



FP-460 Opacity Pigment™

Performance in Masonry Paint

September 2021

Two Masonry Paint Studies (High Quality and Basic Quality)

- Equal contrast ratio and colour at 10% to 20% substitution.
- Similar rheology and scrub resistance.
- No changes in water absorption and water vapour permeability.
- Equal durability.

Conclusions

FP-Opacity Pigments™

- are a partial replacement for TiO_2 .
- are significantly lower cost than TiO_2 .
- provide significant annual raw material costs savings.
- Lower carbon footprint.

Exterior Masonry– High Quality (1 Coat)

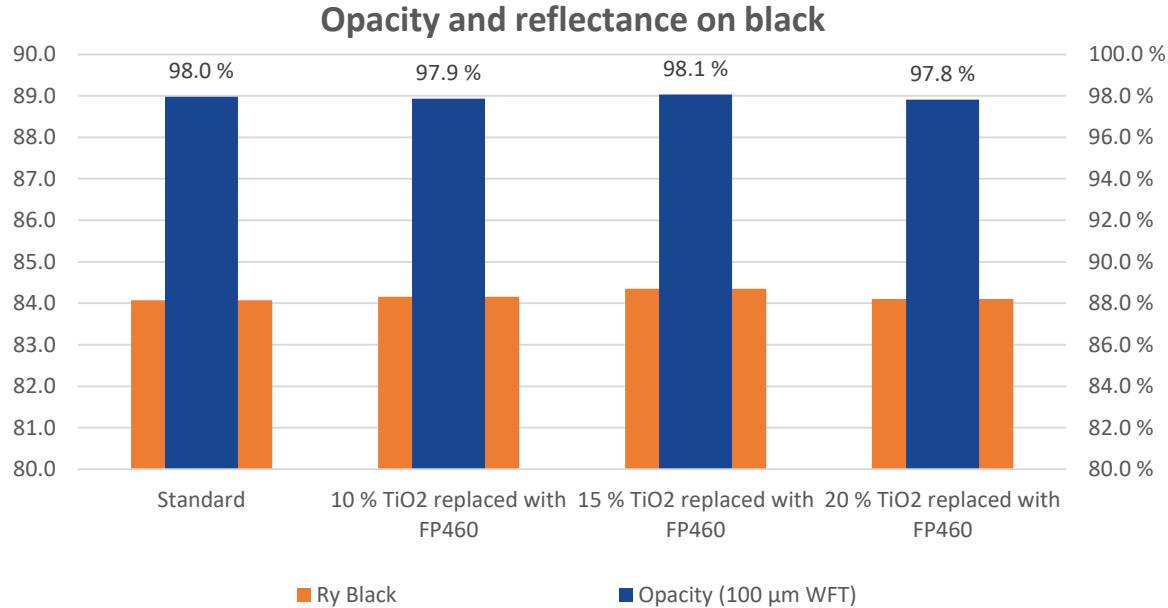
TEST FORMULATION

	wt%
WATER	14.65 %
NATROSOL 250 MHBR	0.30 %
AMP 95%	0.15 %
CHP804	0.50 %
BYK 037	0.30 %
ACTICIDE MBS	0.20 %
FP-460 Opacity Pigment™	0.00 %
TI-PURE R706	20.00 %
MICA MU 101	12.00 %
QUARTZ SAND 45 MICRONS	23.00 %
OMYACARB 10	7.00 %
PROPYLENE GLYCOL	0.20 %
TEXANOL	0.70 %
ACRYLIC BINDER 46 %	21.00 %
	100.00 %

PVC	70.10 %
Volume Solids	54.03 %
Weight Solids	73.50 %
Wet density	1.75

- 10%, 15% and 20% TiO₂ substitution levels were studied. TiO₂ was substituted weight for weight with FP-460.
- Test paints were evaluated for optical and other properties that are typically important for exterior masonry paints.

