

Paint Manual

2022



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Why do I need to paint my boat?

We need to paint for a whole number of reasons. As well as decoration and appearance, painting helps protect your boat, makes it easier to clean and safer to sail. By creating a film between a substrate (surface) and the environment, paint protects:

Steel & aluminium against **Corrosion**

GRP against **Osmosis**

Wood against **Rot and weathering**

Underwater areas against **Fouling**

Decks against **Abrasion**

Once the surface is protected, paint can be used to enhance the appearance of your boat.

The Hempel Group of companies was established in 1915 by Mr J C Hempel with the motto of "Quality and Service", which remains the hallmark of the Hempel Group today.



Preparing to paint

- Planning the job
- Temperature and humidity
- Personal protection
- Surface preparation
- Application methods and tools
- Choosing the right paint system

Planning the job

General considerations:

- Consider the total process, including surface preparation and paint application.
- Decide on the type of paints you're going to use.
- Consider drying, curing and recoating intervals.
- Consider anticipated temperatures and weather conditions.

Indoor and outdoor painting advice:

- If you're painting **indoors**, make sure there's plenty of ventilation so the paint solvents evaporate and the paint cures properly.
- If you're painting **outside**, pick a calm weather day. This minimises the risk of dust pollution on the paint surface, and allows solvent based paints to flow out naturally, which will improve the final finish.



Temperature and humidity

Our paints are very tolerant to varying conditions. The drying/curing and re-coating times we give in this guide are (unless otherwise stated) based on:

- temperatures of 10°C and 20°C
- relative humidity (RH) of 60 – 65%
- a well ventilated working area.

Temperature

You may need to adjust these drying/curing times depending on the conditions. As a guide:

- double drying/curing times for a drop of 10°C
- halve drying/curing times for a rise of 10°C
- adjust accordingly between these temperatures.

Remember that paint properties change with temperature variation.

At lower temperatures, paint thickens so may need thinning. Always note correct/maximum thinner ratios, and take care not to add more than is recommended.

Avoid painting above recommended maximum temperatures, as the faster drying/curing rates reduce the paint's flowing properties, and this can result in visible application marks. This can also happen if you paint in direct sunlight, where the surface has a much higher temperature than the surrounding (ambient) temperature.

Check minimum application temperature of the paint you are using as the paint will not cure below it, resulting in poor film formation, poor adhesion between coats and unsatisfactory gloss finishes.

Relative humidity

Ideally, relative humidity should not be above 65%. (You can measure humidity with a hygrometer.)

A good test is to moisten the surface to be painted. If it dries within 10 – 15 minutes it should be okay to paint.

Key Advice

Do not paint outdoors too early or too late in the day, when there's a risk of condensation or dew.

Personal protection

Ensure you wear suitable protective clothing, including gloves and glasses. Read labels carefully and follow all

application and health & safety advice. Open cans with care. Don't eat or drink in the vicinity of stored or applied paint.

	What are the hazards	The equipment to use
 <p>Eyes</p>	Chemical splash, dust, paint particles and droplets, projectiles, vapour.	Safety spectacles, goggles, face shields, visors.
 <p>Breathing</p>	Breathing dust, vapour, fumes, aerosols, oxygen-deficient atmospheres, paint particles.	Short term filtering mask against dust while sanding. Half facemask for sanding and painting, can be disposable or with replaceable filter cartridges. Full air feed facemask for spray painting.
 <p>Hands</p>	Abrasion, cuts and punctures, impact, chemicals, solvents, liquid paints, skin infection.	Leather gloves, latex gloves, armllets.
 <p>Hands</p>	Dust, dirt, oil and grease, paint particles.	Barrier cream: short term protection. Cleaning cream: designed to remove contaminates and cause least skin damage. Maintenance cream: to help restore the skin's natural protective layers.

	What are the hazards	The equipment to use
 <p>Hearing</p>	<p>Damage to inner ear from loud or constant noise levels.</p>	<p>Ear defenders, ear muffs, ear plugs.</p>
 <p>Body</p>	<p>Chemical or paint splash, spray from spray guns, impact or penetration, dust, excessive wear or entanglement of own clothing.</p>	<p>Overalls, coveralls.</p>
 <p>Feet</p>	<p>Wet, slipping, cuts and punctures, falling objects, chemical and paint splash, abrasion.</p>	<p>Steel toe protection and anti-slip soles. May be a prerequisite on some sites.</p>
 <p>Head</p>	<p>Impact from falling objects, head bumping, hair entanglement.</p>	<p>A range of helmets and bump caps.</p>

Removing old paint and antifouling

Removing old paints and antifouling can be easier with Hempel's Paint Stripper, which is a highly effective solvent based paint remover, and can be used on most painted or varnished surfaces.

- Test a small section to see how long the whole job is likely to take.
- Apply **Hempel's Paint Stripper** liberally by brush or roller to a dry surface.
- Take caution on plastics (it may harm some thermoplasts).
- Don't do too big an area at once.
- Leave for 30 – 45 minutes until the paint coat dissolves or lifts. (Antifouling, alkyd paints and varnishes react quickest, silicone and epoxy take longer.)
- We recommend putting aluminium foil over the treated area to help stop active solvents evaporating.
- Scrape off old paint; clean with hot water and **Hempel's Pre-Clean**.
- Old or thick coatings may need a repeat treatment.

Alternatives to Hempel's Paint Stripper

Abrading. Use coarse paper for coatings, being careful not to damage the substrate. Wet abrade antifouling to avoid inhaling toxic dust particles.

Hot air guns can remove paints and varnishes, but not antifouling as toxic fumes are released.

Don't damage/burn the substrate!

Paint scrapers work for varnishes and paints, but not antifouling.



Wet abrade



Hot air gun / paint scraper



Paint scraper

Key Advice

If you're using a hot air gun, use at low temperature and take great care.

Cleaning and degreasing

Good surface preparation is the key to achieving a great finish. Part of this preparation is making sure the surface is free from dirt and contamination.

Pre-Cleaning

Hempel's Pre-Clean is a high strength cleaner and degreaser for pre-cleaning gelcoat and painted surfaces in order to remove fuel, oil, grease, waxes and silicones. You should use this before painting, and for deep cleaning.

- Dilute 1 part **Hempel's Pre-Clean** to 20 parts water for general cleaning, 1:10 for more demanding cleaning jobs.
- On alkaline sensitive substrates such as aluminium dilute 1 part product to 20 parts water.
- Don't use on bare or untreated wood, as it may absorb the water.

You can also use **Hempel's Pre-Clean** to clean brushes covered in part cured paint.

Degreasing

Use **Hempel's Degreaser** to remove surface contaminants, especially wax or silicone on new gelcoat. Do not use on finished painted surfaces, as the solvents in **Hempel's Degreaser** can damage the coating.

- Work in a well ventilated area using a clean absorbent, lint free cloth soaked in **Hempel's Degreaser**.
- Using the soaked cloth in a longitudinal motion, clean 1 m² at a time, changing the cloth surface before the next section – wear solvent resistant gloves and eye protection while doing this.
- Wipe excess **Hempel's Degreaser** from the surface using a new dry cloth.

Key Advice

Check the surface for grease by sprinkling it with water. If pearly drops form, the surface is still greasy and needs a further treatment with **Hempel's Degreaser**. If the water flows out evenly, no grease is left on the surface.

Abrading

After cleaning the surface you're going to paint, it must be abraded to the correct profile. This is usually called "keying" the surface. After keying, it's essential to remove any dust before painting.

Dry abrading

Dry abrading is recommended for:

- removing old paint (not antifouling)
- sanding filler
- initial preparation of wood, aluminium, steel, lead and GRP.

Dry sanding creates a lot of dust, so you should always wear a good quality particle mask and eye protection. Dry abrasive paper is available in various

grades and comes in sheets, disks or on a roll. To ensure even hand abrading, wrap the paper around a cork sanding block.

Do **not** dry abrade antifouling. They must always be wet abraded to avoid inhaling toxic dust particles.



Size paper to fit block



Wrap paper around block



Dry abrade

Wet Abrading

Due to the lubricating action of the water, there is minimum paper clogging and a clean surface can be quickly achieved.

Wet abrasive paper is available in sheets in various grades, and should be used around a cork sanding block to ensure an evenly abraded surface. Antifoulings must always be wet abraded to avoid inhaling toxic dust particles.



Wet abrasive paper



Wet abrade



Remove soiled water

Choosing the right grade paper

Surface to abrade	Dry paper grade	Wet paper grade
Gelcoat before priming for antifouling	150	180
Gelcoat before priming for topcoat	150 - 180	240
Bare wood	80 - 240	n/a
Bare metal	60 - 120	n/a
Epoxy filler (2 component)	60 - 100	n/a
Painted surface	150 - 180	180 - 240
Lacquered surface	220	240
Varnished surface	80 - 120	120
Old/deteriorated gelcoat	n/a	400 - 1200
Hard antifouling for a racing finish	280 - 400	600 - 800

Surface preparation

Mechanical Abrading

The most popular types are:

Belt Sander

For rapidly removing material on flat surfaces.

Random Orbital/Dual Action Sanders

Rapidly removes material from most surfaces. With the correct paper grades, you can use these sanders all the way from rough sanding to final sanding before topcoat application.

Orbital Sander

General purpose sander for most preparations. Uses standard abrasive paper, making it an economic choice.

Abrasive Blasting

Blasting leaves the ideal surface for new coatings. Grit, slurry and sand are good for this. For aluminium and stainless steel, use a non-metallic abrasive, such as garnet.

This is usually carried out by a professional with the right equipment, but you can hire a high pressure hose with attachments.



Key Advice

Only use drill machine attachments and angle grinders for rough abrading as they can cut in and leave marks.

Only lightly sand plywood and veneered surfaces to avoid sanding through the thin layer of veneer.

Application methods and tools

There are four main tools: brush, roller, paint pad and spray equipment. Alongside the description of each product in this manual, we recommend the best application tool.



