

An Evaluation of Mineral-Spirit-Borne Retouching or Isolating Mediums for Sensitive Unvarnished Acrylic Emulsion Paint

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Introduction

This research evaluated four potential mineral-spirit-borne retouching systems for their suitability for retouching unvarnished acrylic emulsion paint surfaces, including, one conservation paint product, one retouching medium and two isolating systems. Expanding upon previous research on mineral-spirit-borne mediums, this research investigated the potential optical, microscopic, and chemical effects on the surrounding original paint layer caused by the staining or leaching of the retouching mediums during application and removal. The resulting quantitative and qualitative measurements were used to characterise the retouching systems determining their suitability as retouching materials.



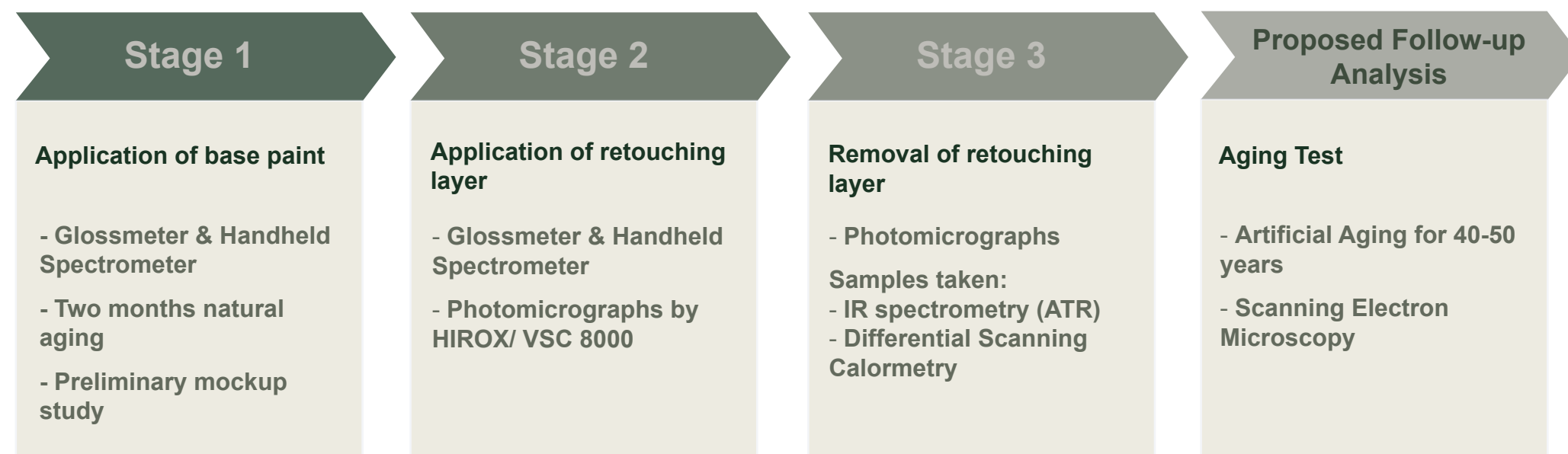
Pre-mixed paint or paint medium	
Plexigum® PQ 611 Poly (n-butyl methacrylate)	Golden MSA Conservation Paint Poly (iso-butyl methacrylate -con-butyl methacrylate) ¹
Isolating layer with QOR paint retouching	
Regalrez® 1094 Hydrogenated Hydrocarbon	Golden MSA Varnish Satin Poly (iso-butyl methacrylate)

