UROXSYS

marine **CLEARCOAT** system

An in-depth look at performance, application and appearance

Index



Introduction

Uroxsys Ltd is a New Zealand company holding significant experience in urethane technology. We have a strong R&D impetus and have developed a large range of products which are marketed both under our own name and via other organisations. Areas of expertise are loosely focused around coatings and adhesives, servicing a range of industries and applications. A specific field of research within the company over the last 20 years has centred on developing unique product solutions for timber.

The Uroxsys Marine clearcoat system was released following a decade long development programme. It is fast gaining a reputation as the best performing clearcoat currently available. Properties that can be expected from this system are: superior durability, easier, faster and more forgiving application coupled with the desired 'wet look' of a traditional varnish.

Our product range comprises of primers, gloss, matt and satin topcoats along with relevant thinners and cleaners. All products are single component. The real point of difference to anything on the wider market is the non-yellowing moisture cure technology that the products are built on. This is also the main engine that provides such forgiving application properties and exceptional durability exceeding even that of multi-component products.

During the course of the development of our system, we tested alongside a range of other common varnishes. This presentation shows comparisons in durability and application between these products and ours and also looks at some of the in-house experiments we have done.

We haven't divulged the identity of competitors products for professional reasons, however all are commonly used products that are currently available.

Products compared are:

Product 1. Available to professionals only – a high solids single component Alkyd varnish

Product 2. **Uroxsys system**

Product 3. A 2 pack acrylic urethane varnish – often sprayed

Product 4. Single component pigmented flexible Alkyd varnish – very commonly used

Product 5. An industry popular standard single component Alkyd.

This presentation is structured around the following headings:

- **Durability**
- **Primers**
- **Application Properties**
- **Overview and Case Studies**

Overview

Within this presentation we hope to be able to illustrate a set of advantages that our Marine Clearcoat range exhibits over other commonly used products on the market.

These are in summary:

- Superior durability and long term retention of a desirable timber appearance
- Application advantages which include:
  - Reduced job duration.
  - Excellent sanding.
  - Single component convenience which also negates the possibility of mixing errors.
  - Forgiving properties with regard to low temperature/high humidity cure.
  - Ability to be overbuilt and recoated early without disastrous consequences.

These characteristics can largely be accredited to the moisture cure technology on which the range has been formulated. This is a significant point of difference to any other current marine clearcoat product. The availability of the only range of exterior-grade semi-gloss products is another advantage.

Interior Use

This presentation has focused on the use of our system in an outdoor environment. Obviously it is also suitable for use in interior applications: although somewhat over designed. Interior use requires even fewer coats and will generally begin with a coat of the clear primer.

Some advantages over existing products that can be expected from our system when used indoors are:

- Convenience of single component products.
- Rapid application and excellent sanding which reduces job duration.
- Semi-gloss options that can be used directly from the can.
- Excellent abrasion, water and chemical resistance.

Flexible topcoat is able to take the movement of flexible caulking

SHENANDOAH

Shenandoah underwent a major refit in Auckland in 2009. Her skipper initially intended to trial our product on the cap rails only and use Product 1 for the rest of the varnishing.

Our system was eventually applied to all 3 mainmasts and significant areas of the rest of the boat. The decision to change was primarily due to time constraints in the project and the rapid rate of application able to be achieved using our system. The contractor was surprised being able to apply 3 heavy spray coats of our Aliphatic daily (in winter) and still have excellent sanding the following day.

THALIA

Thalia's Skipper trialled the Marine Aliphatic (Version 1) on the cap rail of Thalia during her 2008 Auckland refit. The rest of the brightwork was coated in another top shelf system.
She has spent the last 18 months largely in Northern Australia and Thailand. The first mate has since overcoated all of the other product used with ours, due to the superior performance the Marine Aliphatic. The cap rail was overcoated once in the 26 month period with a single coat of our topcoat as 'preventative maintenance' but this is not really necessary with the Uroxsys system.

