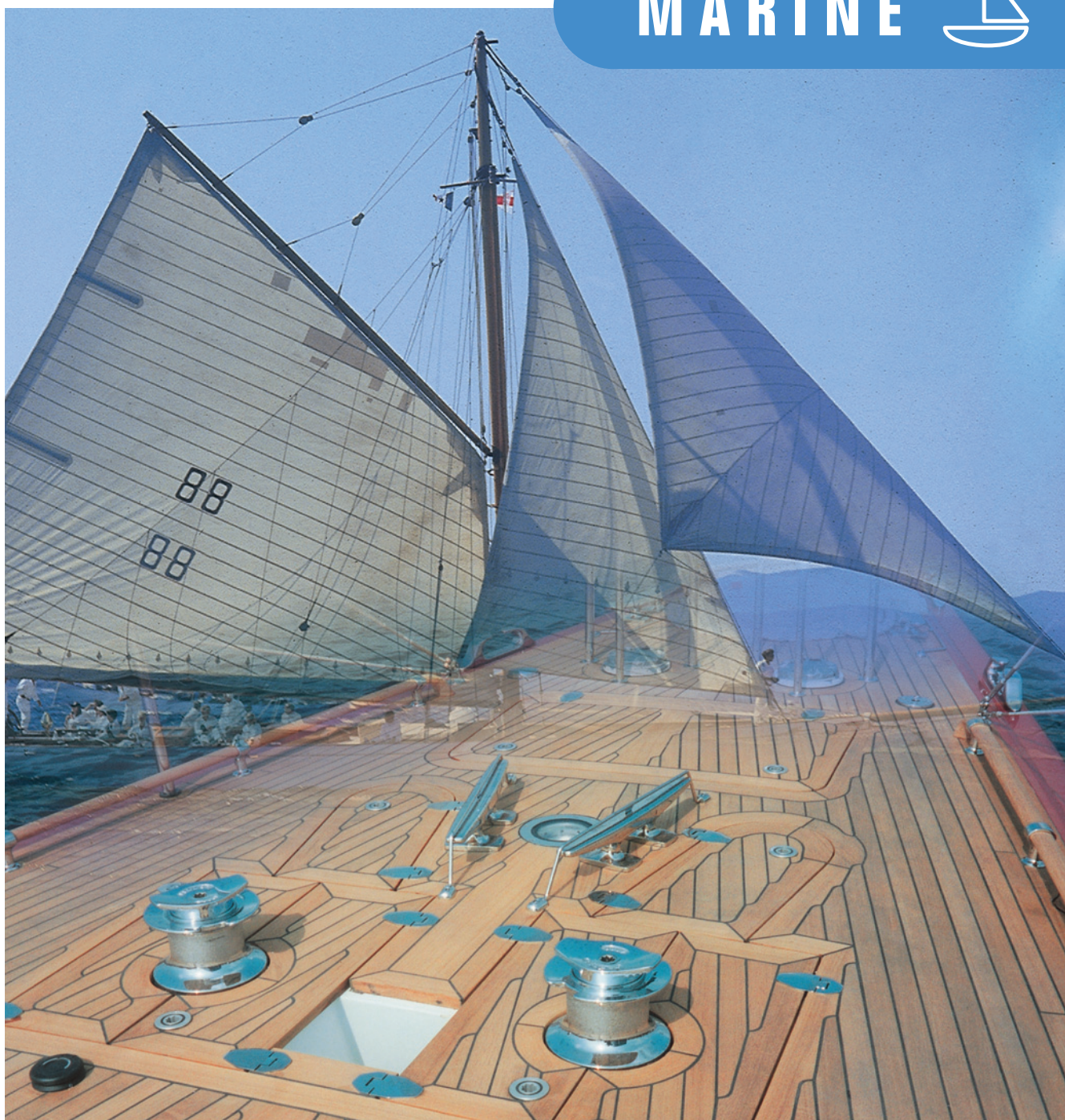


APPLICATION MANUAL FOR

Bonding and caulking of teak decks

MARINE 



*Only high quality teak planks
should be used for bonding teak decks.*



*A dark brown teak deck is not only beautiful,
it is also extremely durable.*



It has been tried and proven many times: the worse the conditions, the more important the quality of the marine adhesives and sealing products becomes. Everywhere ship builders and yacht builders agree.

