innovation in wood clear coatings provides

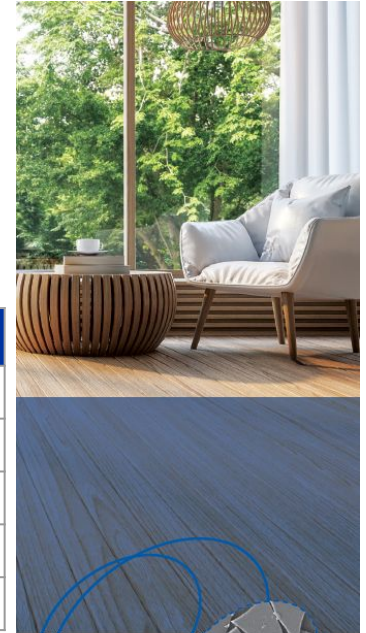
- Dedicated to **matt and satin clear coats**, varnishes, lacquers and stains
- Applied to various substrates like **wood, metal, plastics**
- Used on furniture, joinery, floors, ..., both in interior and exterior
- **Efficient in water-borne formulations**; solvent-borne under testing

ClearLite® mineral

- **Engineered expanded milled perlite**
- Lamellar flat particles
- **White**
- Low dust
- European ore sources owned by Imerys
- Produced in Barcelona, Spain

ClearLite® 6

| | | |
|--|----------|-----|
| Particle Size μm (Malvern) | D50 | 6 |
| | D90 | 14 |
| Brightness | L* value | 92 |
| Oil Absorption | g/100g | 62 |
| Loose Density | g/l | 380 |



Matt and satin clearcoats: transparency ↗ and binder ↘ with ClearLite®

- Transparency improved at similar film smoothness
- Binder level reduction demonstrated leading to formulation cost savings

Application recommendation: WB acrylic mono-component system

Matt (gloss 60°~ **30**)

Satin (gloss 60°~ **50**)

| | Reference | ClearLite® 6 | Reference | ClearLite® 6 |
|--|-------------|--------------|-------------|--------------|
| Wet formulation composition (wt %) | | | | |
| Water + additives | 23.9 | 25.4 | 24.7 | 25.7 |
| Synth. amorphous silica | 1.6 | | 0.8 | |
| ClearLite® 6 | | 8.0 | | 5.0 |
| Acrylic binder | 74.5 | 66.6 | 74.5 | 69.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Volume solid content % | ~ 39 | | ~ 38 | |
| Gloss 60° | ~ 30 | | ~ 50 | |
| <i>Transparency ΔE^* vs reference</i> | - | -1.8 | - | -1.3 |



Transparency comparison
left reference , right ClearLite®

SteaShield™ 10 - Ultra lamellar talc for barrier coatings

Excellent barrier properties are key in

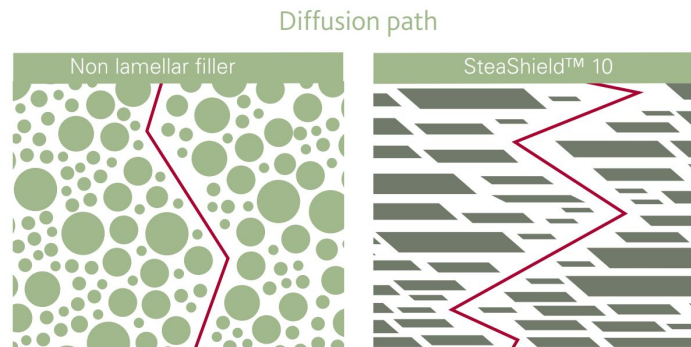
- **Decorative Paints - Stain blocking**

- Ability of the paint to cover existing stains
- Prevent stains from bleeding through the paint film over time



- **Industrial Coatings - Corrosion protection**

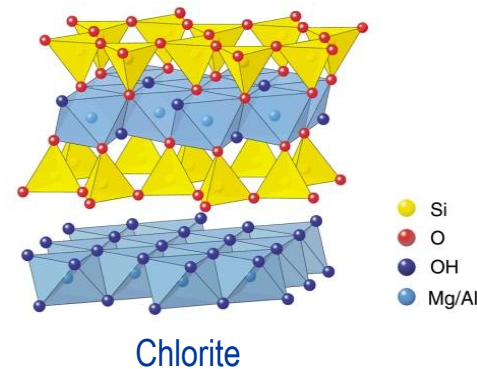
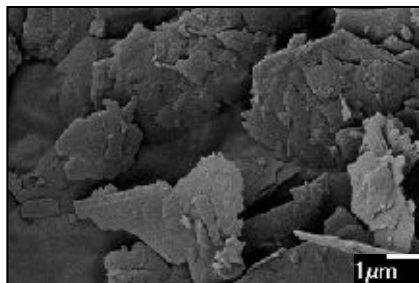
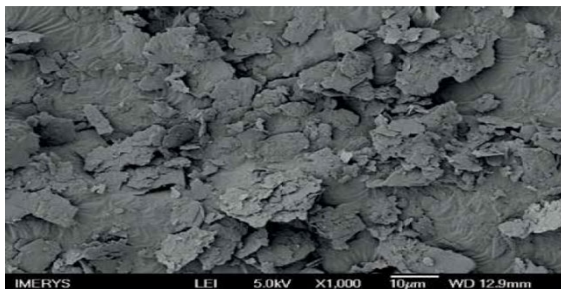
- Protects the paint substrate by impairing the diffusion of water & corrosive agents through the film
- Improved corrosion resistance compared to Zn Phosphate



