



SP Systems
Composite
Engineering
Materials

Guide to Decking with Teak

Introduction

For most craft where a durable deck surface is required, teak provides the ideal properties. Teak can enhance the visual appearance of any deck and can provide good grip characteristics especially when wet. In the dry state teak is easy to work and takes adhesives well.

Teak is classified as a 'heavy' hard wood with a density of approx 930kg/m³. It shows exceptional grain strength and stiffness, along with excellent wear and durability characteristics. The high weight precludes its use on craft of less than 20-25ft. (except in thin veneer form), or on those which are particularly weight sensitive, such as racing craft.

Deck Thickness

Deck thickness for any type or size of boat is largely determined by structural requirements, the considerations being building material, frame spacing and target weight.

On wooden yachts, even those of 50ft. in length, decks are seldom more than 19mm thick and 12-13mm is considered sufficient for most boats up to 40ft. long.

Most alloy yacht decks are finished in teak and a 60ft. hull may have a 10mm-12mm deck laid over 3-4mm plating. GRP decks of many production boats commonly incorporate a lightweight core. Usually a 15-25mm balsa core is sandwiched between GRP skins, each 1-2mm thick. Teak is often used to finish the GRP deck surfaces particularly on the more up-market craft.

Teak is laid using one of two methods:

either: **1. The traditional method** - whereby the teak is sawn into strips up to 19mm thick and applied directly to a metal, grp or wood surface.

or: **2. The thin veneer method** - here the teak is only 5-6mm thick (before finishing) but the total deck thickness is made up by laying on to a plywood base (perhaps 8-10mm thick) using adhesive. This method saves weight since only a thin layer of teak is used. However, life expectancy is still over 15 years even with heavy use.

Adhesives

A two-part solvent-free epoxy adhesive is the most effective way to bond teak, whether in veneer form or thicker section.

For all wood-to-wood bonding involving teak or other woods, either SP 106, SP 320, or Spabond 120 systems are adequate. However, for bonding teak to grp, metal or ferrocement, Spabond 125 is preferable to all others as it shows superior adhesive performance and has more convenient handling properties. This is because Spabond 125 is a pre-thickened system - the resin and hardener

have been thickened with SP Colloidal Silica to give gap filling properties.

The same adhesive should be used for all bonding operations but if the thin veneer method is employed, an 8-10% addition (by volume) of SP Graphite powder will give the necessary colour for the adhesive that is seen between the planks. This addition will also give the glue some ultra-violet protection.

General Teak Preparation

Before any bonding commences, determine the layout pattern of the teak strips. They can be either parallel to the centreline or parallel to the sheerline. The former method is more commonly used since the grain of the teak will be orientated in the most effective way to resist deck compression loads; it is also the quickest procedure and probably the only choice if the traditional planking method, using thick sections, is used.

The teak strips should be 'quarter sawn', a technique which ensures that the edge grain is on the flat surfaces. Teak cut this way not only wears more slowly and more evenly than 'plain cut' teak but also has the least expansion and contraction. Strips 40-50mm wide are the normal width for ease of handling and the length should not exceed 3m.

When cutting teak for the thin veneer method the strips should be cut no more than 6mm thick so that after sanding the finished thickness is 3-5mm. If the thickness exceeds this figure the inevitable expansion and contraction which occurs, and which is normally constrained by the epoxy adhesive, may exceed the bond strength of the adhesive causing it to split at the wood/adhesive face.

PREPARATION OF SURFACES

i) Teak

After cutting the teak all bonding surfaces should be sanded with a coarse abrasive paper (40-60 grit) across the grain in order to obtain a good key, followed by cleaning with liberal quantities of SP Solvent A (Fast Epoxy Solvent).

ii) Other Wood Surfaces

All screw holes and other surface imperfections should be made good with epoxy filler (SP S'Fill or a suitable mix derived from SP 106, SP 320 Spacote, or SP 120 Spabond). Polyester-based fillers should be avoided as they may inhibit the cure of the epoxy adhesive.

After sanding with a coarse grit paper the surfaces are cleaned thoroughly with SP Solvent A (Fast Epoxy Solvent). Ideally the wood or plywood surface is coated with 2 coats of SP 106 or SP 320 system, using the fast hardener, to give adequate protection against moisture. If possible both sides should be coated.

After allowing at least 24 hours to cure the surfaces are wiped with SP Cleaning Fluid (if SP 106 has been used), and sanded using 60-80 grit paper prior to bonding the teak. Particular attention should be given to sealing all end-grain if plywood is used as a base.

iii) GRP

All surface coatings must be removed (paint, non-skid coatings, etc.). If the deck has a moulded-in tread it should be ground away with a coarse sander down to the laminate. A small angle grinder with a flexible sanding pad is ideal. Before bonding the teak all sanding dust should be removed and the surface cleaned with SP Solvent A (Fast Epoxy Solvent). Acetone is not recommended as it may contain undesirable contaminants.