Therefore they choose the sustainable features of the Simson Marine Special Range (MSR).

Another major reason is the technical support offered by Bostik's nautical specialists.

They know all about the specific problems involving building and owning yachts and ships.

They are familiar with all current safety requirements. When choosing for Simson MSR products, you also have access to this extensive Bostik know-how and experience.



Teak, resistant to all weather types

INTERESTING INFORMATION ON TEAK

Teak is the wood from the 4 species of teak trees, which are scattered mainly over South East Asia. However, teak nowadays is cultivated on plantations in many tropical regions. The full-grown teak trees reach an impressive height up to 40 metres. Also their elliptically shaped leaves with a length of 50 cm are very impressive. Teak is mainly appreciated for its extraordinary resistance to wind and weather, properties which are in demand in for instance ship- and yacht building. It can even resist attacks from termites. People also appreciate the golden-brown colour which appears from light to dark tones. Being used for more than 2000 years in the ship- and yacht building, teak decks maintain their exclusive splendour even today. Under dry as well as wet conditions, teak guarantees anti slip properties and protects the subdeck underneath against weather

influences and thus provide a lasting deck surface.

However, the main arguments for use in marine applications are found in its exclusivity and functionality.

With the construction of a teak deck the particular properties of teak must be considered. Like many other tropical woods, teak contains lots of oil depending on the origin and the age of the wood. Storage conditions like relative humidity and temperature and the age of the individual teak planks affects the content of oil and water in the wood.

This application manual will be of help in planning and constructing a high-quality teak deck. A detailed planning as well as a conscientious and skilled realisation regarding the instructions have to be put first in order to obtain an optimum result.

GENERAL CONDITIONS

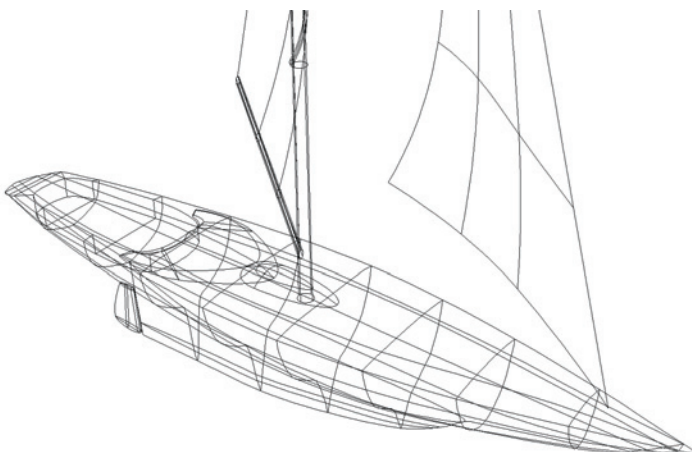
Working in the right conditions during bonding and sealing of a teak deck is a basic requirement for a good result. The air temperature must be between 5°C and 35°C. During the bonding and sealing of the teak planks the relative humidity should be between 40% and 75%. Working indoors or in conditioned areas

gives more certainty of the quality than working outdoors. During the construction and the curing process of adhesives and sealants the deck has to be protected against direct sun radiation and rain, otherwise uncontrollable effects on the teakwood or the adhesives and sealants can occur.

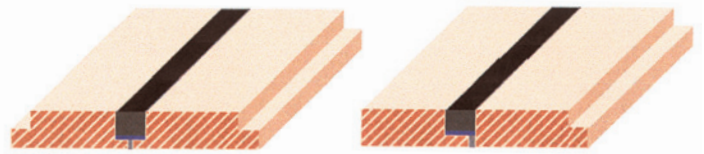
WOOD QUALITY

Only teak planks with standing (radial) year rings should be used. The humidity of the core of the wood must be between 9% and 12%. When the humidity level in the wood is too high during construction of the teak deck, drying of the wood later on will lead to shrinkage of the

wood and subsequent permanent deformation of the sealants and adhesives. This will negatively affect the durability of the teak deck and should therefore be avoided. Ideally, the humidity of the wood during the construction of the deck should be equivalent to the humidity of the wood in service.



