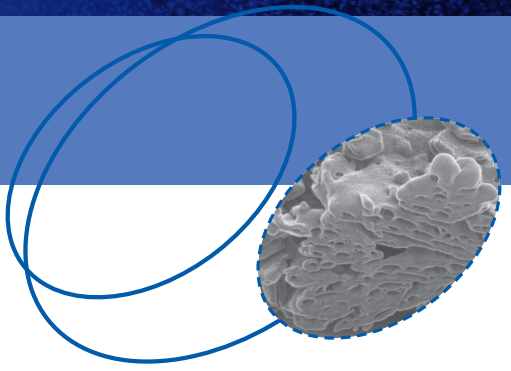
THE APPLICATION OF MINERAL SCIENCE

Opacilite™

Save up to 20% on TiO_2



ATTRIBUTES

- Up to 20% titanium dioxide extension
- Excellent exterior weathering performance
- Outstanding paint film opacity
- Effective above and below coating CPVC
- For use in high quality matt and silk paints

IMERYS
Kaolin

Opacilite™

Opacilite™ is the ideal opacifier for high quality decorative paints.

Providing durability and exceptional opacity both above and below the CPVC of a coating, Opacilite™ is the first choice for TiO_2 extension in high quality matt and silk paints.

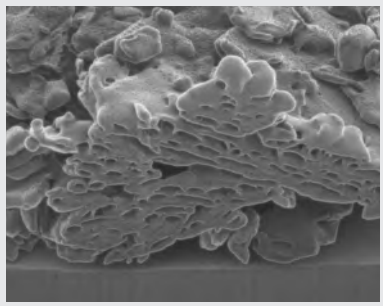
OPACILITE™ IS A FLASH CALCINED KAOLIN ALLOWING SIGNIFICANT COST SAVINGS

Opacilite™ is derived from a naturally-sourced hydrous kaolin and is further processed at high temperature to remove hydroxyl groups and sinter kaolin particles into an aggregated structure. As opposed to conventional or soak calcined kaolin, Opacilite™ is produced using a very rapid calcination technique which creates sealed voids within the kaolin particles. The total void volume inside Opacilite™ is about 20%, resulting in a reduced particle density of 2.06g/cm^3 compared to 2.6g/cm^3 for conventional kaolin.

The intrinsically sealed voids in Opacilite™ are completely resistant to penetration by resins, solvents or water in the liquid paint. Consequently, these air voids can contribute to the wet film opacity of some paints and also give a significant contribution to the dry hiding of all paints. The aggregated structure of Opacilite™ is optimised for maximum light scattering and the combination of both internal and external voids allows higher opacity compared to conventional calcined clay.

Opacilite™ strongly reduces gloss and the matting effect is due to its irregular particle shape, which induces micro-roughness at the film surface. It is ideal for paints below CPVC where gloss is not required, such as satin finishes and exterior wall paints.

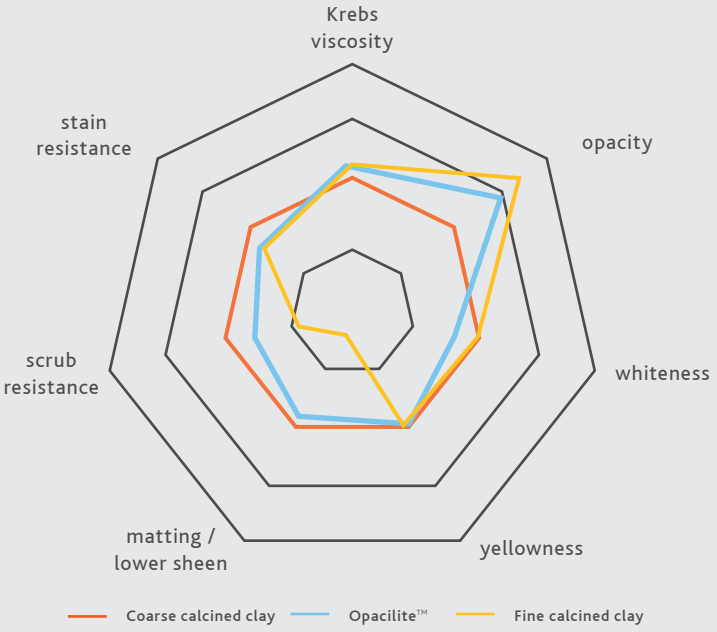
One of the key attributes of Opacilite™ is its effect on scrub resistance. Mineral extenders usually rely on a high binder absorption to give increased dry film opacity (dry hiding), but the higher binder absorption has a detrimental effect of scrub resistance. Opacilite™ is different because the internal voids, which provide opacity, do not absorb binder. Additionally, calcined clay particles are relatively hard and contribute to the abrasion resistance of the dry film.



