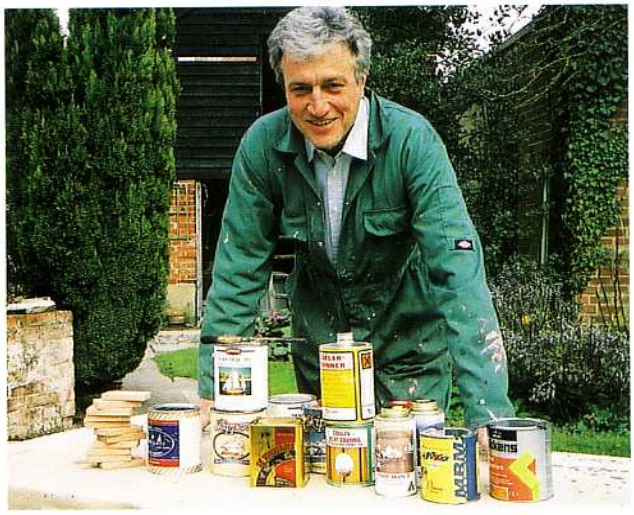
Varnish testing: Making

Classic Boat has begun a brand-new test on a wide-range of exterior wood finishes. Here *Richard Hare* separates the fact from the flannel at the outset. Next issue we'll bring you the findings after six months

With so many exterior finishing products on the market, *Classic Boat* has decided to test the most talked about products to find the merits of each and to see how long they might be expected to last. In this, *Classic Boat*'s definitive exterior wood finishing test, we'll be following manufacturers' recommendations to the letter: if they ask for 15 coats, we will apply 15; if two coats is all that's called for, two will do.

We'll be producing annual updates on all the participants' performances as well as giving you the true costs involved – in terms of time as well as money – and the on-going maintenance implications too. Above all we'll be peeling away all the sales jargon from the hard technical facts.



Richard Hare with a selection of the products tested and, behind him, the test-site that faces the prevailing south-westerly winds

The products we've selected are by no means all those on the market (table 1), but they cover a range of formulations and ways of addressing wood finishing problems.

We're not interested so much in the performance of individual proprietary products, but more that of generic types. For example, we're looking forward to seeing how modern varnishes, such as Prima, Epifanes and Skipper's Starwind compare to the traditional Le Tonkinoise. We also want to see how woodsealers like Deks Olja, Hydrosol and Endeavour compare as a type. Will the two coats of Hydrosol provide as much protection as 15 coats of Deks Olja?

From previous tests we know what to expect from the exterior woodstain Novatech. But what about the two-pack Poliglass/ Acriglass system? And Coelan – a flexible and microporous polyurethane finish – is going to be interesting to track too.

TABLE 1: BASIC PRODUCT INFORMATION

	Name	Technical description*	Coats (1)	Coverage (2)	Cost (3)
1	Prima varnish	Alkyd varnish, with tung oil	5	11	£9.50
2	Epifanes varnish	Alkyd varnish, with phenol and tung oil	5	14	£19.00
3	Skipper's Starwind UV	Alkyd varnish, with phenolic resin, tung oil	5	12.5	£15.50
4	Le Tonkinoise varnish	Varnish, entirely organic, with linseed oil and tung oil	5	20	£16.00
5	Burgess Hydrosol	Acrylic resins in water	3	12	£13.00
6	Deks Olje	No information available	D1: 15 D2: 6	19 15	£15.00 £17.50
7	Deks Olje D1 only	No information available	15	19	£15.00
8	Endeavour Marine Oil	Natural oils with tung, bees wax, citrus, turpentine, eucalyptus and plant extracts	2	12	£19.00
9	Sikkens Novatech exterior woodstain	Exterior woodstain, synthetic pigments, high solids	3	16	£17.00
10	Skipper's Poliglass and Acriglass	Poliglass: 2-pack PU. Acriglass: 2-pack polyacrylic	Poliglass: 3 Acriglass: 3	11	£13.00 £17.00
11	Coelan	Flexible polyurethane (single component)	6	5	£49.00
12	Varnol	No information available	Thinned 5 Normal 4	6.5	£13.95

Notes 1) Primers included, where applicable. 2) Claimed m²/litre on single-coat basis. Where a range is given, a mean is tabled. 3) Cost per litre, based on average; Source: Supplier *) An objective and technical description, non-specific adjectives ignored.

everything transparent

Above all we won't be establishing a 'pecking order'. It would be daft to compare something like conventional varnish with ultra-modern Coelan – look no further than the cost per application (table 2) to see why. But some products will suit one application, others another. We'll just tell you what they do and how they perform.