High Quality (1 Coat) – Optical performance



Color and Gloss				
	Standard	FP-460 10%	FP-460 15%	FP-460 20%
L*	94.30	94.34	94.34	94.31
b*	-0.38	-0.36	-0.37	-0.36
20° Gloss	1.2	1.2	1.2	1.2
60° Gloss	2.0	2.0	2.0	2.0
85° Gloss	1.3	1.3	1.4	1.5

- In terms of opacity, L*, a*, b* and gloss, FP-460 opacity pigment gives excellent performance up to 20% substitution.

High Quality (1 Coat) – Rheology and Scrub Resistance

Rheology				
	Standard	10 % FP-460	15 % FP-460	20 % FP-460
Brookfield 10 rpm	38000 cP	37900 cP	37800 cP	34800 cP
Brookfield 100 rpm	6690 cP	6430 cP	6620 cP	5850 cP
ICI cP	144	144	142	136
KU	138	138	138	133

FP-460 gives very similar rheology performance compared to the STD.

Scrub Test (ISO 11998)				
	Standard	10 % FP-460	15 % FP-460	20 % FP-460
µm loss	5	5	6	6
Scrub Class	2	2	2	2

FP-460 gives similar performance in wet scrub resistance with up to 20 % TiO₂ replaced.

High Quality (1 Coat) – Absorption and Permeability

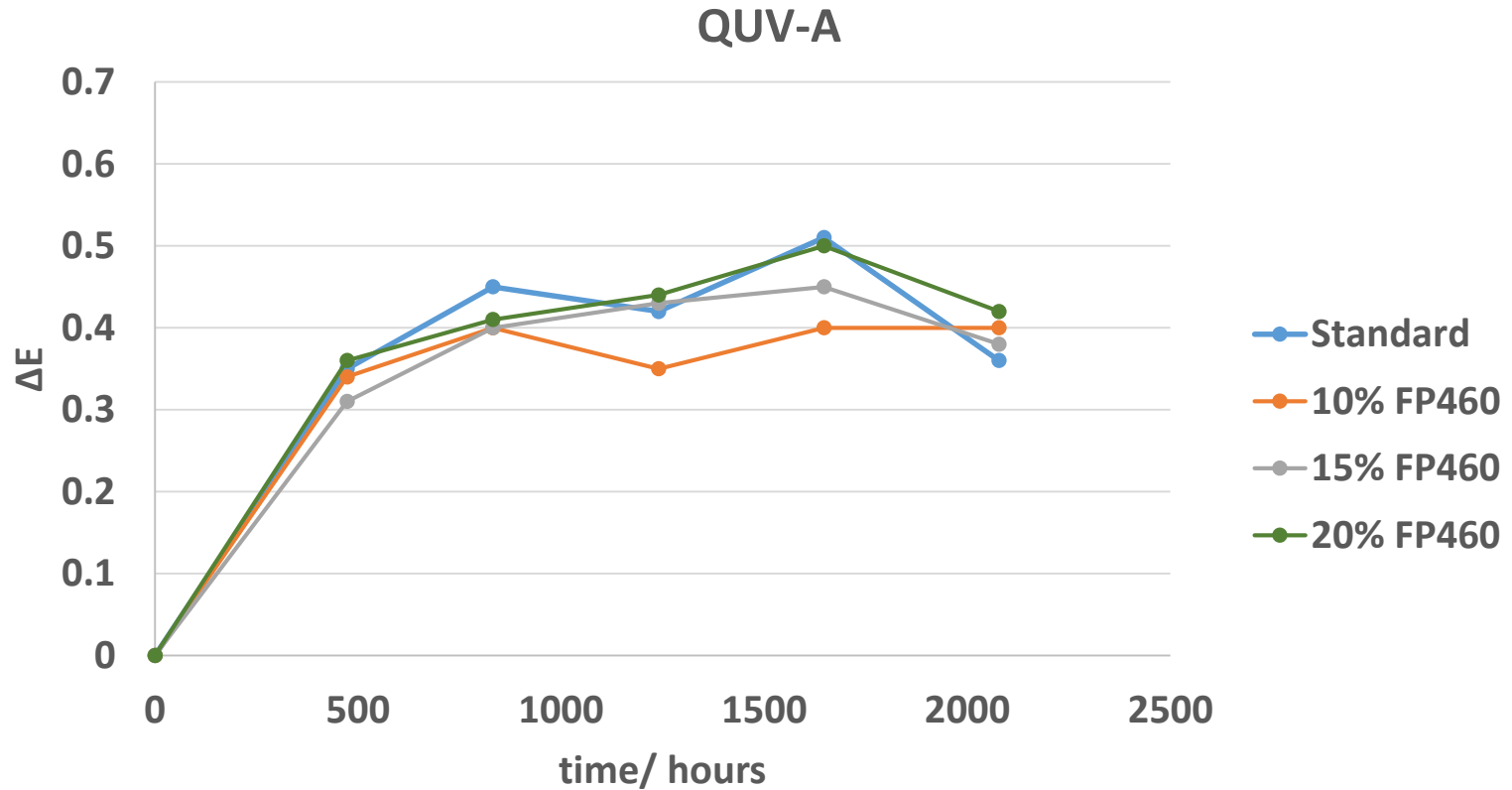
Water Absorption and Swelling				
	Standard	10 % FP-460	15 % FP-460	20 % FP-460
Water absorption	9.6 %	10.2 %	10.4 %	10.6 %
Swelling in water	2.0 %	2.0 %	2.0 %	2.0 %