*In the yacht building sector
Simson MSR products
are also applied for
general bonding and
sealing on yachts
and ships.*



TEAK PROFILE TYPES

Teak planks are supplied in different profile types e.g. T-profile and L-profile (see drawing above). The T-shaped profile with separation of the strokes in the middle is preferred above the L-shaped profile. Movements due to thermal and environmental conditions will be compensated optimally by Simson MSR deck caulking products. When using the L-shaped profile it is of great importance that the Bond Breaking Tape fits very well in the seams, in order to avoid three side adhesion of the sealant Simson MSR Deck Caulk/Deck Caulk Plus.

Adhesion to the bottom and the sides of the seam will negatively affect the performance of a deck caulk and should therefore be avoided by using a bond breaking tape.

Since a few years laminated teak planks are on the market as well, on which a multiple layered wear resistant coating of a few millimetres is applied. Very conscientious priming of the sides of the planks and careful pressing of the sealant into the joint is very important.

PREPARATION OF THE SUBSTRATES

New GRP-decks

- All bonding areas have to be cleaned with Simson Cleaner I or Simson Cleaner E.
- Apply Simson Primer M to the substrate with a clean, colour- and lintfree cloth or tissue paper. Drying time: minimum 5 minutes, maximum 6 hours.

Old GRP-decks

- Remove all old construction layers on the GRP-deck and clean with Simson Cleaner I or Simson Cleaner E.
- The total substrate has to be lightly sanded with a 80-grade or 100-grade sandpaper.
- The total substrate must be vacuumed thoroughly with a high-capacity vacuum cleaner, to remove dust particles that negatively affect adhesion.
- Apply Simson Primer M to the substrate with a clean, colour- and lintfree cloth or tissue paper. Drying time: minimum 5 minutes, maximum 6 hours.

Wooden decks

All wooden substrates that will be in contact with adhesive and sealant, should be primed with Simson Primer P. Apply the primer with a suitable roller or brush in a thin but continuously closed coat. Drying time: minimum 1 hour, maximum 24 hours. Old surfaces have to be sanded first with a 80-grade or 100-grade sandpaper and must be vacuumed thoroughly with a high-capacity vacuum cleaner.

Steel- and aluminium decks

There are many different surface coatings and surface levellers available for use on steel and aluminium decks. Because of this large variety of products, it is not possible to give a general recommendation for the application of our products. We recommend to perform tests on adhesion and durability with our products on the concerning surface material or to contact Bostik.

BONDING OF TEAK PLANKS

Apply Simson MSR Bedding Compound on the pre-treated deck surface and spread with a spatula (5x6 mm teeth). The projected usage is approximately 800-1200 ml/m², depending on the height differences of the deck. Simson MSR Bedding Compound should be applied over the full deck area, in order to protect the deck from moisture ingress. Do not apply more adhesive than can be handled within the skin forming time of the product. Apply Simson Primer P to the surfaces of the teak planks that have to be bonded (allow the primer to dry), place them in the adhesive and

apply light pressure to make sure that the teak surface is wetted completely with the Simson MSR Bedding Compound. Fixate the teak planks by using clamping tools, dead weights or screws for at least 24 hours. After 24 hours the fixing devices can be removed and the surfaces can be loaded lightly, full loading is possible after 48 hours. Residues of uncured adhesive can be removed with Simson SMP Remover. Removal of cured adhesive should be done by mechanical means.





CAULKING OF THE DECK

Durable seams can only be obtained when using the right seam dimensions. For reference in the following table, appropriate seam dimensions are given for different plank widths. The minimum seam dimensions ensure that the possible strains are within a reasonable range when the temperature and/or the humidity level in the wood changes. Contact Bostik in cases where the geometry differs from the values mentioned.

To obtain a good and durable adhesion of Simson MSR deck caulking products, proper pre-treatment of the teak seams is necessary.