All products claim to use UV inhibitors; thereby giving them claimed suitability for exterior applications.

Different species

We're not just be looking at the performance on one type of timber either, we're testing them on two distinctly different hardwoods, iroko and khaya, a species of African mahogany, (although for the sake of simplicity we'll only show images of the iroko pieces until something notable happens to the khaya samples). Both species were used extensively for wooden boatbuilding in the 20th century, although it's in the 'above water line', clear-finishing context that we're assessing them.

Whereas finishes adhere well to khaya, iroko is problematic in terms of wet finish compatibility. As a result, all iroko samples were degreased with cellulose spirit before application – the exception, to comply with the supplier's request, being Coelan. The khaya samples were left uncleaned as we believe this to be normal practice.

Since the arrival of the products they have been stored indoors but in a frost-free cupboard. Furthermore, the wood samples have been kept under wraps to protect them from UV degradation before the commencement of the test. However, the application process is not claimed to have been under laboratory conditions, we've just followed sensible good practice. Products were applied either outdoors, or semi-outdoors in temperatures above 5 degrees. This we feel is fair, and realistic.

Price: don't be misled

Never be misled by the cost-per-litre figures alone. Always check the coverage rates as these often tell a different story (see table 2). High solids products – that tend to cost more per litre but require fewer coats – frequently compare favourably with apparently cheaper products calling for upwards of seven coats. And when you come to consider the labour cost, they can be worth looking into.

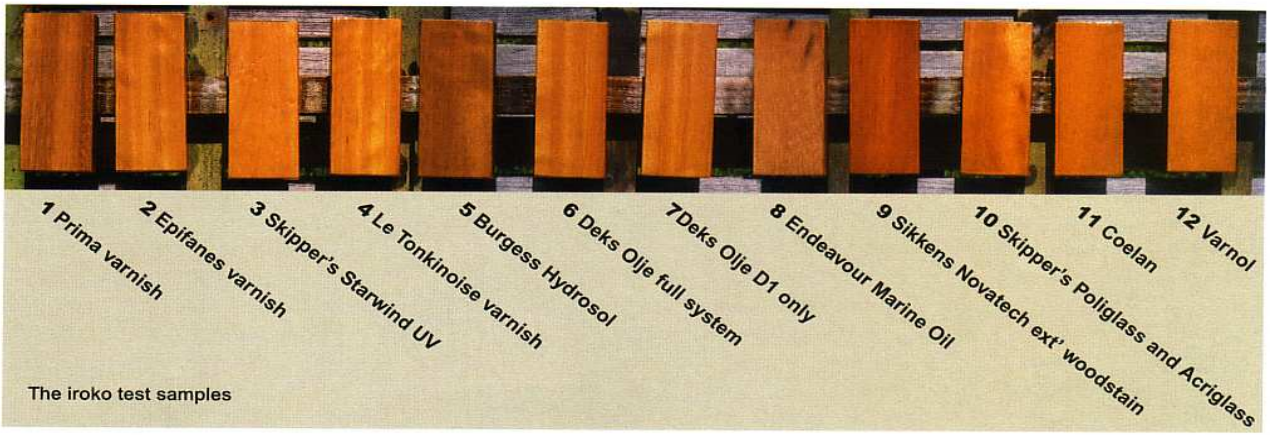
Table 2: Cost and duration of application

	Cost/m² of system tested	Duration of application (days)
Prima varnish	£4.32	5
Epifanes	£6.78	5
Skippers Starwind	£6.20	5
Le Tonkinoise	£4.00	5
Burgess Hydrosol	£3.25	1
Deks Olja D1 & D2	£13.20	10
Deks Olja D1 only	£11.84	2
Endeavour Oil	£3.20	5
Sikkens Novatech	£3.20	3
Poliglass/Acriglass	£8.17	1
Coelan	£58.80	1
Varnol	£16.58	2

May 2003 – the test pieces are exposed to the elements

Soaking in: a caution

Frequently, we hear claims for products that soak into



The iroko test samples

ALEX HARE

These two products claim to penetrate. A scalpel slice raises questions in so far as their ability to penetrate the species used

wood. Regular readers will know that we urge caution against this notion on the grounds that these claims are often backed-up by evidence of penetration by low viscosity (very runny) treatments on highly permeable species such as beech. Definitions and permeability ratings for the different species of wood were laid down decades ago as a way of rating different types of wood for the wood preservation industry, and the species we use in boatbuilding fall, almost exclusively, into the 'resistant to impregnation' class – larch, sitka spruce, douglas fir, etc – or the 'extremely resistant' class – khaya, iroko, oak, teak, meranti etc.