Brush Advantages

Versatile, low cost and often the most suitable way to paint complex objects. For rough surfaces, a brush works paint in better than any other method.

Good practice

- Use a good quality brush that's as large as possible for the job.
- Don't use a new brush for the final coat, as they tend to shed bristles.
- For best results, work 'crisscross' on a manageable area. Brush from side to side, then up and down.
- Continue until the paint is evenly distributed over the area, with your final strokes being very light ("laying-off") and vertical. (See Paint Pad on the next page for an alternative way of laying off).
- Paint with the brush at an angle of 45° to minimise brush marks.
- During painting, the paint will start to cure on the brush. Clean the brush approximately every 30 minutes for consistency.



Roller Advantages

A low cost, versatile tool with similar advantages to brush application. Rollers are particularly good on broad, even surfaces, where they're faster than brushing and the correct roller head can give excellent results.

Good practice

- If speed is more important than finish, use a short pile mohair roller.
- Small diameter felt and closed cell foam rollers are recommended for a better quality finish.
- In all cases use the crisscross technique to distribute the paint evenly.
- After applying by roller, laying off the paint with a brush or pad will give an improved finish.
- Before using a new felt or mohair roller, wrap masking tape around the roller and then pull it off. This will remove any loose fibres.



Paint pad

Advantages

Although you can paint from scratch with a pad, they're most effective for laying off paint already applied by brush or roller. This eliminates almost all application marks, and gives an excellent finish.

Good practice

- Use the pad immediately after you've applied the paint.
- Draw the pad in one direction only, using vertical strokes to avoid a paint build up which may sag.



Spatula

Advantages

Different sizes and shapes of spatula are available for various fillers and tasks.

Good practice

- If using a two component filler, mix small amounts at a time.
- Wipe the spatula clean during and after use.



Spray equipment

Advantages

It's generally accepted that a spray gun gives the best results.

Good practice

- Where possible, work inside to ensure a steady temperature with low humidity.
- Always wear a full air fed mask when spraying two pack products.

An important part of choosing the right tool is knowing how thick your paint needs to be, thus how much area you'll be able to cover. Paint coat film thickness is measured in micron. (1 micron = 1/1000 mm).

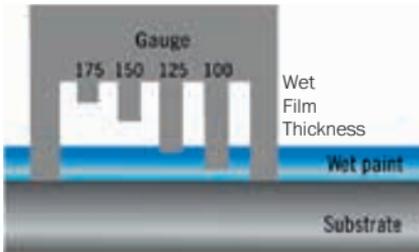
How to measure film thickness

You can use a wet film thickness (wft) gauge if coating depth is critical, but normally it's sufficient to calculate the area to be covered and apply the **recommended** amount of paint. This should ensure the correct thickness.

Our specifications supply this information, listing the litres required per square metre.

Factors to bear in mind

- Thickness alters as paint dries, because solvents evaporate. (An exception is **Hempel's High Protect II** – it's solvent-free, so the thickness is the same wet and dry.)
- An irregular surface means a larger area, and therefore more paint.
- Some surfaces absorb more paint than others.
- When it's cold, paint is thicker and more difficult to distribute evenly.



How much will I get?

Tool/method	Wet film thickness (micron)
Plastic foam roller	20 – 40
Felt roller	30 – 60
Mohair roller	40 – 80
Brush	20 – 80
Air spray	25 – 150

Key Advice

Don't try to apply more than the specified amount of product for one coat, as this can cause problems with curing and solvent entrapment which may result in coating failure.



Choosing the right paint system

It's important to choose the best system for your requirements. A little time spent now could save costly mistakes. For most applications we offer two types of coating system: Single Component (Conventional) and Two Component (High Performance).

	One Component	Two Component
Protection	Good/Conventional	Good/High
Usage	Easy to use. Use on substrates where movement is possible such as clinker or carvel hulls.	Some experience needed. Consideration to temperature and overcoating times required. Use where movement of substrate is minimal.
Compatibility and overcoating	One component primer can only be overcoated with one component system/topcoat.	A two component primer can be overcoated either by one component or two component system/ topcoat.
Durability	Good but less durable than two componet systems.	Generally twice as durable as single componet systems.

Key Advice

If you buy more than one can of topcoat or antifouling, it is recommended that the cans have the same batch number.

General painting advice
for all substrates

General painting advice

This section contains general painting advice, as well as advice for painting on specific surfaces.

Before painting, ensure...

- the substrate has been cleaned and degreased.
- all cracks and blemishes, above and below the waterline, have been fine filled with **Hempel's Epoxy Filler**.
- the surface has been abraded to provide a suitable key, then washed with fresh water and allowed to dry.
- any dust on the surface has been removed with a tack rag.

General tips when painting

- Thoroughly prepare the surface – this is key to a successful finish.
- To avoid dust rising, dampen the ground before painting.
- Always stir paint thoroughly with a flat blade to an even consistency.
- Stir paint periodically while applying.
- Pour enough paint for the job into a suitable container. With single pack products, resealing the lid maintains the paint for next time.
- It's often easier if two people carry out brush and roller painting, with the first person applying the paint with a roller and the second person laying-off with a brush.
- Remove any masking tape before the paint completely cures. This will help avoid exaggerated edges.

General good practice when painting

- Open cans with care.
- Immediately clean up spills.
- Don't eat or drink in the vicinity of stored or applied paint.
- Wear appropriate personal protection equipment.
- Ensure adequate ventilation for the product used. If necessary use a respirator.
- Always read the label thoroughly. If you're not sure what's needed, contact your local Hempel office.
- Any surface to be painted must always be thoroughly cleaned and primed.

Key Advice

Check previous coating system for compatibility to intended new coating system.



Fill along boottop



Fairing any defects

Filling

To fill, build up a surface to the required profile or spot fill (minor defects), apply chosen filler onto a roughened, clean, primed surface. When spot filling, use a filling knife or spatula.

For large profile filling, use a wide filling knife or trowel.

If there are small cracks in gelcoat, you may need to widen the crack to create enough space to apply the filler.

Ensure you use the correct amount of filler. If you use too much, you'll need more sanding to produce a fair surface.

When filling deep holes or large areas, apply a number of layers of filler to eliminate the chance of overfilling or sagging on vertical surfaces.

Fairing

Once the filled area has cured, sand the filled and surrounding area to the required fair profile.

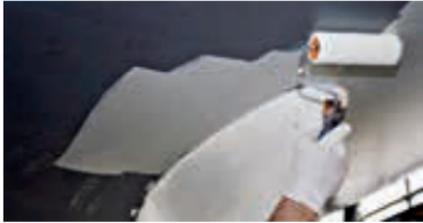
Spot Fairing

For best results, sand by hand using abrasive paper on a cork block to the required fair profile.

Fairing large areas

Large areas can be faired using a range of tools. Initial fairing can be carried out using a sander with rough grade discs, followed by a random orbital or orbital sander with lighter grade discs for a fairer surface. Skill is needed when using these tools.

It's often more successful to use a manual fairing board. Although it's slower, it can easily produce a smooth, fair surface.



Apply antifouling over primer



Wet scrape to remove old antifouling

Antifouling

Most antifouling products are compatible and can easily be overcoated, however:

- The surface must be in good condition, free from contaminants.
- Hard antifouling products leave an exhausted layer of resin at the end of the season. Wet abrade surface before applying new anti-fouling.
- You can overcoat Teflon antifouling, if it's in good condition and has been washed. Do not abrade before applying new antifouling.
- If overcoating ablative/soft antifouling (or if condition of previous antifouling is poor) it is recommended to apply a coat of **Hempel's Underwater Primer** before applying the antifouling.
- Keep the antifouling product indoors before painting as it's easier to apply if it has been stored at "room" temperature.
- Always give antifouling a good stir with a bladed instrument before applying, as they contain heavy pigments which can settle.

- Apply an extra coat along the waterline and the leading edges, where water flows strongest.
- It's not advisable to thin antifouling. However, in particularly cold conditions, thinning it by up to 10% will help with application.
- Never dry sand old antifouling, as the dust is toxic.

Key Advice

If you're changing your antifouling, check the instructions for applying the new product onto your existing product. If in doubt, apply **Hempel's Underwater Primer**.

Painting all substrates

- Previously coated surfaces
- Glassfibre
- Metal
- Painting and varnishing wood
- Decks, bilges and lockers
- Keels
- Propellers, outdrivers and sterngear

Previously coated surfaces

Maintaining coatings helps the protection, appearance and value of your boat. Both two component and single component finishes need repainting. How often varies from boat to boat, depending on the existing paint system, usage, general wear and tear, mooring conditions and UV degradation.

Above the waterline

If the existing coating is intact

- Wash with **Hempel's Pre-Clean** and freshwater to remove surface contamination.
- Allow to dry fully.
- Abrade with 180 – 280 grade paper.
- Freshwater rinse and allow to dry.
- Apply undercoat where necessary, followed by 1 – 2 coats of topcoat, using the relevant painting specifications.



Fill using blade



Spot fill using spatula

Where the coatings are damaged

You may need to fill and prime first.

- Degrease the surface thoroughly with **Hempel's Pre-Clean** or **Hempel's Degreaser** (depending on substrate).
- Abrade with 100 – 240 grade paper.
- Freshwater wash and allow to dry.
- Spot prime and fill where needed, using appropriate materials.
- Fair areas that have been filled.
- Apply primer, undercoat and topcoat using relevant painting specification.



Spot prime

Please remember 2 component products should not be applied to any single pack system.

Below the waterline

We recommend new antifouling once a year for good protection

If the existing coating is intact

Overcoat using the same antifouling:

- Wash the surface with **Hempel's Pre-Clean** and freshwater, remove any loose paint and allow to dry.
- Apply two coats of antifouling.

Where the coatings are damaged

You may need to fill and prime first.