The mate who has worked with a number of varnish products in his career reported that in the tropics, the other product used tends to last 4 months on a cap rail before losing gloss, then developing surface crazing requiring immediate remediation. Since the last coat, the Uroxsys product has been 10 months on the cap rail and shows no sign of deterioration or loss of gloss as yet. From our in-house trials, we expect significantly more time to pass before maintenance will be required.

RERAHI AHI

Rerahi Ahi is a wooden motorsailer purchased by the owner of Red Bull for use on his personal island in Fiji.

A full varnish finish over every square inch of timber above the waterline was specified. The restorer chose our product for the ease of use and durability.

Coloured primers were used exclusively on Ngatira

NGATIRA

Our product is proving to be popular with the local classic boat aficionados who seek the ‘wet look varnish’ appearance without the maintenance that this normally entails.

Durability

The Testing

We have conducted a series of in-house tests over a number of years trialling various ideas and honing our system. Some of these have incorporated other products on the market for performance comparisons.

Exposures are conducted on a series of North facing racks adjusted twice yearly to maximise solar exposure (in the Southern hemisphere). Surface temperature of the panels is regularly above 60°C. The test rig is within 20 metres of a tidal estuary and samples are applied to a range of timbers on the same boards for better accuracy. No trial products are maintained in any way. New Zealand is considered one of the harshest global regions on coatings.

Some of the timbers that we have selected; for example Cedar and Black Walnut are not commonly used in clearcoated marine applications. We have included them to provide accelerated test data; Cedar has very poor dimensional stability and Walnut fades rapidly.

NOTE: Our current Version 2 topcoat system evolved out of Version 1 used in Series 1 and 2. The results for Series 1 and 2 should be taken as representing inferior performance relative to the newer formulation as seen in Series 3.

SERIES 1

41 Month Exposure

Exposure time:
October 2005 – March 2009
(41 Months, 4 N.Z. summers).

Trialling:
Our **Version 1** topcoat over a range of primers benchmarked against Product 5.

Systems compared:
Product 5 vs. Uroxsys Marine System.

Application:
Product 5 – 5 coats, first coat thinned.
Uroxsys Marine system – 1 coat Marine Primer ragged on overcoated with 5 coats **Version 1** topcoat.

10 Months on exposure

TIMBERS LEFT TO RIGHT
Jarrah, Tasmanian Blackwood (light tone), Sapele, Kwila, Silky Oak, NZ Southland Beech ,Cedar (dark tone), Tasmanian Blackwood (dark tone), Teak, Teak, Cedar (light tone), NZ Kauri, Fijian Kauri, Iroko, Black Walnut.

Note: This rack blew down in a storm October '08 landing face down on coarse gravel causing isolated damage to most of the coatings.

PRODUCT 5

Jarrah

Light toned Australian Blackwood

Sapele

UROXSYS

PRODUCT 5

Kwila

Cedar

Dark toned Australian Blackwood

UROXSYS

continued...

PRODUCT 5

Teak

UROXSYS

Fijian Kauri

PRODUCT 5

Iroko

UROXSYS

Black Walnut

Observations

Product 5:

Product 5 started to develop surface crazing after around a year. This propagated, forming deeper cracks which allowed water ingress beneath the coating causing subsequent disbonding. Product 5 becomes progressively brittle over time. As it loses flexibility, it is unable to accommodate movement within the substrate which sheds the coating. This is most evident in the least dimensionally stable timbers such as cedar where failure occurred first whereas the more dimensionally stable timber such as Iroko hold the coating the longest.

An additional mode of failure is that the by-product of Product 5 breaking down in sunlight and water provides food for fungus. Loss of gloss occurred fairly rapidly followed by the appearance of mildew which drove further degradation. Solar degradation seemed to be the main cause of failure in summer while mildew appeared to cause the greater degree of damage in winter.

Uroxsys:

This system fared better. There is some coating delamination emanating from sharp edges and around damage sustained when the rack blew over. (The greater degree of flexibility of Version 2 has improved this). The coating was able to remain attached to cedar. More dimensionally stable timbers looked practically unchanged from the time of coating application.