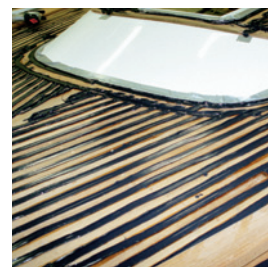
| JOINT GEOMETRY | | |
|-----------------------|-------------------------|-------------------------|
| Teak plank width (mm) | Minimum seam width (mm) | Minimum seam depth (mm) |
| 35 | 5 | 6 |
| 45 | 5 - 6 | 6 |
| 50 | 6 - 7 | 6 |
| 75 | 10 | 7 |
| 100 | 12 | 8 |
| 125 | 16 | 10 |

PRE-TREATMENT OF THE SEAM SIDES

- Remove old sealant and other remaining material completely.
- The seams must be clean, dry and dust free. Do not clean with compressed air, because this can contain oil. Instead, use an industrial vacuum cleaner.
- Use Simson Cleaner E to clean the teak.
- Apply Simson Primer P to the seam sides with a brush. A continuously, thin layer is obtained by striking the brush several times in the seam (see picture). Drying time: minimum 1 hour, maximum 24 hours.
- The temperature should be between 5°C and 35°C, maximum relative humidity is 75%.
- It has to be noted that the surfaces should only be primed once.
- A teak deck will shrink and expand due to the changing environmental conditions. Simson MSR deck caulking products will accommodate to these movements without loss of adhesion on the seam sides, but only if the primer is used and bond breaker tape is applied on the bottom of the seam (after drying of the primer), to prevent three-side adhesion in the seam.

CAULKING THE DECK WITH SIMSON MSR DECK CAULK/DECK CAULK PLUS

- During the caulking procedure the deck should be protected from direct sunlight and rain. The temperature should be between 5°C and 35°C, relative humidity between 40% and 75%.
- Cut the nozzle to the width of the seam.
- The seams must be filled from the bottom to the top, to prevent air voids to be included in the seam. The nozzle is placed on the seam bottom, the gun is held at an angle of 60° to 80°. Pull the nozzle at a constant speed through the seam and apply the deck caulk with a 10% to 20% surplus.
- Simson has two different deck caulks in its Marine Special Range. Simson MSR Deck Caulk is the well known high quality product. Simson MSR Deck Caulk Plus delivers enhanced weatherability and will give an even longer enduring teak deck.
- Immediately after applying the deck caulk, or at least before skin forming, the deck caulk must be pressed into the seam with a spatula. Any remainders should be removed, to simplify the sanding operation.
- After 7 days (depending on temperature and relative humidity), the deck caulk can be sanded.

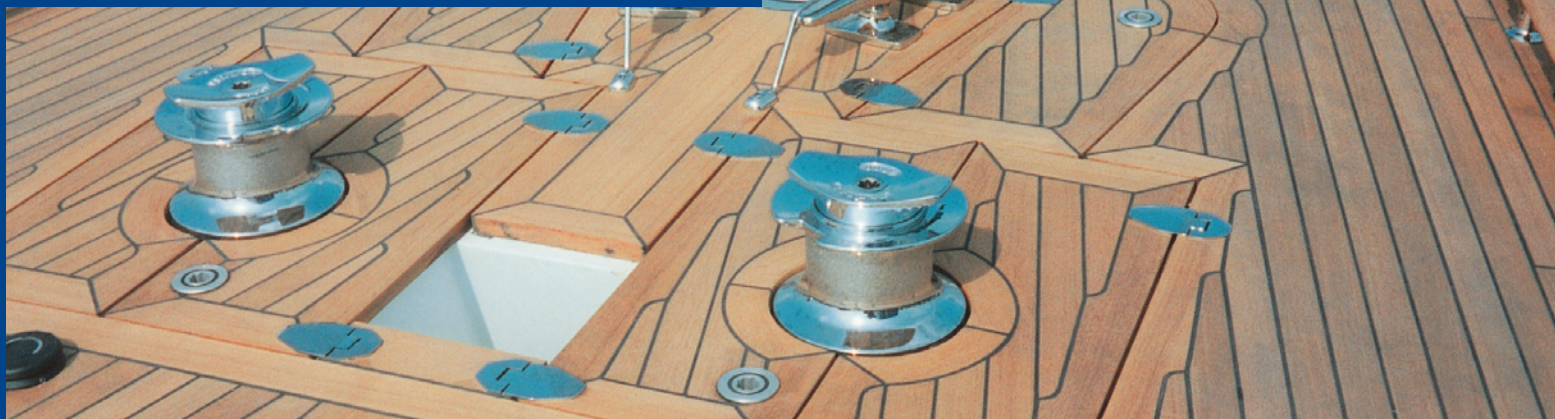




the instructions are followed properly.