- Wet abrade (100 – 240 grade paper).
- Wash with **Hempel's Pre-Clean** and freshwater, then allow to dry.
- Spot prime and fill where needed, using appropriate materials.
- Fair filled areas, apply more coats of primer to encapsulate the filler.
- Allow to dry fully before applying primer and antifouling from relevant painting specification.



Clean abraded surface



Apply **Hempel's Underwater Primer** onto prepared surface



Apply antifouling over primer or tiecoat

Glassfibre

Glassfibre, or GRP (glass reinforced plastic), is a polyester resin strengthened by glass fibres, making a high strength, low weight material which requires little maintenance.

Painting glassfibre

The outer shell of the glassfibre has a layer of gelcoat. New gelcoat contains large residues of wax and mould-release agents that must be removed before painting. Use **Hempel's Pre-Clean** or **Hempel's Degreaser** to remove mould release agents used in the construction of the vessel. Abrade the surface (150 – 180 grade paper). Remove dust.



Repainting glassfibre

Over time gelcoat becomes old and weathered. This will cause the cosmetic appearance to deteriorate, and eventually it will need painting to protect the surface. Generally the deck and coach roof will deteriorate sooner than the topsides.

The extent of the degradation depends on many factors:

- colour and pigment of the gelcoat,
- if the gelcoat has been maintained,
- condition of where the vessel is kept e.g. strong UV light,
- mechanical damage,
- weathering, etc.

Key Advice

Old gelcoat will probably still bear residues of wax and mould-release agents and it will be necessary to carry out a degreasing procedure.

Glassfibre – single component system/conventional

Above the waterline

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat (µm)		Thinner
		10°C	20°C		wft	dft	
Primer Undercoat*	2	8 hrs – 6 days	4 hrs – 3 days	12	75	40	811 (No 1)
Brilliant Gloss onto Primer Undercoat	1	8 hrs – 6 days	4 hrs – 3 days	11.2	90	50	811 (No 1)
Brilliant Gloss	1-2	20 hrs – 6 days	10 hrs – 3 days	11.2	90	50	811 (No 1) 808 (No 3) Spray

Below the waterline

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat (µm)		Thinner
		10°C	20°C		wft	dft	
Underwater Primer	2	6 hrs – indefinite	3 hrs – indefinite	7.8	125	50	811 (No 1)
Antifouling onto Underwater Primer	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)
Antifouling	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)

*Always abrade before using Primers to ensure good adhesion.

Key Advice

Recoating note: If the surface has been contaminated by oils and pollutants, thoroughly remove with a suitable detergent, rinse with fresh water and allow to dry. Lightly abrade and remove all dust prior to repainting.

Glassfibre – two component system/high performance

Below the waterline

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat (µm)		Thinner
		10°C	20°C		wft	dft	
		Light Primer max. thinned 20%	1		8 hrs – 60 days	4 hrs – 30 days	
Light Primer onto Light Primer	3 – 5**	8 hrs – 60 days	4 hrs – 30 days	8.2	120	60	845 (No 5)
Underwater Primer onto Light Primer***	1	4 hrs – 8 hrs	2 hrs – 4 hrs	7.8	125	50	811 (No 1)
Antifouling onto Underwater Primer	1	8 hrs – indefinite	8 hrs – indefinite	see product label	75	40	808 (No 3)
Antifouling	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)

** 3-5 coats to obtain full film thickness. Add thinner to assist application if necessary.

*** For best results overcoat **Hempel's Light Primer** with **Hempel's Underwater Primer** when the surface is almost dry but still has a slight tacky feel.

Application of Antifouling

Recommended system:

Hempel's Light Primer / Hempel's Underwater Primer/ Hempel's Antifouling:

Good top adhesion/protection, easier maintenance and cost saving in the long term, particularly suitable for full coat application and new boats.

Advantage: For seasonal maintenance, when Antifouling is exhausted, a new coat can be applied directly on top of Hempel's Underwater Primer.

Alternative system:

Hempel's Light Primer / Hempel's Antifouling:

Good top adhesion/protection and faster maintenance in the short term, option for touch up and spot repair.

Antifouling must be applied whilst **Hempel's Light Primer** is still tacky.

Disadvantage: For seasonal maintenance, when Antifouling is exhausted, a new coat of Hempel's Light Primer is required to secure adhesion.

Metal

Steel and aluminium are widely used in boat construction due to their strength, ease of fabrication and water tightness.

In the marine environment, they need painting to ensure resistance to corrosion and for a cosmetic finish. With the correct surface preparation and paint system, steel and aluminium hulls will give long periods of service with minimal maintenance.

Particular tips for painting metal

It's essential that the paint system completely isolates the metal surface from air and water.

Metal plates are often pre-primed with a protective shop primer. This isn't intended to be part of the coating system, and ideally should be removed before starting the coating.

Before working on metal, it must be free of corrosion. Remove salt and contamination by high pressure (min 2500 psi) freshwater washing. Grit blast steel to Sa2.5 (Swedish Visual Standard, ie near white metal), or abrade. Grit blast aluminium with non-metal abrasives, or abrade with 60 – 120 grade paper to bright metal. Prime bare metal with **Hempel's Light Primer**, thinned 20%, straight after surface preparation to avoid contamination and surface deterioration before coating, and to obtain maximum adhesion to the surface.

Check surface temperature before coating, as metal surfaces can vary greatly from the ambient temperature.

Steel – single pack/conventional

Above the waterline

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Primer Undercoat Brilliant	2	8 hrs – 6 days	4 hrs – 3 days	12	75	40	811 (No 1)
Gloss onto Primer Undercoat	1	8 hrs – 6 days	4 hrs – 3 days	11.2	90	50	811 (No 1)
Brilliant Gloss	1-2	20 hrs – 6 days	10 hrs – 3 days	11.2	90	50	811 (No 1) 808 (No 3) Spray

Steel / Aluminium – two component/high performance

Below the waterline

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Light Primer thinned max. 20%	1	8 hrs – 60 days	4 hrs – 30 days	8.2	140	60	845 (No 5)
Light Primer onto Light Primer Underwater Primer onto Light Primer	3 - 5**	8 hrs – 60 days	4 hrs – 30 days	8.2	120	60	845 (No 5)
Antifouling onto Underwater Primer	1***	4 hrs – 8 hrs	2 hrs – 4 hrs	7.8	125	50	811 (No 1)
Antifouling	1	8 hrs – indefinite	2 hrs – indefinite	see product label	75	40	808 (No 3)
Antifouling	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)

** 3-5 coats to obtain full film thickness. Add thinner to assist application if necessary.

***For best results overcoat **Hempel's Light Primer** with **Hempel's Underwater Primer** when the surface is almost dry but still has a slight tacky feel.

Application of Antifouling onto Aluminium

Many antifouling are NOT specified for use on aluminium hulls.

Antifouling contains special copper compounds as active ingredients. Copper can harm aluminium by direct contact.

It is important to check the product label or Product Data Sheet to clarify if your chosen antifouling can be applied to aluminium hulls.

If your chosen antifouling can be applied to aluminium hulls:

- It is important that the antifouling does not have direct contact with aluminium.
- It is essential to prime aluminium substrates up to 300 micron minimum dry film thickness.

Painting and varnishing wood

Wood is a naturally occurring organic material that can suffer from several problems in the marine environment.

Being biodegradable, wood is food for various organisms, from rot-inducing fungi to boring worms and crustacea that turn it to crumbling honeycomb.

It can also absorb water, causing movement that adversely affects a coating system's adhesion.

By correctly preparing the surface and using an appropriate coating system, you can overcome these problems – and enhance wood's natural beauty.



Before painting

Check the wood's moisture content with a moisture meter. Only paint if the moisture content is below 16%.

Particular tips when painting and varnishing wood

Consider the construction of the substrate, remembering that it's not advisable to put a two component system onto carvel or clinker built wooden hulls, as they require the greater flexibility of a single pack system.

Sand wood with the grain using 80 – 120 grade abrasive paper to provide a key for the paint system.

Clean wood by wiping **Hempel's Thinner 811 (No 1)** along the grain with a cloth, then allowing it to dry. Oily woods such as teak and iroko should be degreased by wiping **Hempel's Degreaser** along the grain, which will remove some of the natural oil content on the surface and ensure a greater bond with the first coat.

Note: Both paint and varnish finishes are available in single component and two component systems for wood protective coatings.



Remove old varnish with hot air gun



Sand surface

Woods commonly used in boats

Oak

Yellowish brown, dense hardwood. Can be slightly oily in nature. Contact with ferrous metals will cause staining and corrosion.

Uses: Ribs and frames, interior joinery and panelling.

Mahogany

Reddish brown hardwood with good working properties and durability.

Uses: Planking, interior joinery and panelling.

Teak

Dark golden brown hardwood, which – being naturally oily – has excellent durability.

Uses: Planking hull and deck, interior and exterior joinery and panelling.

Cedar

Pinkish brown hardwood of medium density.

Uses: Hull planking.

Larch

Pale reddish brown softwood that bends well and will take impact.

Uses: Hull planking.

Ply/Marine Ply

Layers of wood glued together creating an exceptionally strong and inflexible composition.

Uses: mainly for hull planking for dinghies and smaller boats.

Spruce

Light brown soft wood with poor self preserving. Low density.

Uses: hull planking.

Pitch Pine

Light brown soft wood with fair self preserving. Medium density.

Uses: Hull planking

Key Advice

Make sure you wear a protection mask when sanding as dust is an irritant.

Wood – single component system/conventional

Above the waterline

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Primer Undercoat thinned max 10%	1	8 hrs – 6 days	4 hrs – 3 days	12	75	40	811 (No 1)
Primer Undercoat Brilliant Gloss onto Primer Undercoat	2	8 hrs – 6 days	4 hrs – 3 days	12	75	40	811 (No 1)
Primer Undercoat	1	8 hrs – 6 days	4 hrs – 3 days	11.2	90	50	811 (No 1)
Brilliant Gloss	2 – 3	20 hrs – 6 days	10 hrs – 3 days	11.2	90	50	811 (No 1) 808 (No 3) Spray

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Multicoat thinned up to 10%	1	16 hrs – 6 days	8 hrs – 3 days	11.5	100	40	811 (No 1)
Multicoat	2 – 3	16 hrs – 6 days	8 hrs – 3 days	11.5	90	40	811 (No 1)

Hempel's MultiCoat may be used as an alternative to **Hempel's Primer Undercoat**; and also as an alternative topcoat to **Hempel's Brilliant Gloss** if you want a semi-gloss finish.