A high gloss was retained and no mildew was evident over the duration of the exposure. A high gloss finish tends to be self cleaning.

SERIES 2

28 Month Exposure

Exposure time to date:
December 2007 – April 2010 (28 Months, 2 ½ Summers)

Trialling:
Our **Version 1** system against a number of competitor products.

Systems compared:
Product 1, Uroxsys System, Product 3, Product 4, Product 5.

Application:

Product 1 – 3 coats penetrating Epoxy primer followed by 6 coats of Product 1.

Uroxsys – 1 coat coloured Marine Primer ragged on, overcoated with 5 coats Version 1 topcoat.

Product 3 – First coat thinned with specified thinner followed by an additional 5 coats.

Product 4 – 3 coats as specified.

Product 5 – 3 coats penetrating epoxy primer followed by 6 coats of Product 5.

TIMBERS LEFT TO RIGHT
Iroko, Cedar, Cedar, Sapele, Teak, Teak, Black Walnut, Kwila, Sitka Spruce.

16 Months on exposure

28 Months on exposure

The right hand side of the boards have been covered with white PVC strips. These have been removed for photographing and show the original appearance of the samples at the bottom of each photograph. The first Cedar and the Kwila boards have been left unwashed prior to photographing. The edges of these panels were left reasonably sharp to accelerate failure.

PRODUCT 1

UROXSYS

PRODUCT 3

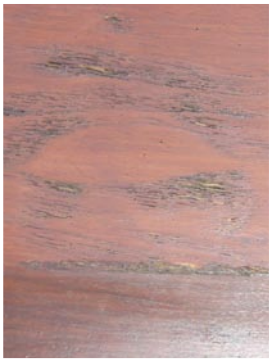
PRODUCT 4

PRODUCT 5

Iroko

continued...

PRODUCT 1	UROXSYS	PRODUCT 3	PRODUCT 4	PRODUCT 5
				
Cedar				
				
Cedar dark toned				
				
Sapele				
				
Teak				

PRODUCT 1	UROXSYS	PRODUCT 3	PRODUCT 4	PRODUCT 5
				
Walnut				
				
Kwila				

Observations

Product 1:

By 16 months, this product had completely lost gloss across all panels. Some cracking on dimensionally unstable timbers is evident by 16 months which has worsened at 28 months. This product became very brittle within a year and has failed where timber movement occurs but largely retained adhesion to the dimensionally stable timbers other than some minor delamination on sharp edges.
Fairly bad mildew development can be seen on the unwashed Cedar and Kwila panels. No surface crazing is evident at this stage.

Uroxsys:

Still has a good appearance, this is exactly the same system as trialled in Series 1 so the patterns are identical. Again, there is some minor delamination on some sharp edges which the greater flexibility of Version 2 has improved upon.
Full gloss has been retained, the unwashed Cedar and Kwila panels display the self cleaning properties of a product over time when the surface retains integrity.

Product 3:

Has retained good gloss. This product is brittle; the effect of which is illustrated on the Cedar panels where the timber has shed the coating on the first sample and bad peeling can be seen on the second. The Teak sample displays some surface cracking which has led to an area of disbonding. Some delamination has also occurred on sharp edges.
The surface has retained good gloss and thus remains fairly clean and free of mildew.

Product 4:

Complete loss of gloss occurred rapidly. This product acts as a semi-transparent paint which protects the substrate for a time but also masks the timber grain. It was still adhered at 16 months. Before two years on exposure however, the film became sufficiently brittle to cause failure on the timbers displaying poor dimensional stability. At the same time adhesion began to fail on the denser more stable timbers; Iroko, Kwila and Teak. The pigment used probably compromises penetration of the product into the timber (from our experience) leading to poor adhesion and subsequent failure. This product didn't develop a mildewed surface, this is possibly due to built in waxes rejecting water.