A perfect durable teack deck will be obtained if...



All information and recommendations in this application manual are based on thorough investigations and our actual experience and are without engagement. Although the documentation is set up with the most carefulness, we can not take any responsibility for mistakes, inaccuracies or printing errors.

Because the application of the described products (regarding design as well as production) is completely beyond the control of Bostik, no responsibility for carried out works can be accepted.

If any additional technical information should be needed, contact Bostik for professional advice.



SANDING OF THE TEAK DECK

- Prior to sanding, remove the excess deck caulk with a chisel to avoid a high load on the seam sides during the sanding operation.
- Sand the deck in at least two steps, first with a 80 grain sandpaper in parallel direction of the seams. The second step should be done with at least 120 grain sand paper.

FINAL TREATMENT OF THE TEAK DECK

Usually, no treatment is necessary or recommended after the sanding operation. For optical reasons, after-treatment is being applied more and more. No recommendation can be given on this matter, because of the large number of available lacquer and varnish systems. We advise to make

a good investigation before applying any after-treatment. Never apply such a treatment before the deck caulk has cured completely. In general, lacquer and varnish systems affect the elasticity of the seams (consult Bostik).

CLEANING TEAK DECKS DURING SERVICE LIFE

Because of the flourishing marketing of teak cleaners, teak brighteners, teak bleachers, teak oil on the internet and in marinas many different opinions and advises are heard. Bostik recommends the following to clean and maintain your teak deck and the Simson MSR deck caulking product:

- To keep teak decks healthy, give them a weekly washdown and flush them regularly with clean salt water. Salt water is a natural bleaching agent in conjunction with sun. Salt water also leaves a fine salt deposit, which will absorb moisture out of air and help

the wood from drying out. It also reduces mildew, mould and algae growth. Fresh water is better than none, and wet or damp teak resists checking and cracking because it does not shrink or swell as much.

- 1% liquid dish soap in warm salt water/fresh water and a plastic pot scrubber are all you need to clean deck stains. Scrub in circular or across the grain motion. Try to minimise scrubbing as it can take the soft grain of teak away. Allow teak to fade to its natural gray-silver colour and let its natural oil take care of the algae growth.

NEVER DO OR APPLY THE FOLLOWING

- Never use stiff bristle brushes for scrubbing.
- Never pressure wash the deck: it will remove the soft grain and raise the grain.
- Never use household detergents like ammonia, bleach, Tri-Sodium-Phosphate (TSP) and vinegar to clean, remove stains nor bleach your deck. All these products may cause irreversible damage to the seam compound / teak deck caulk, the teak wood and other materials on the boat.
- Never use 2-part cleaners and brighteners. The majority of these heavy-duty two-part systems are alkaline-acid combining a very strong alkaline solution (chlorine bleach, potassium and sodium hydroxides) and a very strong acid (oxalic, sulfuric or phosphoric acid), in liquid or crystal form to be diluted. These 2-part chemicals corrode, soften and damage the seam compound/teak deck caulk. These cleaners will also eat away the light coloured soft grain of the teak, leaving rough grooves of the darker coloured grain on the deck. Then premature sanding is the only option to repair the deck. These chemicals also remove the protective natural teak oil, which tends to

concentrate at the wood's surface, thereby making the teak much more susceptible to damages. These cleaners also harm the surrounding and attached hardware like the fiberglass polyester (mar in the gel coat), anodised aluminium, chrome fittings, paint and varnishes especially if any residue is left on the deck. These chemicals are also hazardous for you and the environment.

- One-step cleaners on the market are much gentler, but most of them are still corrosive chemicals (some of them contain oxalic acid), which will damage your teak wood and deck seams. If you want to use one of these products for oil spots, food spots contact Bostik for proper recommendation.
- Never use oil on your deck, because the teak itself already contains a natural (teak) oil which provides durability to the wood. Synthetic and organic oils (tung oil, wood oil) are sold as teak oils to oil your teak. If your deck is properly maintained as described above, your deck does not need to be oiled. These oils tend to permeate and stain porous gel coat as well.

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