Hempel's	No of coats	Recoating interval (wet on wet)		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Wood Impreg	2 – 4	16 hrs	8 hrs	3 – 6	-	-	811 (No 1)

Below the waterline

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10 °C	20 °C		wft	dft	
Underwater Primer thinned up to 20%	1	6 hrs – indefinite	3 hrs – indefinite	7.8	160	50	811 (No 1)
Underwater Primer	2	6 hrs – indefinite	3hrs – indefinite	7.8	125	50	811 (No 1)
Antifouling onto Underwater Primer	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)
Antifouling	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)



Wood – Varnish single component system

Above the waterline

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Favourite Varnish thinned up to max. 20%	1	12 hrs – 4 days	6 hrs – 2 days	16.3	80	30	811 (No 1)
Favourite Varnish thinned up to max. 10%	1	12 hrs – 4 days	6 hrs – 2 days	16.3	65	30	811 (No 1)
Favourite Varnish	3*	12 hrs – 4 days	6 hrs – 2 days	16.3	60	30	811 (No 1)

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Classic Varnish thinned up to max. 20%	1	16 hrs – 4 days	8 hrs – 2 days	17	70	30	811 (No 1)
Classic Varnish thinned up to max. 10%	1	16 hrs – 4 days	8 hrs – 2 days	17	65	30	811 (No 1)
Classic Varnish	3*	16 hrs – 4 days	8 hrs – 2 days	17	60	30	811 (No 1)

*Add thinner to assist application if necessary (max. 5%).



Painting and varnishing wood

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Dura-Gloss Varnish thinned up to max. 20%	1	8 hrs – 4 days	4 hrs – 2 days	19.2	60	25	811 (No 1)
Dura-Gloss Varnish thinned up to max. 10%	1	8 hrs – 4 days	4 hrs – 2 days	19.2	55	25	811 (No 1)
Dura-Gloss Varnish	3*	8 hrs – 4 days	4 hrs – 2 days	19.2	50	25	811 (No 1)

*Add thinner to assist application if necessary (max. 5%).

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Dura-Gloss Varnish to build up coats (see above)	2	8 hrs – 4 days	4 hrs – 2 days	19.2	50	25	811 (No 1)
Dura-Satin Varnish finish coat only	3	8 hrs – 4 days	4 hrs – 2 days	17	60	25	811 (No 1)

Decks, bilges and lockers

The most suitable and used product for coating deck areas on all boats is a high wear-resistant paint with a non-gloss finish. This gives durability, and minimises reflection from the deck.

Particular tips when painting decks

To prepare a patterned deck, use wire brush.

When adding **Hempel's Anti-Slip Pearls** to the paint, mix small amounts in at a time to get the right consistency (50 gm for a 750 ml tin of paint). Glassfibre decks with anti-slip moulding may not need **Hempel's Anti-Slip Pearls**.

For more even coverage use a roller rather than a brush to apply **Hempel's Non-Slip Deck Coating**.

Particular tips when painting bilges and lockers

A lot of time and effort is spent on the external appearance and protection of a boat, but internal areas such as bilges and lockers shouldn't be neglected.

Ensure adequate ventilation while painting the bilge area.

A brush is generally easier and quicker, particularly on the uneven surfaces found in these areas.

For general cleaning of bilges use **Hempel's Pre-Clean**. If the bilges are excessively dirty, clean first with **Hempel's Degreaser**.

Key Advice

Hempel's Anti-Slip Pearls can be added to any Hempel's topcoat or varnish to give an anti-slip finish where required.

Bilges and Lockers

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Bilge & Locker Paint for internal areas	2	16 hrs – 6 days	8 hrs – 3 days	11	90	40	811 (No 1)

If max. overcoating time is exceeded abrade between coats.

Decks

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Primer Undercoat Non-Slip Deck Coating	2	8 hrs – 6 days	4 hrs – 3 days	12	75	40	811 (No 1)
Deck Coating on Primer Undercoat Non-Slip Deck Coating	1	6 hrs – 6 days	3 hrs – 3 days	9.2	100	50	808 (No 3)
Deck Coating	1 – 2	6 hrs – 6 days	3 hrs – 3 days	9.2	100	50	808 (No 3)

If max. overcoating time is exceeded abrade between coats.

To overcoat **Light Primer** with **Non-Slip Deck Coating**:

10°C	20°C
Min. 4 days	Min. 2 days
Max. 6 days	Max. 4 days

If using Hempel's 2 component primer, it is recommended to abrade the surface for optimum adhesion before application of **Hempel's Non-Slip Deck Coating**.

Keels

Keels are made from steel, cast iron, lead or occasionally a combination of a cast iron fin with a lead ballast.

Preparation for Lead Keel

High pressure fresh water hose and allow to dry. Abrade with 40 – 60 grade abrasive paper. Remove dust with a soft brush and follow chosen specification below.

Preparation for Cast Iron and Steel Keel

Shot blast or abrade to bright metal. Remove dust and grit by brushing, vacuuming or using dry compressed air. Follow chosen specification below.

Iron steel and lead keels – single pack/conventional

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Underwater Primer	3	6 hrs – indefinite	3 hrs – indefinite	7.8	125	50	811 (No 1)
Antifouling onto Underwater Primer	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)
Antifouling	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)

Iron steel and lead keels – two component system/high performance

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Light Primer thinned max. 20%	1	8 hrs – 60 days	4 hrs – 30 days	8.2	140	60	845 (No 5)
Light Primer	3*	8 hrs – 60 days	4 hrs – 30 days	8.2	120	60	845 (No 5)
Underwater Primer onto Light Primer**	1	4 hrs – 8 hrs	2 hrs – 4 hrs	7.8	125	50	811 (No 1)
Antifouling onto Underwater Primer	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)
Antifouling	1	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)

* Thinner can be added to assist application if necessary (max. 5%).

** For best results overcoat with **Hempel's Underwater Primer** when **Hempel's Light Primer** is almost dry but still tacky.

Note: If filling is required, this should be done after the first application of **Hempel's Light Primer**.

Propellers, outdrives and sterngear

Any aluminium, stainless steel or metal alloy under the water will need protecting. They're prone to the same fouling and corrosion as all underwater areas, and – as they directly affect your boat's efficient and safe propulsion – it's important you correctly maintain them.

Due to the excessive movement and water turbulence in these areas, the endurance of any coating is tested, particularly on the propeller.

Preparation

Thoroughly clean with **Hempel's Pre-Clean** and freshwater. Abrade with 40 grade paper. Wash with freshwater and allow to dry, before applying relevant specification (see below).

Repainting

Due to the excessive wear and tear in this area, repainting usually involves a complete strip back followed by full painting specification.

Key Advice

Take care never to overcoat the anodes, as this adversely affects performance.



Propellers, outdrives and sterngear

By brush (Best performance)

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Light Primer thinned max. 20%	1	8 hrs – 60 days	4 hrs – 30 days	8.2	140	60	845 (No 5)
Light Primer thinned max. 5%	1	8 hrs – 60 days	4 hrs – 30 days	8.2	120	60	845 (No 5)
Silic One Tiecoat	1	4 hrs – 8 hrs	2 hrs – 4 hrs	10	100	67	-
Silic One	1	16 hrs – 48 hrs	8 hrs – 48 hrs	10	100	78	-

For further information, refer to page 72 - Hempel's Silic One System for Propellers

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Light Primer thinned max. 20%	1	8 hrs – 60 days	4 hrs – 30 days	8.2	140	60	845 (No 5)
Light Primer thinned max. 5%	1	8 hrs – 60 days	4 hrs – 30 days	8.2	120	60	845 (No 5)
Underwater Primer onto Light Primer	1	4 hrs – 8 hrs	2 hrs – 4 hrs	7.8	125	50	811 (No 1)
Antifouling onto Underwater Primer	2-3	8 hrs	4 hrs	see product data	75	40	808 (No 3)

Aerosol spray

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Prop Primer	2 - 4	2 hrs	1 hrs	3.5	150	30	-
Ecopower Prop	4	60 min	40 min	1.3	100	25	-

Osmosis

- What is osmosis and how is it caused?
- Protection
- Treatment
- Using Hempel's High Protect II

What is osmosis and how is it caused?

When two liquids with different concentrations are separated by a semi-permeable membrane, one liquid will penetrate the membrane causing the volume to increase pressure to develop.

What does this mean to us?

In our case the semi-permeable membrane is the gelcoat of the glassfibre boat and the liquid is water. In time water will be absorbed into the GRP. Whilst most of this moisture will pass directly through the hull into the bilges with little damage, a certain amount will eventually start to break down some of the materials used in the laminate itself which will lead to a build up of “osmotic” fluids. Osmotic fluid contains acetic acid and glycol and has a higher molecular weight to water which can make it unable to pass back through the gelcoat or laminate. As more moisture is absorbed through the GRP, a hydraulic effect occurs which eventually leads to blisters being formed in the gelcoat. Most unprotected glassfibre boats at some stage during their life will develop osmotic symptoms to some degree. The timescale and extent of this depends upon various factors including temperature and type of water, periods afloat versus ashore and, most importantly, the quality of the original laminate.

Recognising the problem

The first visual signs of osmosis will be the formation of blisters in the gelcoat.

When pierced the liquid contents of an osmotic blister will have a sour smell similar to vinegar. Osmosis can be detected before any visual symptoms appear by checking the moisture content of the hull with a moisture meter, although this will only give an indication and it is recommended that professional advice is sought to determine the degree of the problem and what future action to take. Hempel have Approved Osmosis Treatment Centres who are qualified to assist you; contact Hempel for an up-to-date list.