Product 5:

Complete failure at 28 months via the same mechanisms seen in Series 1.

SERIES 3

16 Month Exposure

Exposure time to date:
December 2008 – April 2010
(16 Months, 1 ½ Summers)

Trialling:
Our Version 2 upgraded topcoat formulation which we currently market.

Systems compared:
Effect of under-building our system. Clear vs. coloured primers.

Application:
Coloured primer applied as a rubbing stain or clear primer brushed on. Topcoated with six coats Uroxsys Marine Aliphatic Gloss.

4 Months on exposure

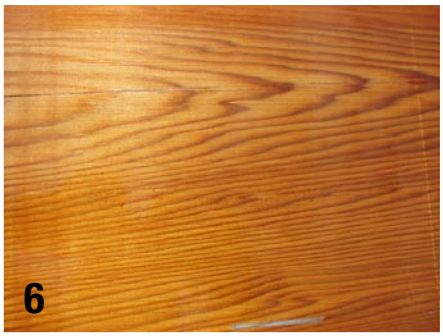
TIMBERS LEFT TO RIGHT
Black Walnut, Teak, Cedar, Cedar, Cedar.

Note: We used Walnut in this trial for its extremely poor colour stability and Flatsawn Cedar with a multitude of hairline cracks which we have found to be the most challenging substrate for a clearcoat to hang on to. Each plank has a covered section which was removed for photographing the samples.

16 Months on exposure

Test 1:

Effect of underbuilding the system. The plank was primed then topcoated in one through to the recommended six coats.



1 coat

2 coats

Observations:

Even a single coat has lasted surprisingly well after 16 months. The bad splits have caused coating rupture at up to four coats of film build but the smaller hairline cracks have not propagated through the coating. Five and six coats seem adequate even for the bad splits. Good bonding on the edges has been retained with the upgraded flexible formulation. Where the film has ruptured, the flexibility minimises subsequent delamination. This can be seen at the bottom of Photo 6. A sliver of coating was removed seven months ago and no undercutting of the film is evident.

No loss of gloss has occurred, the reflection in the bottom left photo shows how thin the film build was.

Test 2:

Comparison of coloured and clear primers

TIMBERS LEFT TO RIGHT Black Walnut, Teak, Cedar.

The left hand side of these panels have the clear primer and the right the coloured. The coloured primers retain colour closer to the original timber tone however the clear retains a desirable timber aesthetic. The two bands across each board are kept covered.

Note: Black Walnut and Cedar are prone to particularly bad fading.

Some of the major cracks in the cedar have caused the film to rupture but the other samples look as if they had just been applied. Note excellent gloss retention – water still beads on these samples after 16 months.

The flexible nature of the topcoat enables the timber substrate to sustain fairly major denting without cracks forming in the coating or delamination occuring.

Conclusion

Typical modes of failure for exterior clearcoat systems can be generally regarded as containing the following aspects to varying degrees.

Embrittlement: Initially, effective coatings are able to move with the timber substrate. On outdoor exposure however, most clearcoats tend to become progressively brittle over time. Concurrently, solar energy degrades the surface of the timber beneath the coating compromising the bond between coating and timber. The end result is an inflexible coating poorly bonded to a moving substrate. Invariably, this leads to the timber shedding the coating; most demonstrably on timbers prone to excessive movement and around areas of localised stressing, for example hairline cracks. Once the coating is ruptured, water, sunlight and fungal attack progressively undercut the coating causing accelerated failure.

Any coating that displays initial poor adhesion or low penetration into the substrate, such as Product 4 can also be expected to fail more rapidly from this mechanism.

Fungal Attack: As their surface is broken down by sunlight and water, oil based coatings tend to form food for fungal growth typified by the appearance of black mildew. This exacerbates the degradation of the surface of the coating. It also provides a source of fungal spores when the coating ruptures which then start feeding on the timber, accelerating undercutting of the coating. Product 5 shows this effect. This is primarily a wet season phenomenon.