Five Parameters Evaluated

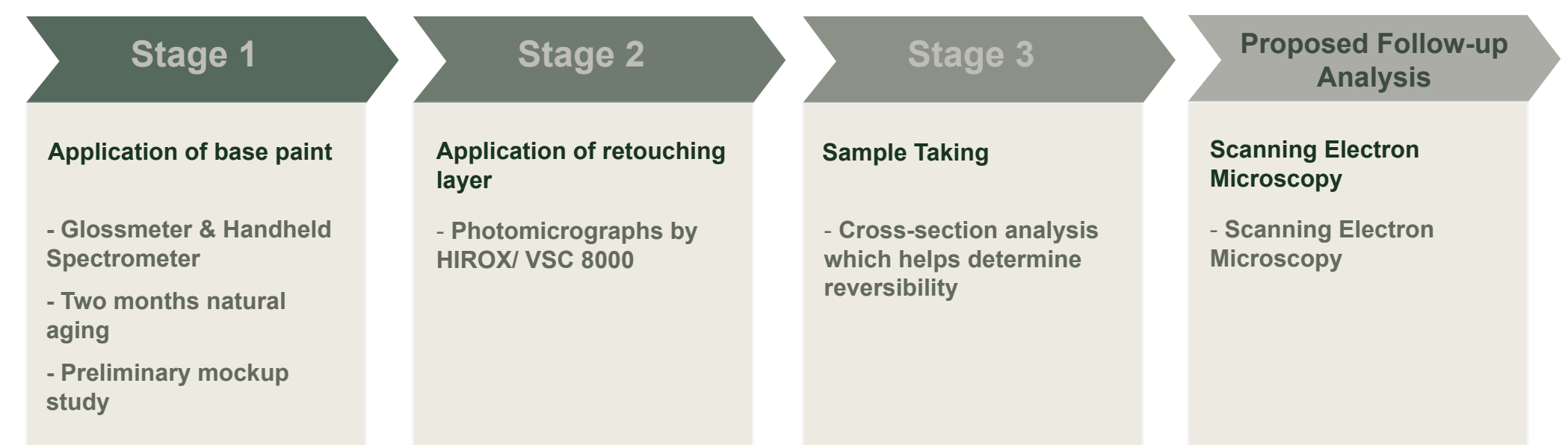
Materials Evaluated

¹ (Sims et al., 2010)

Experimental



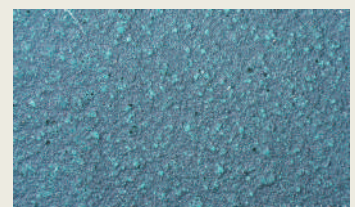
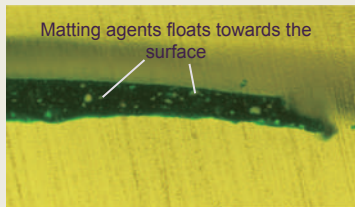
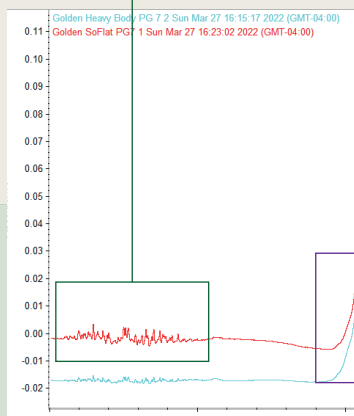
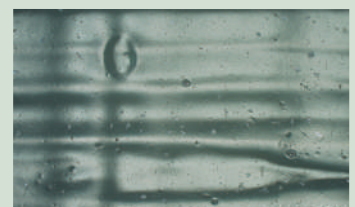
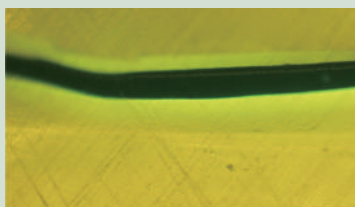
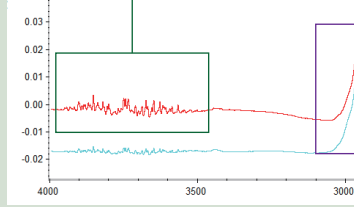
Experimental Setup 1: Gloss, Colour Matching, Leaching Problem, and Reversibility