Paint blisters and lifts

Osmosis protection

When to use an osmosis protection.

New boats

The best initial defence against osmosis is the correct methods and materials used during build. The higher the standard of the GRP laminate at construction, the greater the defence against osmosis. The addition of **Hempel's High Protect II** will give the ultimate protection to a new hull.

Used boats

Before applying a protective epoxy coating to older boats the condition of both the laminate and gelcoat need to be assessed. If in doubt, seek professional advice. If the hull condition is suitable, Osmosis Protection can be carried out using **Hempel's High Protect II**, if the condition is not good enough Treatment is recommended.

Preparation and specification for osmosis protection.

New boats

New gelcoat should be cleaned thoroughly with **Hempel's Degreaser** or **Hempel's Pre-Clean** to remove mould release agents used in the construction of the hull. For more information refer to Surface preparation: cleaning and degreasing, on page 11.

After degreasing, the surface should be abraded with 60 - 100 grade abrasive paper, or lightly slurry blasted, and washed off with fresh water. When dry the hull should have an even matt finish.

Used boats

Remove all old paint or antifouling by manual dry scraping or having the hull grit or slurry blasted (this is a quick and efficient way of removing the old paint layers and also provides a well keyed surface which will require little extra preparation). Whichever method is used the hull should have an even matt finish with no trace of previous coatings. Freshwater wash the hull and allow to dry. Any minor cracks and blemishes to the hull should be filled after the first coat of **Hempel's High Protect II** with **Hempel's Epoxy Filler**.



Gelcoat Peeling

Key Advice

Correct surface preparation is vital for a long-lasting protective finish. Time spent at this stage is well invested.

Protection

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
High Protect II	1	18 hrs – 11 days	8 hrs – 5 days	6.6	150	150	do not thin
Epoxy filler (if needed)	–	16 hrs – 48 hrs	8 hrs – 24 hrs	–	–	–	do not thin
High Protect II	1	18h – 11d	8h – 5d	6.6	150	150	do not thin

Overcoating option 1 - Two component system / high performance

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Light Primer thinned 5% onto High Protect II	1	18 hrs – 11 days	8 hrs – 5 days	8.2	125	60	845 (No 5)
Antifouling onto Light Primer*	2	4 hrs – 8 hrs	2 hrs – 4 hrs	see product label	75	40	808 (No 3)

Overcoating option 2 - Single component system / conventional

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Underwater Primer* onto High Protect II	1	18 hrs – 24 hrs	8 hrs – 12 hrs	7.8	125	50	811 (No 1)
Antifouling onto Underwater Primer	2	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)

* Overcoat two component products with a single component product whilst the surface is almost dry but still has a slight tacky feel.

Key Advice

Overcoating option 1 with **Light Primer** is also recommended if maximum recoat interval of **High Protect II** has exceeded.

Osmosis treatment

When to use an osmosis treatment.

If the laminate and/or gelcoat is poor and there are indications of osmosis, a full Osmosis Treatment may be required. Full treatment involves the removal of the gelcoat which, under the correct conditions, will allow the hull

to dry out to the recommended levels, before coating the bare laminate with **Hempel's High Protect II**, replacing the gelcoat to give the hull a moisture resistant coating.

Preparation and specification for osmosis treatment.

Preparation

The gelcoat will need completely removing to allow the hull to dry out.

Hand Power Tools

Grinders provide an inexpensive means of removing the gelcoat and preparing the surface. The disadvantage is the time to complete the task and the amount of dust produced. Protective clothing must be worn by the operator, especially dust mask and eye protection

Slurry or Abrasive Blasting

Either of these methods successfully remove the gelcoat and prepare the hull for the application of **Hempel's High Protect II**. Any hull defects will become apparent during blasting, ie voids in the laminate. A professional with the correct equipment is needed to carry out either of these methods.

Gelcoat Peeling

A gelcoat peeler, planes away the gelcoat at a preset depth resulting in an even and smooth finish. This is generally accepted as being the most effective method for removing gelcoat. Once peeled, the surface will require abrading with 40 grit grinding disks, or light slurry blasting to provide a key for the **Hempel's High Protect II**. This method requires a professional operator.

Once the gelcoat has been removed, the hull should be steam cleaned, or at least pressure washed to remove salts and other contaminants which are present in the laminate due to osmosis. The salts and other contaminants will continue to come to the surface so it is necessary to repeatedly wash the hull, once a day is recommended.

On average a hull can take between 4 weeks and 3 months before it is dry enough to recoat. Expert advice at this stage is essential to ensure that the hull is adequately prepared for the ap-

plication of **Hempel's High Protect II**. Any minor cracks and blemishes to the hull should be filled after the first coat of **Hempel's High Protect II** with **Hempel's Epoxy Filler**.

Treatment

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
High Protect II	1	18 hrs – 11 days	8 hrs – 5 days	6.6	150	150	do not thin
Epoxy filler (if needed)	-	16 hrs – 48 hrs	8 hrs – 24 hrs	-	-	-	do not thin
High Protect II	4	18 hrs – 11 days	8 hrs – 5 days	6.6	150	150	do not thin

Overcoating option 1 - Two component system / high performance

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Light Primer thinned 5% onto High Protect II	1	18 hrs – 11 days	8 hrs – 5 days	8.2	125	60	845 (No 5)
Antifouling onto Light Primer*	2	4 hrs – 8 hrs	2 hrs – 4 hrs	see product label	75	40	808 (No 3)

Overcoating option 2 - Single component system / conventional

Hempel's	No of coats	Recoating interval		Covers (m ² /ltr)	Thickness per coat		Thinner
		10°C	20°C		wft	dft	
Underwater Primer* onto High Protect II	1	18 hrs – 24 hrs	8 hrs – 12 hrs	7.8	125	50	811 (No 1)
Antifouling onto Underwater Primer	2	8 hrs – indefinite	4 hrs – indefinite	see product label	75	40	808 (No 3)

* Overcoat two component products with a single component product whilst the surface is almost dry but still has a slight tacky feel.

Using Hempel's High Protect II

How to apply Hempel's High Protect II for both Protection and treatment

From the moment the **Hempel's High Protect II** base and activator are mixed together the product will start its chemical hardening reaction. Only mix as much as can be applied during the pot life (45 mins @ 20°C). Higher temperatures will decrease the drying time and pot life.

Apply **Hempel's High Protect II** with a felt roller (lay-off the surface with a brush if an improved surface finish is needed). **Hempel's High Protect II** should be applied at a minimum of 150 micron thickness per coat, this can either be measured using a wet film thickness gauge or by working out the surface area of the boat and calculating the correct amount of **Hempel's High Protect II** needed per coat (1 litre of **Hempel's High Protect II** will cover 6.6m² at 150 micron).

Hempel's High Protect II has a minimum application temperature of 10°C, if possible keep the job at a steady temperature with low humidity, best achieved under cover.

Note: Hempel's High Protect II must not be thinned.



Stir base



Stir curing agent



Pour curing agent into base



Stir both products well



Apply **Hempel's High Protect** with roller



Lay off **Hempel's High Protect** in opposite direction with brush

Curing

Hempel's High Protect II should be touch dry within 10 to 12 hours at 20 degrees.

If the temperature drops below 10°C **Hempel's High Protect II** is likely to stop curing. The curing will start again once the temperature increases, however an inadequate curing temperature may cause amine sweating to occur. This is a condition where a thin film of amine carbonate forms on the surface of the epoxy and this amine sweat must be degreased or washed off with fresh water before overcoating.

Planning overcoating times is essential to avoid rubbing down between coats. See painting specifications for more detail.

Full cure of **Hempel's High Protect II** will take approximately 7 days at 20°C. It is recommended that the boat is not launched during this period as it could affect the curing of the coating.

Good practice

- If **Hempel's High Protect II** application cannot be carried out indoors, it is advisable to erect a cover around the hull to provide protection from the elements.
- If **Hempel's High Protect II** is being applied at 10°C, keep the product indoors at normal room temperature before use.
- Move the tape line up with each coat to avoid a hard ridge at the waterline.
- **Hempel's High Protect II** is produced in 2 colours to allow application of alternative layers of cream and grey to ensure total coverage of each coat.
- Stir both the base and activator of **Hempel's High Protect II** thoroughly before mixing together. Once mixed together, again stir well to achieve an even consistency.
- Do not thin **Hempel's High Protect II**.
- Thorough surface preparation and the careful following of all instructions is the key to a successful finish.

Our products

- Primers
- Fillers
- Antifoulings
- Biocide-free Antifoulings
- Topcoats
- Varnishes
- Teak products
- Thinners / equipment cleaner
- Boatcare

Primers

Selecting the right primer will protect the boat's substrate, avoid early failure of a subsequent painting system and enhance the final finish. (See 'Choosing the right paint system' on page 16.)

Hempel's Primer Undercoat

A single component primer for all substrates (including steel) above the waterline, and an undercoat for **Hempel's Brilliant Gloss/Hempel's Multicoat/Hempel's Non-Slip Deck Coating**. A quick-drying, high-opacity primer and undercoat, that gives excellent durability and surface stability ready for overcoating with single component topcoats.



750ml

2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	6 hrs	8 hrs – 6 days	811 (No 1)	12m ² /l	
20°C	3 hrs	4 hrs – 3 days			

Hempel's Underwater Primer

Use as part of a single component system below the waterline, including keels; and as a tiecoat before anti-fouling. Can be applied directly onto the hull or a primed surface, and between an existing antifouling and a new antifouling. Fast-drying with excellent waterproofing.



750ml

2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	6 hrs	6 hrs – indefinite	811 (No 1) (brush)	7.8m ² /l	
20°C	3 hrs	3 hrs – indefinite			

Hempel's Prop Primer

Aerosol. An anti-corrosive primer for a large variety of substrates. Particularly recommended as a primer for outdrives and propellers. **Hempel's Prop Primer** has very good adherence to most substrates. Fast drying, easy to apply with a matt finish. Overcoat with appropriate antifouling.