U.V. Degradation, Water and Pollutants: These are the most damaging elements for clearcoats. U.V. light must be blocked as it destroys the lignin component of the timber to which the coating is adhered to. U.V. is also a primary cause of coating embrittlement.

Physical damage: This can occur in a number of ways: scoring, chafing or the clearcoated surface suffering a blow which causes the timber to dent and an inflexible topcoat to crack. The end result is the same; water ingress. This causes the timber beneath the coating to go through cycles of swelling when the timber is wet and contraction when it dries out again. If the film is brittle, the coating disbands from the timber over time around the area where the damage has occurred becoming progressively worse by the same mechanism.

The Uroxsys Marine clearcoat system has been developed to combat these modes of failure. It is primarily the attributes facilitated by the Moisture Cure technology that the system is designed on that have enabled the excellent durability of this product.

Specific contributing properties are:

- The chemistry the coating is based upon is fundamentally stable even in extremely harsh climates where the qualities designed into the film are retained for many years.
- The film is able to be stretched 2.5 X its length and then recover. This elasticity is sustained even after years of outdoor exposure.
- 90% of U.V. is blocked per coat at the recommended rate of application; resistance to water and chemicals is extremely high.
- The coating retains full gloss after many years exposure which minimises the build up of surface contamination. Fungal attack will not occur at all on this coating.
- The topcoat is designed to have a tough film that displays high resistance to abrasion. Also, the inherent flexibility allows reasonably bad timber denting to occur without cracking or delamination of the coating. This flexibility also accommodates wet and dry cycle timber swelling and contraction if the coating is ruptured dramatically slowing undercutting and disbonding.

Primers also play an important role. This will be discussed in the next section.

Primers

Introduction

A major element in the development of our clearcoat system has been the design of a primer that retains rich timber toning over many years. There is little point in offering a long lasting coating if the timber bleaches out beneath the coating or exposed areas of a job fade badly contrasting with those more often in shade. We chose to use a dedicated primer within this system for the increases in overall performance and long term gains in appearance.

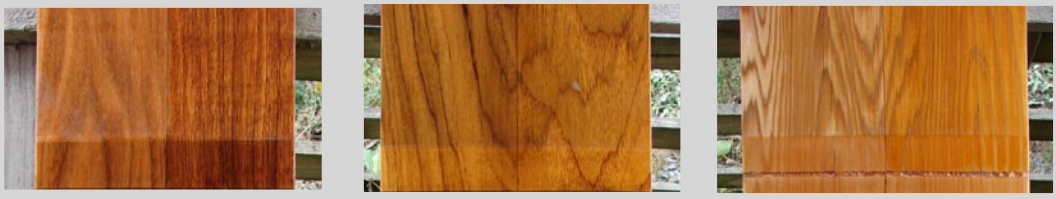
Our Primers

All are single component moisture cure polyurethanes able to be applied by brush, roller or spray. These are available in both clear and coloured options. Clear is used predominantly however the coloured primers can offer enhanced long term appearance to timbers prone to fading.

Coloured primers are based on the same resins used in the clear and are available in red, yellow and brown tones. These are selected to loosely match the colour toning of the timber on which they are to be used. Application of these is best done in a manner akin to a rubbing stain. This leaves a layer of durable colour in the surface of the timber only and thus retains a highly natural appearance.

TIMBERS LEFT TO RIGHT: Black Walnut, Teak, Cedar

4 Months on exposure



16 Months on exposure

Each board has been primed with our clear primer on the left hand side and coloured primer on the right hand side. The bands at the bottom were covered and indicate original timber colour. As can be seen, changes in colour can occur fairly rapidly but then stabilise to a degree. The greater colour stability of Teak over Black Walnut and Cedar is evident.

Background

Timber colour is basically generated by natural vegetable dyes which display varying degrees of light fastness depending on the species.