The species that we use in our applications (not those used for interior furniture, like beech) can absorb little or no fluid, even after long periods under pressure. So, for the time being at least, remain sceptical. Perhaps one or two of the products that we're looking at will remain fluid enough after application to penetrate our test pieces, but we're not holding our breath.

Don't misinterpret evaporation for soaking in, as these can appear the same. With products that are low solids, 12 to 15 per cent, over 85 per cent of what you buy evaporates, requiring many coats. Whereas products with 50 to 75 per cent solids will require fewer coats.

Timescales

Readers are likely to check the test's progress in the late winter, prior to choosing their own systems, so we'll assess and photograph the rig each November for publication around March or April. We've held up publication of this piece so we can carry the first up-date – six month's exposure – in April's CB.

Failures

Should any piece fail within the first six months it will be restarted in the test – using fresh wood samples and fresh products. This will confirm the original findings within a similar time scale or prove them to be erroneous, in which case the products can be re-entered in the test – albeit a few months behind the main batch.

1 Prima varnish
2 Epifanes varnish
3 Skipper's Starwind
4 Le Tonkinoise

Single-pot solvent-based varnishes

Five coats of each product were applied. The first coat of products 1, 2 and 3 was diluted 60/40 with white spirit (although the first coat of Tonkinoise was not). All four were given a light de-nibbing with 400-grade abrasive paper after the second coat had dried.

The consistency of three of these products was very similar, the exception being product 2 (Epifanes), which was noticeably thicker.

1, 2 and 3 are conventional 'modern' alkyd varnishes, but 4 (Tonkinoise) claims to a formulation from pre-1940, it also claims to be totally organic.

The five-coat application process for all of these samples spanned five days.

5 Burgess Hydrosol

Single pot water based

In terms of application this was a fantastic product. Anything water-based steals a lead here, if only for ease of cleaning up, but applying a complete system in one day is very impressive. Its colour is similar to the varnished test pieces, but it has no gloss.

The two-coat application spanned one day.

6 and 7 Deks Olje

One and two-product systems

Product 6 combines 15 coats of Deks Olje's D1 penetrating oil and six additional coats of the D2 finishing product, making it the most complex and time-consuming system tested by far. With Product 7 we dispensed with the finishing treatment to see what difference it made. An inspection of a separate sample, using a scalpel knife cut raised a question mark over the product's ability to penetrate the wood used for our test pieces (see photo), but we still reserve judgement.

D1 is certainly very low in solids. As a separate test we allowed a fully loaded brush to dry without being cleaned. Once dry, it could have been re-used, albeit very slightly crunchy.

We gave the D1 a very light de-nibbing before moving on to applying D2.

The 15-coat D1 application spanned two days, with the five coats of D2 taking five days more. Three days must elapse between the two systems. Total time span (D1 + D2) was 10 days. Barring the gap between the two systems, the 15 coats were applied wet-on-wet.

With product 6 it's worth noting that the khaya test sample has become noticeably darker than its high-gloss counterparts.

8 Endeavour Marine Oil:

Two-product, priming oil and a finishing oil

This is curious stuff. Formulated with 100 per cent natural products it smells like sherbert lemons. It involves odd things like abrading the end grain with 240-grit paper while still wet (to help seal the end grain, we're told), and also the whole surface is abraded after the finishing oil has been applied. We're also told to rag off the excess, which seems a strange thing to do, although the information leaflet explains that we're actually 'clothing it in'. We're sceptical, but let's see if we're proved wrong.

In terms of ease of application this product is excellent (two coats only, albeit with the first coat being left for three days) but by the time it all dried everything seems to have disappeared, less so on the khaya though. The wood looked virtually un-treated. The manufacturers claim that it's all gone into the wood. We'll have to see.

A scalpel-knife cut raises a question mark over the product's ability to penetrate the species under test (see photo opposite page) but time will tell on this score too.

A minimum of three days is needed for the priming oil to cure before the finishing oil is applied, making a total time span for application of five days.

9 Sikkens Novatech

Single-pot system.

This product is similar to varnish, but considerably darker and its finish has a sheen rather than a gloss. The manufacturers claim this product to be micro-porous, which previous tests bear out.