500ml

Temp	Touch dry	Re-coat (min/max)	Covers
10°C	40 min	2 hrs - none	3.5m ² /l
20°C	20 min	1 hrs - none	

Hempel's Light Primer

A two component high performance epoxy primer and undercoat for use both above and below the waterline. Use on glassfibre, wood, steel and aluminium. Superb corrosion, impact and water resistance. Can also be used for osmosis protection when application is required at low temperatures.



375ml

750ml

2.25L

Pot life at 10°C: Mixed product 4 hrs

Pot life at 20°C: Mixed product 2 hrs

Mix ratio: 2:1

Minimum application temperature: 5°C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	6 hrs	8 hrs - 60 days	845 (No 5)	8.2m ² /l	
20°C	3 hrs	4 hrs - 30 days			

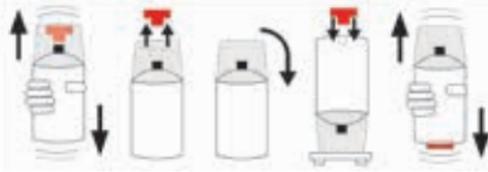
Hempel's Light Primer Spray

A two-component epoxy primer spray suited for maintenance, spot repair, touching-up and as a primer for small uncoated surface areas. Can be also used as a primer on propellers before antifouling application. Suitable on glass fibre, steel, aluminium and plywood. For interior and exterior use above and below the waterline.



311ml

Minimum application temperature: 5 °C



Above the waterline:

Temp	No of coats	Light Primer Spray onto Light Primer Spray	
		Min	Max
10°C	2-3	4 hrs	60 days
20°C		2 hrs	30 days

Subsequent coat: Apply topcoat onto a dry, sanded and clean surface.

Below the waterline:

Temp	No of coats	Light Primer Spray onto Light Primer Spray	
		Min	Max
10°C	3-5	Wet on wet: Approx. 40-50 mins	-
20°C		Wet on wet: Approx. 15-20 mins	

Subsequent coat: Apply Antifouling whilst the surface is still tacky.

For propellers:

Temp	No of coats	Light Primer Spray onto Light Primer Spray	
		Min	Max
10°C	1-2	Wet on wet: Approx. 40-50 mins	-
20°C		Wet on wet: Approx. 15-20 mins	

Subsequent coat: Apply Antifouling whilst the surface is still tacky.

Primers and undercoats

Hempel's Sealer

Is a two-component epoxy-polyamide with low viscosity and good penetration ability. For saturation of glass fibre laminate, when gel coat has been removed (repair of osmosis damage). For priming of ferro-cement boats and boats of wood that can absorb the sealer.



750ml

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8hrs	8 hrs – none	845 (No 5)	10m ² /l	
20°C	4hrs	4 hrs – none			

Hempel's High Protect II

A solvent free two component high build epoxy. For use above and below the waterline. An excellent osmosis protection or treatment which can be applied at, and will dry to, a very high film thickness. Can be a substitute for **Hempel's Light Primer** where solvent emissions are a consideration. **Do not thin.**



750ml

2.5L

Pot life at 10 °C: 1h 30 min

Pot life at 20 °C: 45 min

Mix ratio: 3:2

Minimum application temperature: 10 °C.

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	24hrs	18 hrs – 11 days	845 (No 5)	6.6m ² /l	 Lay-Off
20°C	12hrs	8 hrs – 5 days			

Fillers

Filling and fairing will streamline the surface of your boat, improving hull performance through the water, and giving clean, smooth lines on the topsides. If the substrate is damaged, you'll need structural filling and fairing.

Hempel's Profair

A light weight two component epoxy filler, with good adhesion and water resistance, and when fully cured easy to sand. Can be applied in coats up to 25mm without sagging. Especially suited for detailed fairing where structural strength and flexibility is required. Suitable on glass fibre, hardwood, steel and other rigid materials. For use above and below the waterline.

Pot life at 20 °C: Mixed product 1hrs

Mix ratio: 1:1

Minimum application temperature: 5 °C



1L

Temp	Touch dry	Re-coat (min/max)	Tool cleaner	Covers	Tools
10°C	24 hrs	48 hrs – none	845 (No 5)	1 m ² /l	
20°C	12 hrs	24 hrs – none			

Hempel's Epoxy Filler

A two component, solvent free, epoxy filler. Use for a variety of filling and fairing jobs both above and below the waterline. Can be applied in thick coats up to approximately 5mm without runs or sags. Fair before over-coating with relevant primer.

Pot life at 20 °C: Mixed product 1hrs

Mix ratio: 1:1

Minimum application temperature: 5 °C



130ml

1L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Film thickness	Tools
10°C	18hrs	18 – 54 hrs	845 (No 5)	5mm per coat	
20°C	8hrs	8 – 24 hrs			

Antifoulings

Fouling not only makes a boat look unsightly, it can also foul propellers and outdrives, block engine water inlets and outlets, slow down the boat speed, increase fuel costs and ultimately damage the hull substrate/surface.

Painting a boat's underwater area:

- protects its substrate/surface
- avoids undue hull roughness.
(Roughness increases resistance through the water, causing lower speeds and consuming more fuel.)

Fouling varies widely depending on temperature, salinity and water quality. Differences in levels and types can be dramatic, even on boats moored in what seems to be the same environment, as fouling conditions are affected by sunlight/shade, temperature and flow of water, pollution levels and water inflows.

Fouling grows faster in sunlight, so is first seen on the waterline and rudder. Water surface dirt and pollution can adversely affect the antifouling.

Key Advice

Put extra layers on the rudder and waterline where more aggressive water flow takes place.

How antifouling works

Antifouling paints release bioactive ingredients. The bioactive materials used today are mainly cuprous oxide and booster organic biocides. They're water-soluble and, when released, lethal to fouling organisms. Different types of antifouling paint release biocides/toxicants in different ways. There are three main types:

- Self Polishing/Erodible
- Hard
- Traditional/Soft.

These are explained on the next page.

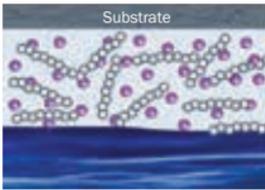
Choosing the right product

You should consider:

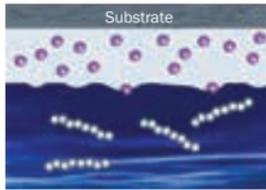
- boat type
- sailing pattern & speed
- geographic location and characteristics of the mooring
- any existing coating
- environmental and legislative issues in the area where you apply the product and sail.

In self polishing/erodible antifoulings, a resin of active ingredients (biocides) repels/discourages fouling. Once in water, the resin breaks down in a con-

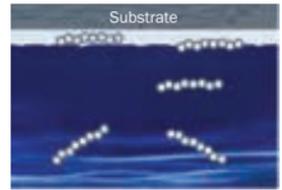
trolled way, continually exposing fresh biocide layers. This gives constant performance throughout the season, and reduces build-up of old antifouling.



Start of lifetime



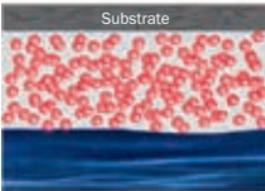
Half of lifetime



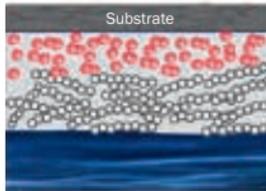
End of lifetime

In hard antifoulings, the coat's high levels of insoluble resin make it hard and stop erosion. The resin's packed with active ingredients, and the particles are so close that as one dissolves the next is exposed.

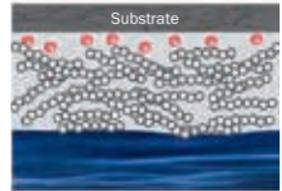
Hardness and durability makes these antifoulings ideal for fast power boats, mud-berthed vessels and racing yachts (burnishing the antifouling with wet abrasive paper before launch gives a smooth finish).



Start of lifetime



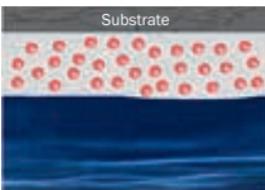
Half of lifetime



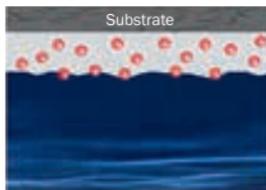
End of lifetime

In traditional/soft antifoulings, a simple resin (gum rosin or resin derivatives) disperses active ingredients with

the binder. Water soluble, it progressively dissolves/erodes, giving low cost protection.



Start of lifetime



Half of lifetime



End of lifetime

 Antifouling toxicants

 Dissolved resin

Antifoulings



Applying antifouling



Applying Hempel's Hard Racing Boottop

How much do I need?

As hull designs vary, this table is only a guide. The figure shows the total amount you need for two coats.

Important:

Amount of paint may vary depending on type/model of vessel. Calculations are approximate.

LOA	6m 20ft	7.5m 25ft	8.5m 28ft	10m 33ft	11.5m 38ft	13m 43ft	14.5m 48ft	16m 53ft	18m 60ft	20m 66ft	23m 76ft
 Fin keel	1.5l	1.5l	3l	4l	5l	6l	7l	8l	9.5l	11l	13l
750ml	2	2	4	2	0	2	3	1	2	1	1
2.5l	0	0	0	1	2	2	2	3	3	4	5
 Full keel	2l	3l	4l	5l	6l	7.5l	9l	11l	13l	15.5l	19l
750ml	3	4	2	0	2	0	2	2	1	1	2
2.5l	0	0	1	2	2	3	3	4	5	6	7
 Motor Cruiser	2l	3.5l	4.5l	6l	7l	9l	10l	12l	15l	18.5l	23l
750ml	3	2	3	2	3	2	0	3	0	2	1
2.5l	0	1	1	2	2	3	4	4	6	7	9

Hempel's Classic

Efficient polishing (erodible) antifouling providing good protection all season. As an antifouling for boats of glass fibre, wood, plywood and steel. Do not use on aluminium or other light-alloy metals. Risk of corrosion in case of direct contact. Suitable for cruising speeds.