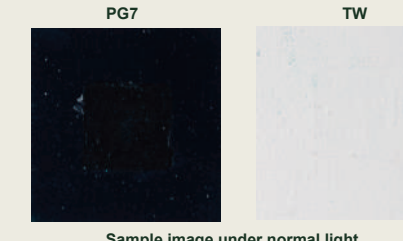

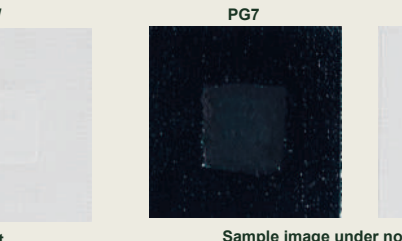
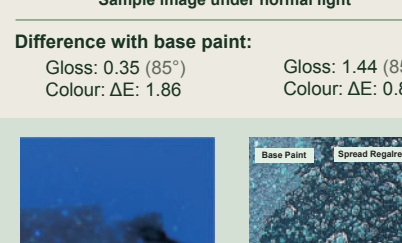
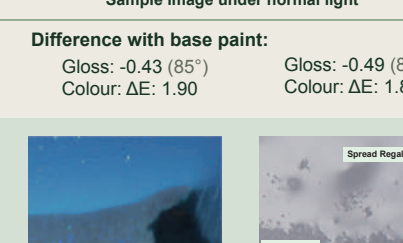
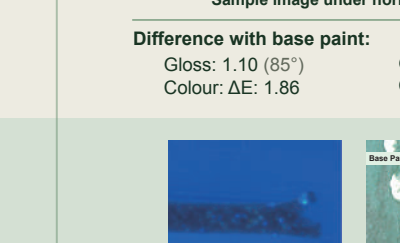

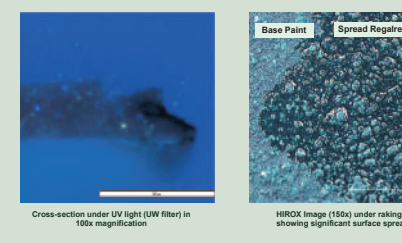
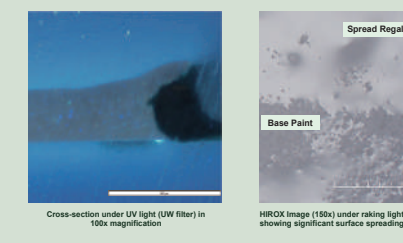

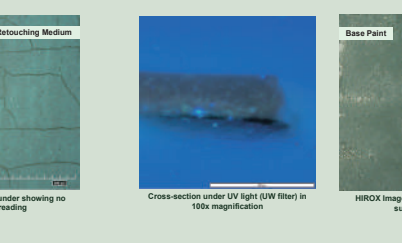
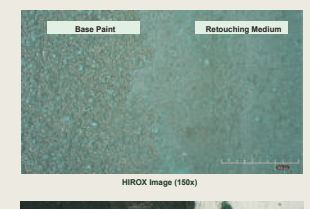
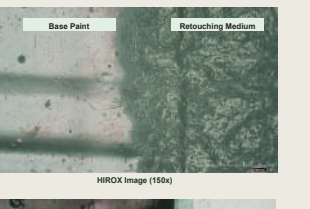
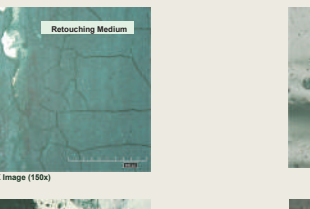
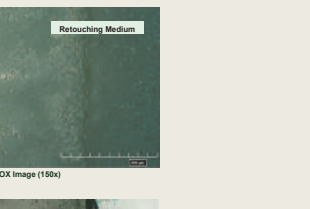
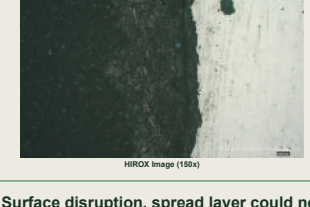

