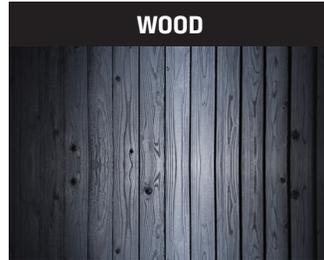


SPECTRAL[®] FUMED ALUMINA IN POLYURETHANE CLEARCOATS



Application description

Polyurethane coatings exhibit excellent anti-scratch performance and stand up well in harsh environments. They also provide exceptional aesthetic performance, particularly when formulators are looking for crystal clear topcoats.

Our portfolio of Spectral[®] fumed alumina further enhances the durability of polyurethane clearcoats. The addition of the hard alumina particles imparts excellent scratch and abrasion resistance to the coating.

CABOT PRODUCT OFFERING

Fumed alumina products	Surface area (m ² /gm)	Bulk density (g/L)	Refractive index	pH (4% aqueous slurry)
Spectral 51	55	110	1.77	4.7
Spectral 81	80	80	1.77	4.7
Spectral 100	95	60	1.77	4.7

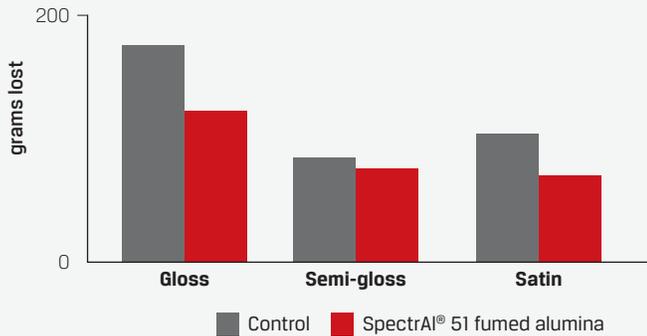
The data in the table above are typical test values intended as guidance only, and are not product specifications. Product specifications are available from your Cabot representative.

PRODUCT PERFORMANCE

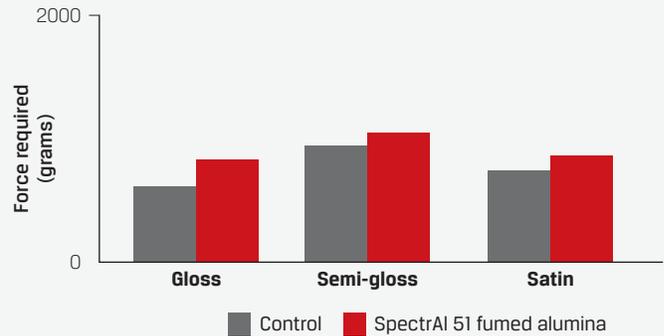


PRODUCT PERFORMANCE

Taber abrasion



Hoffman scratch

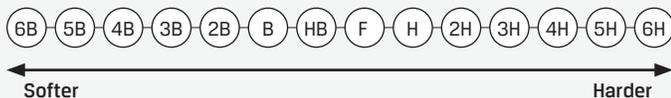


In Taber abrasion tests, the weight lost from the film when subjected to continuous abrasion is measured. The addition of fumed alumina to the model formulation can reduce the weight loss by up to 35%.

In Hoffman scratch tests, the amount of force required to cut the film down to the substrate is measured. The addition of fumed alumina to the formulation can increase scratch resistance in a range of finishes.

The product performance results above were obtained using the model formulation that follows. Only the fumed alumina was changed.

The hardness of polyurethane coatings is commonly measured with ASTM D3363, also known as pencil hardness. In all cases, SpectralAI fumed alumina increases the hardness of the polyurethane coating.



Substrate material	Pencil hardness	Gloss	Semi-gloss	Satin
Red oak	Control	3B	2B	2B
	With SpectralAI 51 fumed alumina	2B	HB	HB
Maple	Control	3B	2B	4B
	With SpectralAI 51 fumed alumina	2B	HB	HB

MODEL FORMULATION

Grind portion		
Product name	Description	Amount (%)
HS oil modified polyurethane	Grinding resin	85.97
BYK 052	Defoamer	0.15
Surfynol 104	Wetting agent	0.15
Mineral spirit	Solvent	9.44
SpectralAI 51	Fumed alumina	4.29
Total		100.00

- Premix PUR grinding resin, BYK 052 defoamer, Surfynol 104 wetting agent, and mineral spirit together under good agitation
- Post add SpectralAI 51 fumed alumina slowly to the premix under good agitation
- Grind the above at 5000 RPM for 20 minutes then slow down to 500-1000 RPM and proceed with the finish formulation

Letdown portion		
Product name	Description	Amount (%)
HS oil modified polyurethane	Binder	75.05
Mineral spirits	Solvent	21.78
Calcium drier	Drier	0.58
Zirconium drier	Drier	0.07
Manganese drier	Drier	1.20
Skinor™ #2	Anti-skinning agent	0.99
BYK 052	Defoamer	0.12
BYK 348	Wetting agent	0.21
Total		100.00

- Premix the PUR grinding resin, mineral spirit, calcium drier, zirconium drier, manganese drier, Skinor #2 anti-skinning agent, BYK 052 defoamer and BYK 348 wetting agent together

Finish formulation	
Component	Amount (%)
Grind portion	46.61
Letdown portion	53.39
Total	100.00

- Add the letdown portion to the grind portion under good agitation
- Mix for another 15 minutes, discharge then proceed to the application and testing stage



Technical Support