FP-460 gives similar behavior in absorption and swelling compared to the Standard paint at all replacement levels.

Water Vapour Permeability (g/m²/day)				
days	Standard	10 % FP-460	15 % FP-460	20 % FP-460
1	544	581	582	568
2	527	568	569	557
3	518	562	562	556
4	511	555	555	548
Average	525	567	567	557

FP-460 has very little effect on Water Vapour permeability with TiO₂ replacement levels of up to 20%.

High Quality (1 Coat) – QUV-A Testing



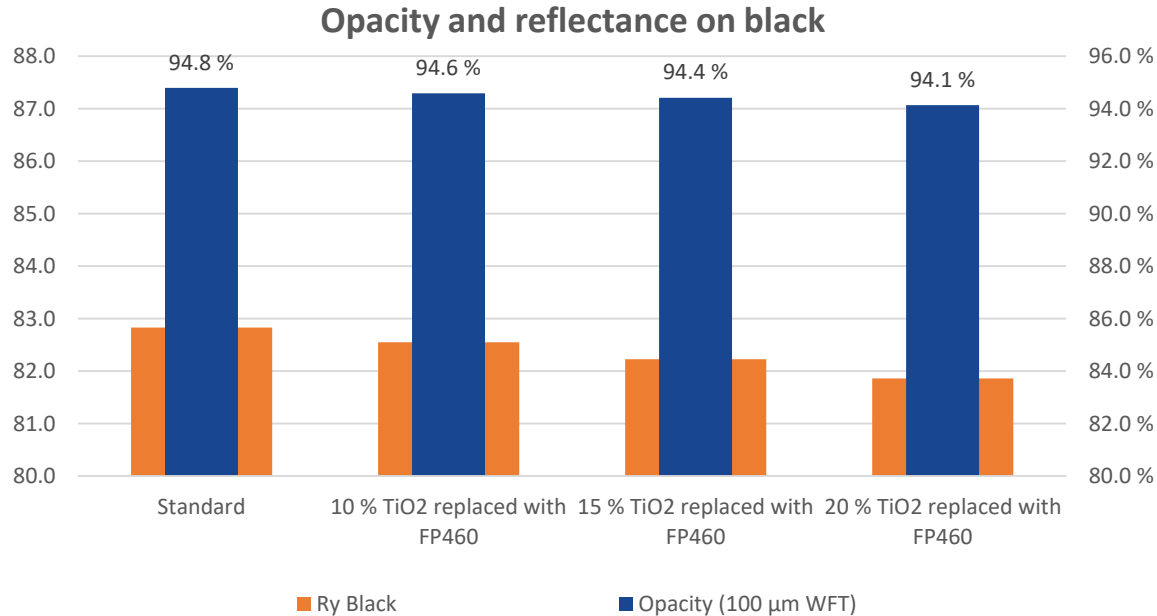
FP-460 replacement levels up to 20% give a similar QUV-A performance.