When clear coated and exposed to sunlight, timbers such as Mahogany and Black Walnut occupy one end of the spectrum displaying dramatic and rapid fading. Iroko and Teak at the other end have excellent light stability. On outdoor exposure Teak initially tends to rapidly lose red tone over a matter of weeks (the red component of its colour make-up is an unstable dye), it then settles into a very durable golden/green hue which remains unchanged over many years of exposure.

We have found that merely blocking U.V. is not sufficient for the retention of natural timber colour. The energy contained in the visible part of the light spectrum itself is destructive enough to cause dramatic fading over time. For this reason, we offer the option of adding natural looking, light stable colourants to the timber via the primer.

PRIMER TRIAL

Exposure time to date: December 2009 – April 2010 (4 Months)
Trialling: Clear primer variations for timber colour retention

FIRST DAY	FIRST DAY (OUTDOORS)	4 MONTHS EXPOSURE	
			Black Walnut
			Mahogany
			Teak

This is a trial of 32 different experimental Uroxsys clear primers. The timber is bookmatched quartersawn veneer which allows accurate comparisons. Samples were put on exposure December 2009 with the control being in the top left hand corner. Note how the slightly lighter areas from the early photographs have faded rapidly after only four months. This is due to less primer penetration. Our current primer is 3rd from the left and 3rd from the top of each panel. Five down on the right is the topcoat applied directly to the timber which is fading more rapidly. Teak displays its inherent colour stability showing little difference in fading regardless of the primer used as opposed to the Walnut and Mahogany. These differences will become progressively more pronounced over time.

Development

The development of our primer system has involved trialling a massive range of timber surface treatments and experimental primers. We also put a doctorate student through her thesis on this project which gave us access to the research facilities and testing equipment at Auckland University.

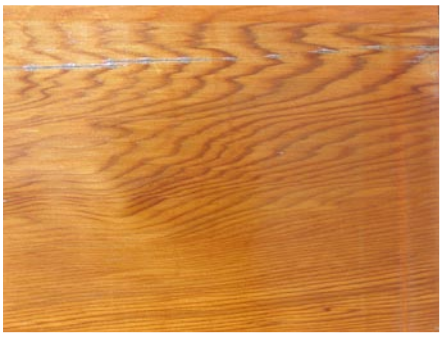
During this project we found that the initial objective of complete retention of original timber tone was unrealistic, but found that particular primers dramatically reduced fading over time. Optimising this became the focus of the project and fed directly into the design of the primer.

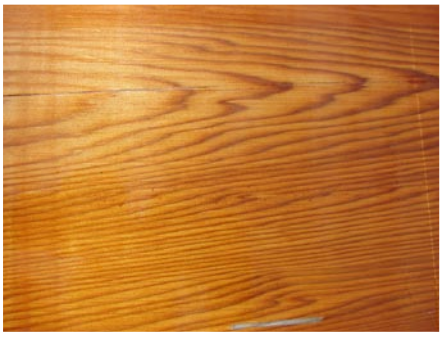
Black Walnut

Teak

Cedar

Images above: Coloured primers are used on the left and clear on the right. The insets display appearance at the time of application and the main pictures after 16 months on exposure.





Far left: Cedar with coloured primer and a single coat of topcoat.

Left: Cedar with coloured primer and six coats of topcoat.

Both of these samples have had 16 months exposure. The band at the top of each photo has been covered and indicates the original timber colour. Note the colour stablility of the coloured primer with even a single coat of the topcoat.

Key requirements of an effective timber primer:

A dedicated primer designed for the purpose, is far more effective than thining the first coat of the topcoat both for retaining colour and increasing the lifespan of the system overall.

- **Primers must penetrate as deeply as possible.** This is dictated by the nature of the molecule on which the primer is built and its affinity to timber, and also the solvents used to carry the primer into the timber. This quality vastly improves long term timber aesthetics and also provides the most effective anchor for the topcoat to bond onto the substrate.
- **Both primers and topcoats should be flexible.** This allows the coating to move with the timber substrate without cracks forming allowing the ingress of water.
- **Topcoats should remove practically all U.V.** This significantly slows the degradation of the timber beneath the coating.

