

TECHNICAL BULLETIN

Universal Digi Clear Improves Weathering Performance, Colour Fastness & Helps Maintain Gloss

INTRODUCTION

In late 2010, Vipond's Paints undertook technical evaluations to explore how well Universal Digi Clear protected printed adhesive vinyl. This evaluation was assessed at two stages, with the second stage now complete. Results are reported below.

In order to obtain realistic results in a shorter time frame, Vipond's engaged the services of the Allunga Exposure Laboratory, based near Townsville in northern Queensland, Australia. The Allunga Exposure Laboratory has a system called Altrac which tracks the movement of the sun and intensifies the UV radiation on a given sample. It is estimated the UV radiation using this method accelerates UV degradation by approx 5 times, ie 1 month Altrac exposure gives approx 5 months natural exposure.

The experiment was designed to test sets of printed vinyl samples in various ink colours. Samples were prepared in Black, Magenta, Cyan and Yellow from two ink suppliers and applied to a composite board for backing. The samples were prepared both uncoated and coated with Vipond's Universal Digi Clear. The test panels were then mounted in the Altrac system and exposed to intensified natural UV radiation for 6 months and 12 months (equivalent to approx 2½ and 5 years respectively of natural UV exposure).

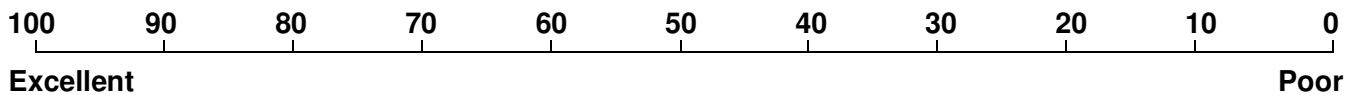
Test samples were assessed against an un-exposed master set of samples which were prepared at the same time. They were checked visually for loss of gloss and colour fade. They were also evaluated by colour and gloss measurement devices.

The following pages provide the results of those evaluations.

INITIAL OBSERVATIONS **(sample assessment prior to exposure)**

Upon initial preparation of the printed vinyl samples, differences were observed in the appearance of the inks from the two suppliers. There were also differences observed when the samples were coated with Universal Digi Clear. The samples were rated according to the scale below.

Rating Scale



Ink Colour	Ink Supplier	Uncoated	Comments	Coated	Comments
Black	A	95	good colour depth; slight streakiness in ink appearance	100	coating improved colour depth & richness; improved gloss & overall appearance
	B	95	reasonable colour depth (some "greying off"); good ink application	100	coating improved colour depth & richness; improved gloss & overall appearance
Magenta	A	95	good colour depth; good ink application	100	coating improved colour depth & richness; improved gloss & overall appearance
	B	90	good colour depth; slight blotchiness in ink appearance	95	coating improved colour depth & richness; improved gloss & overall appearance
Cyan	A	95	good colour depth; good ink application	100	coating improved colour depth & richness; improved gloss & overall appearance
	B	90	good colour depth; slight blotchiness in ink appearance	95	coating improved colour depth & richness; improved gloss & overall appearance
Yellow	A	95	good colour depth; good ink application	100	coating improved colour depth & richness; improved gloss & overall appearance
	B	95	good colour depth; good ink application	100	coating improved colour depth & richness; improved gloss & overall appearance

6 MONTH RESULTS (equivalent to approx 2½ years natural exposure)

Rating Scale*

1	2	3	4	5
No Change	Minimal Change	Noticeable Change	Poor	Fail

* samples rated against a master set of unexposed test panels.

Ink Colour	Ink Supplier	Uncoated	Comments	Coated	Comments
Black	A	3	some gloss loss & colour fade observed	1	coating intact with excellent overall appearance
	B	2	some colour fade observed	1	coating intact with excellent overall appearance
Magenta	A	2	slight gloss loss & colour fade observed	1	coating intact with excellent overall appearance
	B	3	some gloss loss observed; significant colour fade observed	1	coating intact with excellent overall appearance
Cyan	A	3	some gloss loss observed; significant colour fade observed	1	coating intact with excellent overall appearance
	B	4	significant gloss loss & colour fade observed	1	coating intact with excellent overall appearance
Yellow	A	3	some gloss loss & colour fade observed	1	coating intact with excellent overall appearance
	B	2	slight colour fade observed	1	coating intact with excellent overall appearance

COMMENTS

After 6 months of exposure, all uncoated samples showed signs of onset of UV degradation. All coated samples remained intact and had excellent gloss and depth of colour.

There were no signs of UV degradation in the samples coated with Universal Digi Clear.