SteaShield™ 10 - Ultra Lamellar Talc

Talc is a **hydrated magnesium silicate** with the chemical formula $\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$

SteaShield™ 10 is a talc/ chlorite



SteaShield™ 10:

- Highly lamellar, 15µm top cut talc
- Brightness Y 85.5
- Excellent barrier effect
- Recommended for stain blocking paints and barrier coatings (top coats and primers)

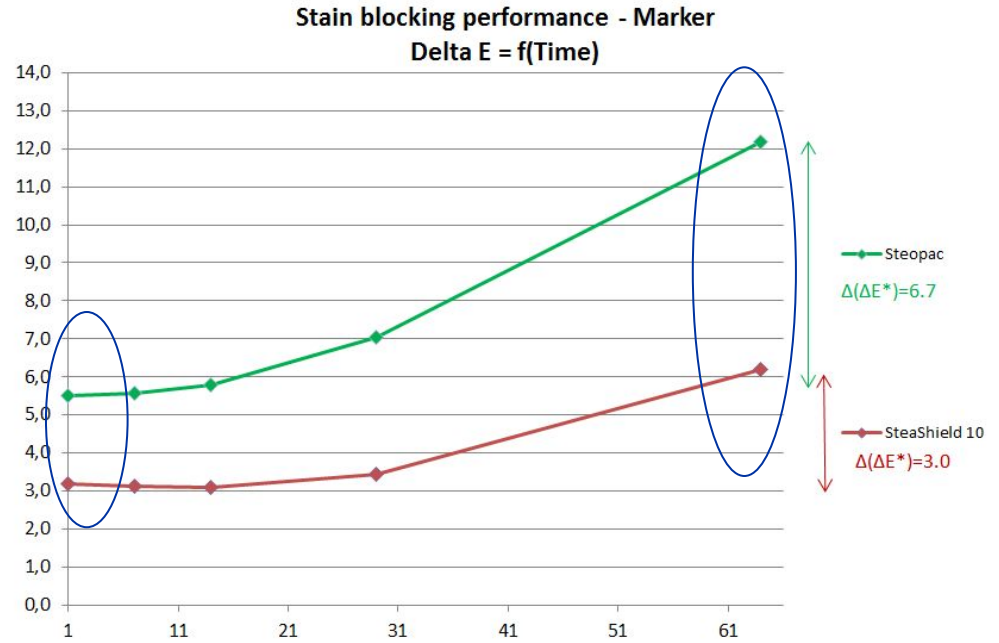
SteaShield™ 10 - Improvement of stain blocking

SteaShield™ 10 provides higher stain blocking compared to the reference Steopac (Talc/Chlorite, d50 2 μm).

Preferences

- Decorative topcoat and primers

Test performed according to ASTM Standard D7514, 2009






PVC 65.4 %, TiO₂ 23 wt-%, GCC 20.4 wt-%, **SteaShield or Steopac 10 wt-%**, binder VAE or SA

SteaShield™ 10 - Performance in a 2K epoxy coating

Improved impact resistance and hardness of the coating with SteaShield™ 10

- Full replacement of Zn Phosphate (12.4 wt-%) in a 2K epoxy coating:
 - PVC 30.7 5
 - Solids by Volume 55.7 %

| Mechanical properties | Reference Steopac® | Zn Phosphate | SteaShield™ 10 |
|--|---|--|---|
| Falling impact (cm,1kg) | 100 | 5 | 100 |
| PersoZ hardness (s) | 260 | 295 | 280 |
| Conical Mandrel (mm) | 30 | 35 | 15 |
| Cross-cut Adhesion (ISO 2409) | 0 | 4 | 0 |
| Anti-corrosion performance (salt-spray resistance): 24µm DTF - up to 350h |  |  |  |

- The coatings were applied on S 46 Q panels.
- Dry film thickness of 100 µm.
- Properties were measured after 7 days curing

Conclusion

- Morphology, particle size & shape have a important influence on the properties of paints and coatings
- Steamat, ECO-PHYL, Celite 281 and Optimat 2550 are effective matting agents that
 - achieve a deep matt finish at very low loading levels and
 - improve scrub and
 - burnish resistance at same time.
- ClearLite - 2 in 1 additive for matt & satin clearcoats
 - Excellent transparency
 - Reduces binder level
- Steashield 10 - Ultra lamellar Talc for barrier coatings
 - Reinforces barrier effect
 - Enhances corrosion resistance
 - Excellent stain blocking performance

Thank you for your attention

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