If bonding to a new grp surface it is important to determine whether the laminate is fully cured, since epoxy will not bond satisfactorily to a less than fully cured polyester laminate. From the time the boat was first started the elapsed period for this is usually between 2 and 4 weeks at normal temperature. A small preliminary test is advised to ascertain when a good bond can be obtained.

iv) Aluminium

It is important for the best adhesion that all bare aluminium is pre-treated with an Aluminium Etch Primer before bonding. It is likely that some filling will be necessary which can be done using the chosen epoxy system with the addition of SP Glass Bubbles and SP Colloidal Silica. After sanding and solvent cleaning using SP Solvent A, bonding can commence.

If the deck shows any significant distortion it is simpler to adopt the thin veneer method using a plywood base which will serve to fair the surface.

v) Steel

Steel surfaces coated with an epoxy holding primer should be coarse sanded and cleaned thoroughly with SP Solvent A (Fast Epoxy Solvent).

Application Methods

i) Conventional Decking with Teak

This method of construction should not be confused with 'traditional' method of planking, where the planks are laid directly over deck beams and notched into the king plank down the centre and meet a covering board down the sides. Here no adhesive is used (the only fastening method being screws or nails) and the seams are caulked and payed with a marine stopper or hot marine glue.

The conventional method differs in two important respects. Firstly, a flexible caulking compound is used between the seams and an adhesive is used to fasten the strips down to a solid base (which may be plywood, grp or metal). Secondly, the teak strips can be thinner (but not as thin as the veneer method), perhaps 19mm thick, and they are screwed down to the base material (in the case of wood) or bolted (metal or grp). Since plywood is lighter than teak, some weight saving can be made over the traditional method and the deck is likely to be stronger and leak-free.

On production grp or metal hulls a flexible elastomer adhesive sealant such as 'Sikaflex' is sometimes used instead of epoxy adhesive to bond the teak directly to the grp substrate and the same product is used to lay the seams. Being apparently no less effective than using the more rigid adhesive technique it may be more convenient for manufacturers, since the preparation is far less intensive.

After all of the teak planks have been fastened into position the gaps between are payed with a flexible sealant, either a polyurethane elastomer type such as 'Sikaflex' or polysulphide rubber type such as 'Arbocol'. Teak plugs should be glued into all screw or bolt holes and left proud of the surface.

ii) The Thin Veneer Method

This method uses a suitably thick plywood base, pre-coated with epoxy system, upon which are fastened teak veneers no thicker than 6mm. An epoxy adhesive mix, pigmented black by addition of graphite powder, is used to both glue the strips down and fill the gaps between the strips.

The strips are usually held in position by stapling every 10-20cm and the gaps between the strips maintained at a constant width (usually 3-4mm) by the insertion of spacing pieces, usually of plastic.

The use of a temporary clamping bar will ensure the minimum number of staples piercing the teak veneer. The bar, usually of wood approximately 10mm thick and protected with polythene, is laid at right angles across a number of strips at a time. Staples are then driven through it into the plywood base at a spacing corresponding to the gaps between the teak strips, thus bedding all the strips into the adhesive at the same height. When the glue has sufficiently cured the bar is removed.

Sufficient adhesive should be applied to the teak and bare plywood to squeeze out and fill the gaps between the teak strips.

Finishing

When the sealant and the adhesive mix has cured all surfaces are sanded with 50 grit paper. On large open surfaces a floor sander is best but a hand operated belt or rotary sander is adequate. With the conventional method of teak decking, only the minimum of wood is removed but in doing so the excess flexible sealant is removed and the teak plugs are faired in.

With the teak veneer deck, sufficient teak should be removed by sanding to bring the thickness down to a finished thickness of no more than 5mm. Any remaining filling of the gaps can be completed at this stage with additional graphite epoxy mix and a final sanding with 80 grit paper used to finish the deck.

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Structural Polymer Systems Limited

St Cross Business Park . Newport . Isle of Wight . PO30 5WU . United Kingdom
Tel: +44 (0)1983 828000 . Fax: +44 (0)1983 828100
E mail: info@spsystems.com . Web site: <http://www.spsystems.com>

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SP Systems (Australia) Ltd

4b Wilmette Place . Mona Vale . Sydney . NSW 2103 . Australia
Tel: +61 2 9979 7248 . Fax: +61 2 9979 6378
E mail: simongrosser@compuserve.com