Our dedicated primer also offers superior properties relative to application such as good grain-filling and excellent sanding properties. Application properties will be examined in the following section.

Application

Introduction

For the owner of a varnished article, the durability of the coating used is likely to be the most important attribute of that product. For those applying the coating however, the practicalities of actually using it are also important.

Key concerns from an applicators perspective would be:

- The time required from start to finish.
- Consistency of the finished result in varying temperatures and humidity ranges.
- Good sanding and handling properties with the greatest general ease of use.

We believe from an application viewpoint, that the Uroxsys clearcoat system offers clear advantages in all of these respects.

The Uroxsys system consists of primers, Gloss, Satin and Matt topcoats, relevant thinners and a cleaner. All products within the range are single component and can be applied by brush, roller or spray across a wide range of temperatures and humidity levels.

This section will compare the systems considered in the durability section from an application context.

	Product 1	Uroxsys Primer	Uroxsys Marine Aliphatic Topcoat
Appearance	Amber liquid	Clear liquid. Coloured primers resemble a rubbing stain	Clear liquid
Relative Viscosity of products 1 = least viscous, 7 = most viscous	6	1	4
Odour	Fairly pleasant Tung oil aroma	Fairly mild solvent smell	Fairly mild solvent smell
Application Conditions	10°C - 41°C.	4°C - 40°C, RH up to 95%	4°C - 35°C, RH up to 95%
Number of coats	3 – 8 depending on system used	1	6-8 at recommended application rate
Preparation for use	First coat on bare timber thinned 100%, product for subsequent coats can be used directly from the can	Apply directly from can	Apply directly from can
Application	Brush, roll or spray	Brush, roll or spray	Brush, roll or spray
Tack free time at 25°C 125 micron drawdown	50 minutes	4 ½ hours	40 minutes
Tack free time at 18°C 125 micron drawdown	1 ¾ hours	7 ¼ hours	1¼ hours
Print free at 25°C	2 hours	6½ hours	1½ hours
Print free at 18°C	3 ¼ hours	10¼ hours	2¼ hours
Recoat time	1 coat per day is recommended	N/A	As soon as print free (as little as 2 hours). 2-3 coats per day easily achievable
Sanding	Poor the following day. Paper clogs; particularly in colder conditions. Cannot be machine sanded	Good the following day. Can be machine sanded	Good the following day. Can be machine sanded
Time required to apply	6 – 8 days as a stand alone system	1 day	Minimum 3 days at 3 coats a day over Marine Primer. At 2 coats a day, minimum 4 days. An extra day is required if a semi gloss topcoat is used
Shelf Stability	Good – opened tins can skin	Good – open cans will last up to one year if resealed properly	Good, opened cans will last up to a year if resealed correctly

Note: These times roughly halve on normal application due to available moisture in timber accelerating cure

	Product 3	Product 4	Product 5
Appearance	Clear liquid	Semi-transparent coloured liquid	Amber liquid
Relative Viscosity of products 1 = least viscous, 7 = most viscous	3	5	2
Odour	Strong solvent smell	Fairly pleasant alkyd smell	Fairly pleasant alkyd smell
Application Conditions	15-35°C. RH must be less than 80%	10°C - 35°C. RH must be less than 80%	10°C - 35°C
Number of coats	6	3	Temperate zones – minimum 6 coats Tropical zones – minimum 10 coats
Preparation for use	2 components must be mixed. First coat is thinned prior to application	Apply directly from can	Apply directly from can
Application	Brush, roll or spray	Recommended brush only	Brush, roll or spray
Tack free time at 25°C 125 micron drawdown	2 hours	2 hours	2 ½ hours
Tack free time at 18°C 125 micron drawdown	3 hours	3 ¾ hours	4 ¾ hours
Print free at 25°C	2 hours 40 minutes	3 hours	3 hours
Print free at 18°C	5 ¾ hours	4 ¼ hours	5 ¾ hours
Recoat time	1 day	1 day	1 day
Sanding	Good the following day. Can be machine sanded	Poor the following day. Paper clogs; particularly in colder conditions. Cannot be machine sanded	Poor the following day. Paper clogs; particularly in colder conditions. Cannot be machine sanded
Time required to apply	5 days minimum	3 days	Temperate zones – minimum 6 days Tropical zones – minimum 10 days
Shelf Stability	Good	Good – opened tins can skin	Good

Comments

Product 1

PROS: Convenience of a single component product. Relatively rapid rate of cure. Pleasant smell when using.