FIB CROSS-SECTION OF OPACILITE™

TEM CROSS-SECTION OF OPACILITE™

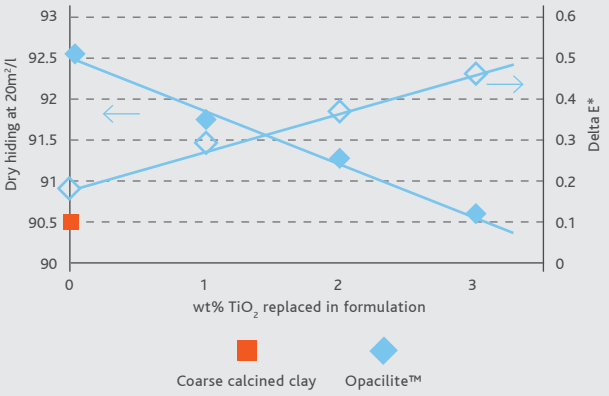
Consequently the flash calcined kaolin Opacilite™ gives a unique balance of opacity, matting and scrub resistance as illustrated in the spider diagram. Traditionally, fine calcined kaolin can be used to replace conventional coarse calcined kaolin and improve paint opacity. However, this is at the detriment of gloss and scrub resistance. Opacilite™, with its combination of internal and external void structure, can provide significant increased opacity (dry hiding) whilst maintaining acceptable matting and mechanical performance.

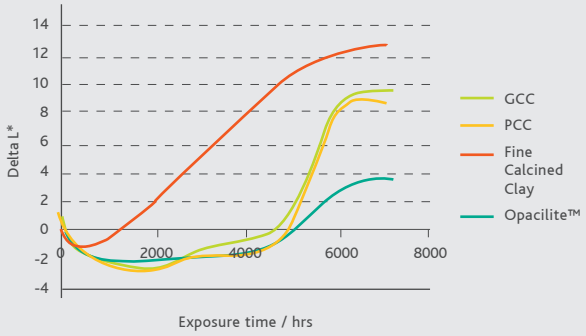


Comparison of key properties of a 75% PVC matt paint based on styrene acylic and containing 10wt% TiO_2 and 12wt% of test extender.

The improvement in paint dry hiding brought by Opacilite™ compared to coarse calcined kaolin can be translated into TiO_2 savings in paint formulations. For example, in an interior matt paint at 67% PVC containing 10wt%TiO_2 and 6wt% calcined clay, the coarse calcined clay was fully replaced by Opacilite™ whilst TiO_2 level was reduced incrementally and compensated with a higher level of coarse calcium carbonate to maintain the same wt% solids. Results show that the optimum TiO_2 reduction level to obtain similar opacity without detrimental effect on colour was between 2 and 3wt% in the formulation, corresponding overall to 20-30% TiO_2 saving.

Opacilite™ offers additional benefits in exterior paints compared to other extenders such as fine calcined clays or ultrafine calcium carbonates. Opacilite™ gives good opacity, better matting and good UV weathering performance. This is shown by a delay in the onset of chalking or colour change after UV exposure.





Change in whiteness of blue tinted exterior paints containing 18% TiO_2 and 8% test extender.

		wt% TiO_2 replaced in formulation			
	Standard	0%	1%	2%	3%
Tioxide TR92	10	10	9	8	7
Speswhite™	5	5	5	5	5
Opacilite™	-	6	6	6	6
Luzenac 0	6	6	6	6	6
Coarse calcined clay	6	-	-	-	-
ImerCarb 5L	15	15	16	17	18
Mowilith LDM1871	13	13	13	13	13
Other additives (dispersant, thickener, defoamer, biocide)	45	45	45	45	45
TOTAL	**100**	**100**	**100**	**100**	**100**
PARAMETERS					
% PVC	67.2	68.1	68.3	68.4	68.6
Total % TiO_2 saving	-	-	10.9	20.9	30.9
Specific Gravity	1.398	1.386	1.383	1.381	1.379
Solids, wt%	49.8	49.8	49.8	49.8	49.8
Solids, volume%	30.0	30.5	30.7	30.8	30.9
RHEOLOGY					
Brookfield, Poise - 1rpm	896	1048	960	936	952
Brookfield, Poise - 10rpm	116	134	116	120	118
Brookfield, Poise - 100rpm	20	22	20	20	21
Stormer Krebs, Krebs	93.4	96.9	93.0	93.6	94.0
Rotothinner, Poise	4.6	4.7	4.6	4.8	4.8
Cone-Plate, Poise	0.6	0.7	0.7	0.7	0.7
DRY FILM PROPERTIES					
Dry CR at 60µm, %	91.6 (0.2)	93.3 (0.1)	92.9 (0.2)	92.1 (0.1)	91.0 (0.1)
Dry Hiding @ 10m² per 1L, %	97.0	97.9	97.6	97.4	97.1
Scattering coefficient S, mm^{-1}	265	303	282	269	254
Absorption coefficient K, mm^{-1}	1.10	1.38	1.37	1.37	1.35
Paint colour - whiteness L*	96.5	96.4	96.3	96.2	96.1
a*	-0.4	-0.3	-0.3	-0.3	-0.3
b*	2.5	2.4	2.5	2.5	2.6
ΔE*	-	0.2	0.3	0.4	0.5
Gloss at 85°, %	3.0	3.5	3.4	3.4	3.2
Gilsonite stain resistance, %	76	70	69	68	66
ISO Scrub Resistance: Average loss in film thickness, µm 200	39 (4)	44 (6)	42 (1)	49 (7)	47 (5)

FOR MORE INFORMATION

t: +44 (0)1726 818000 f: +44 (0)1726 811200 coatings.kaolin@imerys.com imerys-kaolin.com

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