TEST FORMULATION

	wt%
WATER	20.90 %
CELLOSIZATE QP4400H	0.50 %
AMP 95%	0.10 %
CHP804	0.40 %
PEG 400	0.20 %
BYK 037	0.30 %
ACTICIDE MBS	0.20 %
FP-460	0.00 %
TI-PURE R706	8.00 %
FINNTALC M15	4.00 %
QUARTZ SAND 45 MICRONS	18.00 %
Omyacarb 2	13.00 %
Omyacarb 5	13.00 %
PROPYLENE GLYCOL	0.80 %
TEXANOL	0.60 %
ACRYLIC BINDER 46 %	20.00 %
	100.00 %

PVC	70.60 %
Volume Solids	48.95 %
Weight Solids	67.90 %
Wet density	1.59

- 10%, 15% and 20% TiO₂ substitution levels were studied. TiO₂ was substituted weight to weight with FP-460.
- Test paints were evaluated for optical and other properties that are typically important for exterior masonry paints.



Color and Gloss				
	Standard	10 % FP-460	15 % FP-460	20 % FP-460
L*	94.90	94.85	94.77	94.72
b*	-0.54	-0.54	-0.52	-0.53
20° Gloss	1.2	1.2	1.2	1.2
60° Gloss	2.0	2.1	2.1	2.1
85° Gloss	1.3	1.2	1.3	1.3

- In terms of opacity, L*, a*, b* and gloss, maximum TiO₂ replacement level is 10-15 % of the TiO₂. Visual difference in opacity is observed once 15% or more TiO₂ is replaced.

Basic Quality – Rheology and Scrub Resistance

Rheology				
	Standard	10 % FP-460	15 % FP-460	20 % FP-460
Brookfield 10 rpm	23400 cP	23400 cP	23400 cP	23200 cP
Brookfield 100 rpm	5270 cP	5250 cP	5200 cP	5040 cP
ICI cP	170	168	160	163
KU	123	123	122	121

FP-460 gives a similar rheology performance compared to the Standard paint at all tested substitution levels.

Scrub Test (ISO 11998)				
	Standard	10 % FP-460	15 % FP-460	20 % FP-460
µm loss	8	9	8	8
Scrub Class	2	2	2	2