We provided both test pieces with three coats in total, giving them a light sanding after the first coat.

It is vital, perhaps more so than for any of the other products tested, that oily species are degreased before the application begins.

Technically we have high expectations of this product as it continues to perform well in our original four-year test (see CB 167). However, some boat owners might find the tint too dark for their taste and the lack of gloss a problem.

The application of the three coats spanned three days

10 Poliglass/Acriglass

Twin-pack varnish system

Since a catalysed cure is entirely chemical, rather than by drying, two-pack varnishes are of interest to those who want to apply a full system quickly. The pot life (once catalysed) is claimed to be six to eight hours and the re-coating time is claimed to be eight and ten hours. However, we were told by Skipper's UK that we could apply the system wet-on-wet at 20 minute intervals so long as the previous coat felt tacky. If we had stuck to the 8-10 hour re-coating schedule, the advantage of the system (speed of build up) would have been lost. As a compromise, we allowed six hours for the three coats of Poliglass to cure before we applied three coats of Acriglass.

Special care has to be taken with two-pack systems as they do cure rapidly. So long as you're prepared this is not an obstacle.

The manufacturer's instructions require that the initial coat of Poliglass be thinned using a special solvent, but we didn't. This was an oversight that we have decided to leave in place as it provides a greater build, though thinning would no doubt improve the product's self-levelling capability. We thinned the Acriglass by 10 per cent, as required by the instructions. The pot life, spanning each 60-minute application, was fine but the brush was stiffening towards the end. Any longer and it would be advisable to keep the brush stored in solvent between coats. The Poliglass was de-nibbed with 400-grit paper before commencing the Acriglass system.

Application of the six-coats spanned just one day.

11 Coelan

Two-product system, one coat primer with five top coats

The low coverage rate and high cost per litre will concern many potential users but, on the other hand, those who I have spoken with who have used this product, endorse its claimed technical qualities. It combines the appearance of varnish with a microporosity of exterior woodstain and it is flexible. So, in the end, this may well turn out to be a price worth paying.

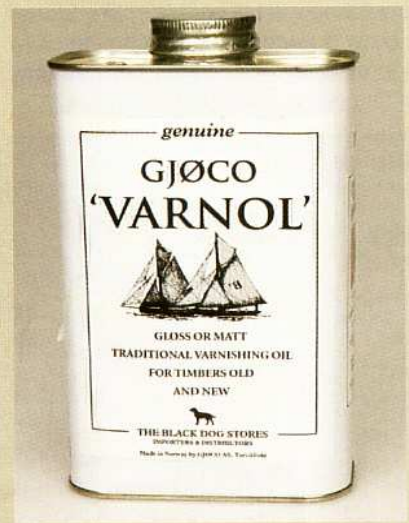
However, like the catalysed Skipper's product, Coelan has the potential to be built up to a full system in a single day. Factors like this can have a big impact on cost if you're paying someone to apply your wood finish product.

Care needs to be taken to ensure a good pot life as polyurethane products cure with moisture. The trick is to keep the humidity in the tin low after opening. Applying a blast from a warm air dryer inside the tin before closing is recommended. Although we had no such problems, the can carries the caution: "Reaction product. Please use up contents after can is opened."

A branded thinner/cleaner, or acetone, is needed.

We abraded the test pieces with 80-grit paper and applied the primer, which dried in two hours. Subsequent coats were also applied at intervals of about two hours.

Application of the six-coat system spanned two days, but might easily have been done in one.



12 Varnol

One-pot system

This system is built up initially wet-on-wet; the first coats being thinned three parts to one with turpentine. Then the remaining coats were applied neat.

The manufacturer's directions call for four to eight coats of the thinned mixture (we used five, which provided a solid film), followed by three to six coats un-thinned (we used four). Like Deks Olje, this is a comparatively complex application process, although it is not nearly as time-consuming to complete.

We tested Varnol on iroko only. Although the directions do not require that oily species be degreased, neither did they prohibit it. As a result, we cleansed the surface with cellulose spirit and then followed the recommendation to wipe the surface with turpentine.

We allowed 1 to1½ hours between each wet-on-wet coat. After four coats it seemed to be forming a film, so a fifth was applied. The following morning this was still tacky and we followed the instructions to rag off with turpentine. Four un-thinned top coats were subsequently applied at 3-hour intervals.

Application of the nine-coat system spanned two days, which is not bad at all.