2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	8 hrs – none	808 (No 3)	12.5 m ² /l	
20°C	4 hrs	4 hrs – none			

Hempel's Mille NCT

High performance, self-polishing antifouling. Hempel's patented binder technology ensures outstanding fouling and colour retention all season.

For use on all substrates below the waterline excluding aluminium.



2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	4 hrs	8 hrs – none	808 (No 3)	13.8 m ² /l	
20°C	2 hrs	4 hrs – none			

Hempel's Mille NCT (white)

Is high performance, self-polishing antifouling. Hempel's patented binder technology ensures outstanding fouling protection and colour retention all season. As an anti-fouling for boats of glass fibre, wood, plywood, steel and aluminium.



750ml

2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	4 hrs	8 hrs – none	808 (No 3)	13.3 m ² /l	
20°C	2 hrs	4 hrs – none			

Antifoulings

Hempel's Hard Racing

Hard, high strength antifouling which gives a smooth racing finish, offering all round competitive performance. Formulated especially for power boats, racing yachts and vessels which are mud berthed. It may also be used on vessels that are dry sailed. Suitable for all substrates except aluminium. Maximum launch time 6 months.

Minimum application temperature: 5 °C



375ml

2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	8 hrs - none	808 (No 3)	12.5 m ² /l	
20°C	4 hrs	4 hrs - none			

Hempel's Hard Racing TecCel (white)

High performance, hard antifouling providing outstanding protection all season. Includes TecCel technology which ensures reduced friction and increased speed. Can be used on glass fibre, wood, plywood, steel and aluminium. For power boats and regatta yachts.



375ml

750ml

2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	8 hrs - none	808 (No 3)	12.5 m ² /l	
20°C	4 hrs	4 hrs - none			

Hempel's Cruising Performer

Self-polishing, erodible antifouling with very latest eroding technology which reduces the build up of paint, maximizing cruising capability in all areas, whilst ensuring fouling is kept to a minimum. An excellent coverage rate and colour stability ensures **Hempel's Cruising Performer** offers you the very best in value. Suitable for use on all substrates except aluminium.

Maximum launch time 6 months.

Minimum application temperature: 5 °C



2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	8 hrs – none	808 (No 3)	14.3 m ² /l	
20°C	4 hrs	4 hrs – none			

Hempel's Tiger Xtra

Self-polishing, erodible antifouling. Suitable to both power and sail boats and just 1 coat can last the season.

Applying a second coat for year round protection gives excellent and consistent long term performance, under all conditions. It is suitable for use on all substrates except aluminium. Maximum launch time 6 months.

Minimum application temperature: 5 °C



2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	8 hrs – none	808 (No 3)	12.8 m ² /l	
20°C	4 hrs	4 hrs – none			

Antifoulings

Hempel's Tiger Xtra (white)

High performance, self-polishing antifouling providing excellent protection all season. As an antifouling for boats of glass fibre, wood, plywood, steel and aluminium.



2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	8 hrs - none	808 (No 3)	13.3 m ² /l	  
20°C	4 hrs	4 hrs - none			

Hempel's Broads

Medium strength antifouling specifically designed to reduce paint build up and give a good performance on fresh, salt and brackish waters. It is suitable for all substrates except aluminium. The maximum launch time is one month.



2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	8 hrs - none	808 (No 3)	12.5 m ² /l	  
20°C	4 hrs	4 hrs - none			

Hempel's Alu Prop NCT

High performance, self-polishing antifouling. Hempel's patented binder technology ensures outstanding fouling protection and colour retention all season. Especially suited for aluminium boats. As an antifouling for boats of glass fibre, wood, plywood, steel and aluminium vessels.



750ml

2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	4 hrs	8 hrs - none	808 (No 3)	13 m ² /l	  
20°C	2 hrs	4 hrs - none			

Biocide-free Antifoulings

Hempaspeed TF

High performance, hard biocide-free, thin-film coating. Forms an ultra smooth surface that minimizes growth and reduces drag. For use as an antifouling for boats of glass fibre, steel and aluminium. Suitable for pleasure boats and racing/regatta boats. Ideal for both fresh and salt water use.



750ml

2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 h	8h - none	808 (No 3)	10 m ² /l	
20°C	4 h	4h - none			

Hempel's Ecopower Cruise

Biocide free bottom paint protecting the epoxy coating from fouling. An advanced binder technology controls the self-renewing effect throughout the season. Eliminates copper leakage from old antifouling when used together with Hempel's Underwater Primer. Compatible with conventional antifouling coatings and can be used on all substrates including aluminium. Maximum launch time 9 months.



2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 h	8h - none	808 (No 3)	14,3 m ² /l	
20°C	4 h	4h - none			

Hempel's Ecopower Prop

Biocide free spray that keeps propellers, outdrives and stern gear free from fouling and making it easy to clean. An advanced binder technology controls the self-renewing effect throughout the season. Maximum launch time is one month.



500ml

Temp	Touch dry	Re-coat (min/max)	Covers
10°C	40 min	60 min	1.3 m ² / 500ml spray
20°C	20 min	40 min	

Compatibility and sealing of old antifouling

Old antifouling in good condition	Hempel's Ecopower Cruise	Hempel's Ecopower Racing
Hempel's Cruising Performer	Clean & Apply	Clean & Apply
Hempel's Tiger Xtra, Hempel's Hard Racing	Wet abrade with sand paper, clean and apply.	Wet abrade with sand paper, clean and apply.
Sealing of old antifouling	To avoid copper and zinc leakage from old antifouling apply 2 coats of 50 micron Hempel's Underwater Primer. Apply the bottom paint.	

System for sealing of old antifouling

Hempel's	No of coats	10°C		20°C	
		Min	Max	Min	Max
Underwater Primer	1 coat/ 50 micron				
Underwater Primer	1 coat/ 50 micron	6 hours	No max	3 hours	No max
Ecopower Cruise on Underwater Primer	1 coat/ 50 micron	6 hours	No max	3 hours	No max
Ecopower Cruise	1 coat/ 50 micron	8 hours	No max	4 hours	No max

Hempel's Silic One

Our most efficient
antifouling solution

hempeleyacht.com



2
year

**Fouling
protection**



**Easy to apply
& maintain**



**Fuel
saving**



**Biocide- and
copper-free**



**Works on
propellers**

Discover Hempel's latest innovation and technological achievement - Silic One!



Silic One

Available in shades:

-  Red
-  Black
-  Blue

Biocide-free product based on silicone and hydrogel, which gives the coating surface water-like properties making it difficult for fouling organisms to attach to the hull and easy for them to be removed when the boat is in motion.

What is a Fouling Release System?

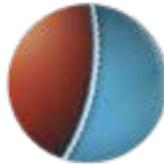
- It is a biocide-free paint/method to prevent fouling
- It is a "non-stick paint"
- Copper-free

What is hydrogel?

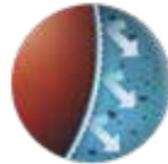
Hydrogel is based on unique, non-reactive polymers that are added to the paint, creating an invisible barrier between the hull surface and the water. Fouling organisms perceive the hull as a liquid and consequently attach to a much lower extent.

If the hydrogel is removed can it then build up again?

The polymers responsible for the formation of the hydrogel are evenly distributed in the paint film. If the original hydrogel is removed, a new layer instantly builds up when the hydrogel-forming polymer comes into contact with water.



Unique, non-reactive polymers form a hydrogel layer between the substrate and water.



Fouling organisms perceive the hull as a liquid and consequently have difficulty in attaching.

Antifouling vs. Fouling Release

Which fouling control method is right for you?

	Antifouling	Silicone Fouling Release
How it works?	Antifouling work by releasing biocides, in a controlled manner, to prevent fouling organisms from attaching to the boat. Upon exposure to water the top layer of antifouling is dissolved, and the biocides "leach" onto the coating surface, therefore keeping fouling organisms away.	Unlike antifouling, the Fouling Release System doesn't rely on biocides. This product is based on silicone and hydrogel, which gives the coating surface water-like properties, making it difficult for fouling organisms to attach firmly to the hull and easy for them to be removed when the boat is in motion.
Cost difference	In the first year costs for antifouling are lower compared to the Silicone Fouling Release System, but maintenance costs in the second year are higher.	The Fouling Release System has higher costs in the first year, but maintenance costs in the second and third year will be lower. Silic One reduces the friction, hence increasing speed and saving fuel.
Types of boats	There are different antifouling paints for different types of boats, depending on the substrate and type of water the boat will be sailing in.	The Fouling Release System can be used on all types of boats, except wood, and for all types of water. The frequency of usage and speed can influence amount of fouling, so the best performance is expected on motor boats.

Silicone Fouling Release System application

General Application Advice

- Please read and carefully follow all the instructions before painting.
- Remember to check the shelf life before use.
- Painting should be avoided if there is a risk of rain!
- The paint is sensitive to humidity, therefore only open the tin just before use.
- Hempel's Silic One Tiecoat and Silic One can be used up to 1 hour after opening the tin. A tin that has been opened cannot be stored for later use.
- It is strongly advised to apply the maximum film thickness without sagging for best performance and adhesion.
- **For the initial application of Hempel's Silic One, two coats are required, but for next application one coat will be sufficient.**
- Pour the paint into a paint tray and replace lid during application.
- The boat can be launched 24h-36h after last coat has been applied. Maximum launch time is 1 month.

Tools



Short haired or felt roller is ideal for the application of the Silic One system.

Key Advice

In case the recoating interval is exceeded simply apply a fresh coat of the previously applied coat.