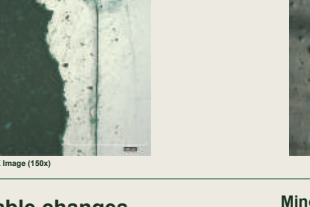
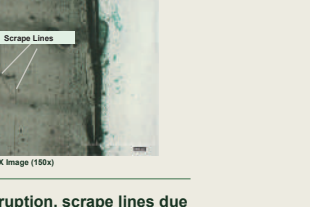
Experimental Setup 2: Staining and Reversibility

Results and Discussion

Composition of the Base Paint

	Surface Morphology	Cross-section	IR-ATR Spectrum	Matting Agents	Gloss Value	Modifications Made to the Retouching Medium
Golden Acrylics SoFlat (PG7)			Clay materials, possibly China Clay 	- Silica - Clay materials (China Clay) - Cabosil	0.7 - 1.9 (85°)	Additives: - 1% Titanium White - 1% Calcium Carbonate (Increasing opacity) - 5% extra pigment Matting Agent: - 1% Silica
Golden Acrylics Heavy Body (PG7)			Silica and Cabosil 	No	7.5 - 12.4 (85°)	No

Evaluation of Retouching Medium

	Regalrez® 1094 (Isolating) QOR (retouching)	Plexigum® PQ 611 (medium)	Golden MSA Conservation Paints	MSA Varnish Satin (Isolating) QOR (Retouching)
	SoFlat Paint PG7 TW	SoFlat Paint PG7 TW	SoFlat Paint PG7 TW	SoFlat Paint PG7 TW
	Heavy Body PG7 TW	Heavy Body PG7 TW	Heavy Body PG7 TW	Heavy Body PG7 TW
				
				
	Difference with base paint: Gloss: 0.35 (85°) Colour: ΔE: 1.86	Difference with base paint: Gloss: 1.16 (85°) Colour: ΔE: 0.39	Difference with base paint: Gloss: 1.96 (85°) Colour: ΔE: 0.47	Difference with base paint: Gloss: 0.62 (85°) Colour: ΔE: 2.93
				
	No in-layer staining but surface spreading is more significant on SoFlat	No in-layer staining or surface spreading	No in-layer staining or surface spreading	No in-layer staining or surface spreading
	Non-aromatic Mineral Spirits		Aromatic Mineral Spirits	
	Before 	Before 	Before 	Before 
	After 	After 	After 	After 
	Surface disruption, spread layer could not clearly removed	No observable changes	Surface pigment loss	Surface disruption, with clear baseline, interference in colour
	Swabs used: 25	Swabs used: 50/ wait for solvent action	Swabs used: 25	Swabs used: 20
	Material Leaching (detection of C=O stretching at 1730cm ⁻¹): No	Material Leaching (detection of C=O stretching at 1730cm ⁻¹): Yes, low peak	Material Leaching (detection of C=O stretching at 1730cm ⁻¹): Yes, low peak	Material Leaching (detection of C=O stretching at 1730cm ⁻¹): Yes, medium peak

Conclusion

To summarize, most of the systems could match the colour and gloss of the two base paint separately after the modification. However, for the Plexigum® PQ 611, the resin formed a very matte retouching layer which could not match the gloss with the Heavy Body paint. For the two isolating system, Regalrez® 1094 resin spread on both the paint surface due to its low molecular weight, in particular, on the uneven SoFlat paint surface. A thickener may need to be considered in future studies. Considering reversibility, systems that could only be removed by aromatic mineral spirits caused stronger surface disruption and interference on the surface. The SoFlat paint may find with pigment loss, while the Heavy Body paint which is more binder rich is more prone to surface disruption. Leaching of the binding material was found on the samples with notable surface disruption. Further testing is needed for quantitative analysis of the leaching issue. However, in this research, issues were found with gloss and colour of both the base paint and retouching mediums on the Mylar samples compared with the canvas samples, possibly due to the different in absorbancy of the binder and surfactant by the ground or canvas, which affected the performance of both the base paints and retouching mediums. A new set of samples were planned to be remade in a different application method to analysis the issue.

Acknowledgements

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