Samples were re-exposed for a further 6 months and evaluated at the end of 12 months exposure (equivalent to approximately 5 years natural UV exposure). These results are shown next.

12 MONTH RESULTS (equivalent to approx 5 years natural exposure)

Rating Scale*

1	2	3	4	5
No Change	Minimal Change	Noticeable Change	Poor	Fail

* samples rated against a master set of unexposed test panels.

Ink Colour	Ink Supplier	Uncoated	Comments	Coated	Comments
Black	A	3	some gloss loss & colour fade observed	2	coating intact with good overall appearance; slight gloss loss & colour fade observed
	B	3	some gloss loss & colour fade observed	2	coating intact with good overall appearance; slight gloss loss & colour fade observed
Magenta	A	4	significant gloss loss & colour fade observed	2	coating intact with good overall appearance; slight gloss loss & colour fade observed
	B	5	gloss & colour obliterated	2	coating intact with good overall appearance; slight gloss loss & colour fade observed
Cyan	A	5	gloss & colour obliterated	3	some gloss loss & colour fade observed
	B	5	gloss & colour obliterated	3	some gloss loss & colour fade observed
Yellow	A	3	some gloss loss & colour fade observed	2	coating intact with good overall appearance; slight gloss loss & colour fade observed
	B	3	some gloss loss & colour fade observed	2	coating intact with good overall appearance; slight gloss loss & colour fade observed

COMMENTS

After 12 months of exposure, all uncoated samples showed signs of UV degradation, with the Magenta and Cyan inks from both suppliers having significant degradation. The Yellow and Black inks from both suppliers showed best exposure performance when uncoated.

















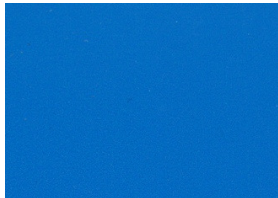
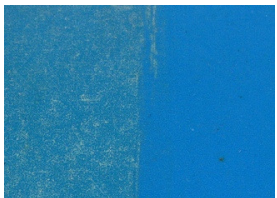
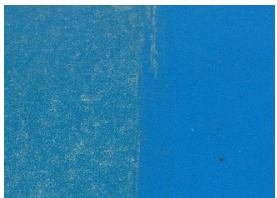
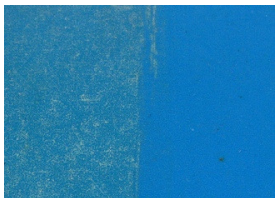
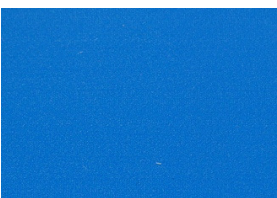
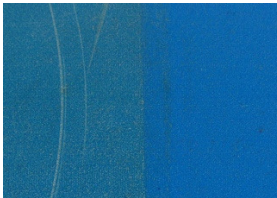
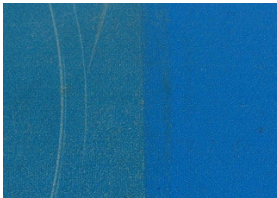
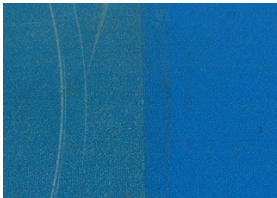
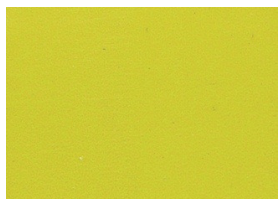







All coated samples remained intact and had good gloss and depth of colour following exposure. There were minimal signs of UV degradation in the samples coated with Universal Digi Clear. All the coated samples were of an acceptable commercial standard.

CONCLUSION & SUMMARY

Significant changes in appearance were observed in the uncoated samples only.

All samples coated with Universal Digi Clear remained serviceable and of a commercially acceptable appearance after 12 months of exposure on the Altrac system. This is equivalent to approximately 5 year's service life.

PHOTOS OF SAMPLES AT THE CONCLUSION OF 12 MONTHS ALTRAC TESTING**

Ink A				Ink B			
Reference		Exposed		Reference		Exposed	
Uncoated	Coated	Uncoated	Coated	Uncoated	Coated	Uncoated	Coated
							
							
							
							

NOTES

** The above photos are provided as a guide only as their appearance will change depending on the computer screen / printer quality used to view them. The actual samples are available for viewing at the Vipond's office in Melbourne.

Two coats of Universal Digi Clear were applied to the printed vinyl samples at an approximate spread rate of 15m² per litre per coat. This corresponds to a total dry film thickness of approximately 35 – 40 microns.