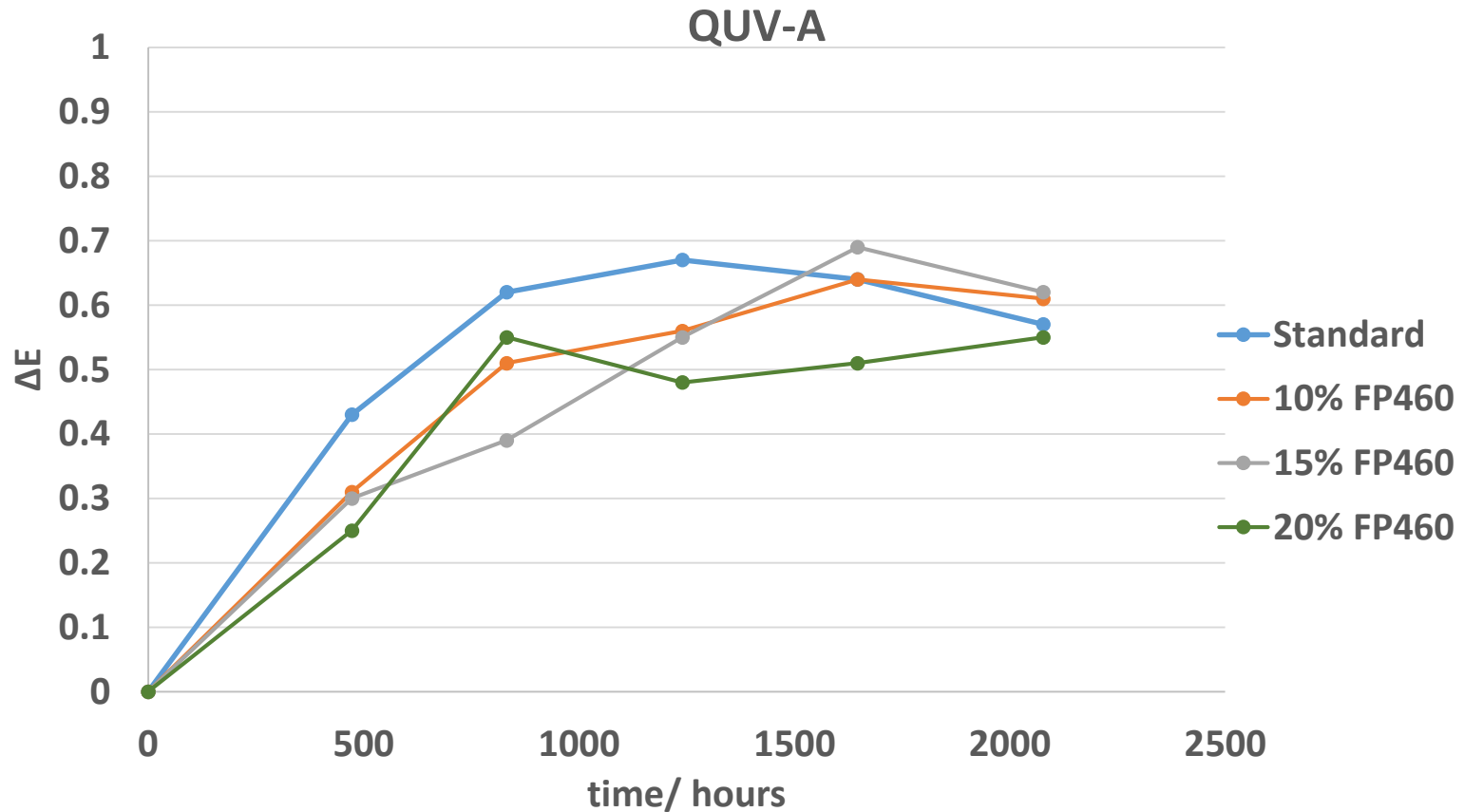
FP-460 gives a similar performance in wet scrub resistance with up to 20% TiO₂ substitution.

Water absorption and swelling				
	Standard	10 % FP-460	15 % FP-460	20 % FP-460
Water absorption	8.6 %	8.3 %	8.5 %	8.5 %
Swelling in water	2.5 %	2.0 %	3.0 %	2.0 %

FP-460 gives a similar behavior in absorption and swelling compared to the Standard paint at all substitution levels.

Water Vapour permeability (g/m ² /day)				
days	Standard	10 % FP-460	15 % FP-460	20 % FP-460
1	555	572	543	529
2	542	563	538	520
3	530	549	526	507
4	526	545	521	503
Average	538	557	532	515

FP-460 has very little effect on Water Vapour permeability even at the TiO₂ substitution levels of 20 %.



FP-460 gives a similar performance in terms of QUV-A stability compared to the TiO_2 Standard paint

Why should you choose FP-460 Opacity Pigment™?



FP-460 can substitute 10 to 20% of TiO_2 .

FP-460 is typically 25% to 40% below the cost of TiO_2 pigment.

Performance neutral (opacity, durability and physical properties)

60% lower carbon footprint than TiO_2

Partial TiO_2 replacement to optimize TiO_2 performance and reduce cost.

Significant annual cost savings can be achieved by replacing TiO_2 with FP-460 Opacity Pigment™

Optimize your TiO_2 usage and reduce the cost of opacity with FP products