CONS: Poor sanding by hand after 1 day cure, inability to be machine sanded increases preparation time significantly. Heavy applications can result in surface skinning and subsequent 'wrinkling'. Recoating too early can fry the previous coat. Lingering odour after curing which may be a problem in enclosed spaces.

Uroxsys System

Comprising of 1 primer coat and 6-8 coats of Marine Aliphatic

Marine Primer

PROS: Convenience of single component product. Can be applied in low temperatures and high humidity environments without problems. Good sanding: can be machine sanded minimising preparation time. No lingering smells once cured.
CONS: Fairly slow cure – can always be sanded and coated the follow day however. Slight solvent odour when using.

Marine Aliphatic

PROS: Convenience of single component product. Can be applied in low temperatures and high humidity environments without problems. Rapid rate of cure: can be multicoated daily. Good sanding: can be machine sanded minimising preparation time. Can be heavily applied without adverse effects such as wrinkling, frying, or slow cure occurring. No lingering smells once cured.
CONS: Slight solvent odour when using.

Complete system

Requires up to 3 different products if a semi-gloss finish is required. Offers simplicity and insurance against mixing errors as all products are single component. Able to be applied with consistent results in greatly varying temperatures and humidity levels. Rapid application rates minimise job times. Ability to be machine sanded reducing preparation time.

Product 3

PROS: Simplicity of using one product for the entire application process. Good sanding properties: can be machine sanded minimising preparation time. Relatively rapid application process due to low number of coats stipulated. No lingering smells once cured.

CONS: Inconvenience and potential for mixing errors of a 2 component system. Cannot be applied when relative humidity is above 80%. Fairly potent solvent smells when using.

Product 4

PROS: Simplicity of using one single component product for the entire application process. Low number of stipulated coats equates to rapid application process. Relatively pleasant smell when applying.

CONS: Cannot be applied when RH is above 80%. Cannot be sanded by hand or machine. Lingering odour after curing which may be a problem in enclosed spaces.

Product 5

PROS: Simplicity of using one single component product for the entire application process. Relatively pleasant smell while applying.

CONS: Poor sanding by hand after 1 day cure, inability to be machine sanded increases preparation time significantly. Heavy applications can result in surface skinning and subsequent 'wrinkling'. Recoating too early can fry the previous coat. Large number of coats are stipulated: up to 10 for tropical applications equating to a minimum of 10 days for the application of the full system. Lingering odour after curing which may be a problem in enclosed spaces.

Conclusion

From an application perspective, we hope that the information conveyed shows that some distinct advantages can be gained from using the Uroxsys system.

These are in summary:

- The time required from start to finish is significantly reduced due to the ability to apply up to 3 coats of the product daily and that 7 coats are generally required. Preparation times are also reduced as the products are able to be machine sanded a day following application - or often the same day in warmer conditions.
- The Uroxsys system can be used across a wide range of temperatures and humidity levels yielding consistent results. We even tested application of the topcoat in a heavy fog with temperatures of 8°C and attained perfect gloss and tack free time of 3 hours.
- Single component technology on which the products are based, facilitates ease of use and negates the possibility of 'mixing errors'. The products can be punished within reason through early recoating or overly heavy build, without displaying adverse outcomes such as surface wrinkling or frying.

Phone: +64 9 274 0808
Email: enquiries@uroxsys.co.nz
Website: www.uroxsys.co.nz

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