Application Options

Previously Coated Boats

CASE 1 – Removal of old antifouling and application of full system

CASE 2 – Application on top of old antifouling in good condition (easy switch to Silic One system)

New Boats

CASE 3 – New boat or bare boat with epoxy

CASE 4 – New boat without epoxy

Propellers

CASE 1 – Propeller painted with AF

CASE 2 – Propeller not painted previously



CASE 1

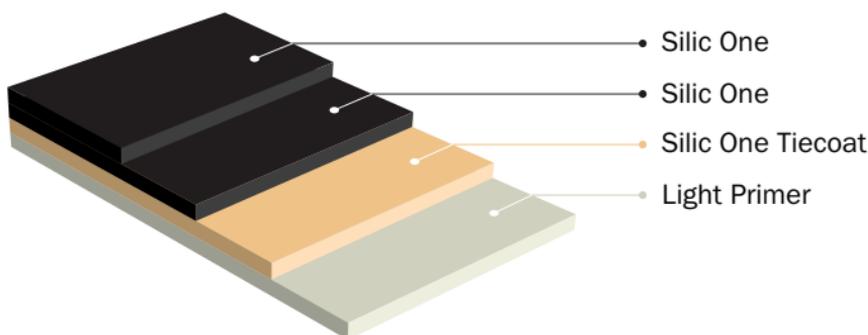
Removal of old antifouling and application of full system

Surface preparation

Remove old antifouling down to two component primer. Abrade, clean and dry the surface.

Application

Apply layers of the system as indicated below:



Can be overcoated after:							
Layers	Hempel's	10 °C		20 °C		30 °C	
		Min	Max	Min	Max	Min	Max
1.	Light Primer	4h	8h	2h	4h	1h	2h
2.	Silic One Tiecoat*	16h	48h	8h	48h	4h	24h
3.	Silic One	16h	No max**	16h	No max**	8h	No max**
4.	Silic One						
To be immersed after final coat		36h	1 month	24h	1 month	24h	1 month

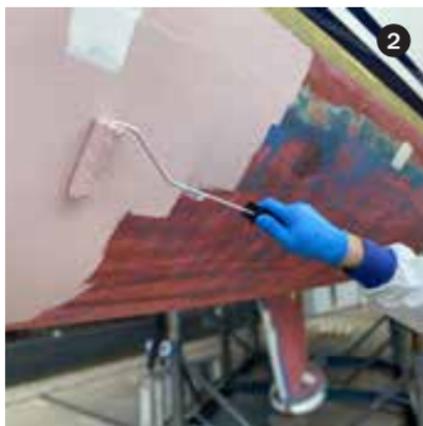
*The Silic One Tiecoat must be applied to full coverage to ensure adhesion.

After 48 hours surface **must be cleaned with a suitable detergent, rinsed with fresh water and allowed to dry before applying the next coat. Overcoating must be carried out as soon as possible after surface has dried.

CASE 2

Application on top of old antifouling in good condition - easy switch to Silic One system

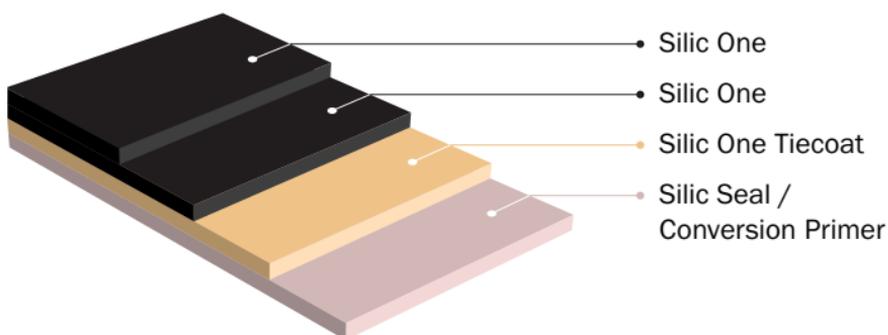
Hempel's Silic Seal / Conversion Primer is a two-component epoxy primer for an easy conversion from antifouling to Fouling Release System.



Surface preparation

Identify the condition of the antifouling currently on your boat. Use a metal scraper to determine whether the aged antifouling adheres sufficiently. In case of bad adhesion, remove all loose/brittle layers. Abrade with wet abrasive paper. Rinse carefully with freshwater and allow the surface to dry.

Apply layers of the system as indicated below:



Application

Mix the two components of Hempel's Silic Seal / Conversion Primer thoroughly to an even consistency. Be aware that the product has a very low viscosity and any runs and sags should be brushed out immediately. Thinning is NOT recommended. Pot life at 20°C: 8 hours. Minimum application temperature is 5°C.

Can be overcoated after:							
Layers	Hempel's	10°C		20°C		30°C	
		Min	Max	Min	Max	Min	Max
1.	Silic Seal / Conversion Primer	4h	8h	2h	4h	1h	2h
2.	Silic One Tiecoat*	16h	48h	8h	48h	4h	24h
3.	Silic One	16h	No max**	16h	No max**	8h	No max**
4.	Silic One						
To be immersed after final coat		36h	1 month	24h	1 month	24h	1 month

*The Silic One Tiecoat must be applied to full coverage to ensure adhesion.

After 48 hours surface **must be cleaned with a suitable detergent, rinsed with fresh water and allowed to dry before applying the next coat. Overcoating must be carried out as soon as possible after surface has dried.

CASE 3

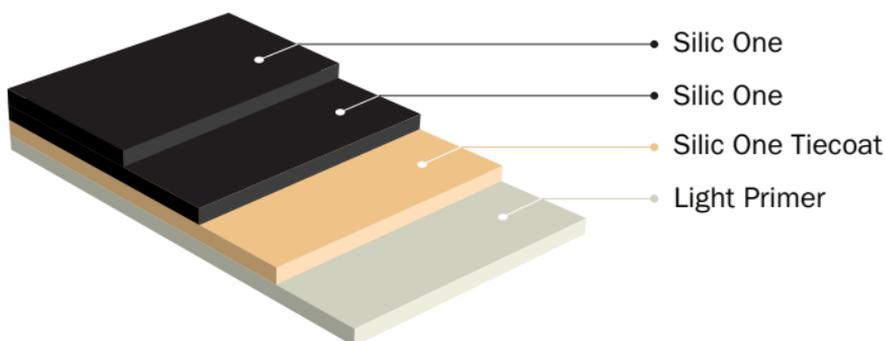
New boat or bare boat with epoxy

Surface preparation

Clean with a suitable detergent and sand with dry abrasive paper (P120). Carefully clean with water and allow the surface to dry.

Application

Apply layers of the system as indicated below:



Can be overcoated after:							
Layers	Hempel's	10 °C		20 °C		30 °C	
		Min	Max	Min	Max	Min	Max
1.	Light Primer	4h	8h	2h	4h	1h	2h
2.	Silic One Tiecoat*	16h	48h	8h	48h	4h	24h
3.	Silic One	16h	No max**	16h	No max**	8h	No max**
4.	Silic One						
To be immersed after final coat		36h	1 month	24h	1 month	24h	1 month

*The Silic One Tiecoat must be applied to full coverage to ensure adhesion.

After 48 hours surface **must be cleaned with a suitable detergent, rinsed with fresh water and allowed to dry before applying the next coat. Overcoating must be carried out as soon as possible after surface has dried.

CASE 4

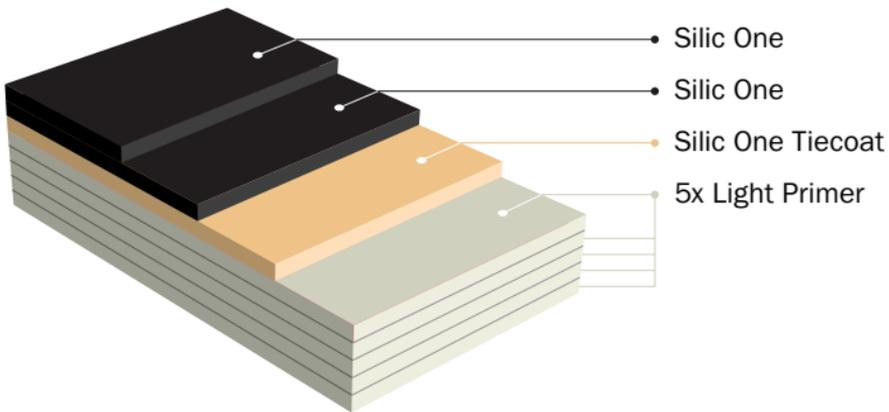
New boat without epoxy

Surface preparation

Clean with a suitable detergent and sand with dry abrasive paper (P120). Carefully clean with water and allow the surface to dry.

Application

Apply layers of the system as indicated below:



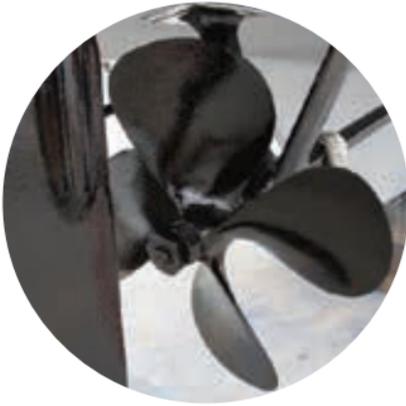
Can be overcoated after:

Layers	Hempel's	10°C		20°C		30°C	
		Min	Max	Min	Max	Min	Max
1.	Light Primer (thinned 20%)	8h	60d	4h	30d	3h	22.5d
2.	Light Primer	8h	60d	4h	30d	3h	22.5d
3.	Light Primer	8h	60d	4h	30d	3h	22.5d
4.	Light Primer	8h	60d	4h	30d	3h	22.5d
5.	Light Primer	4h	8h	2h	4h	1h	2h
6.	Silic One Tiecoat*	16h	48h	8h	48h	4h	24h
7.	Silic One	16h	No max**	16h	No max**	8h	No max**
8.	Silic One						
To be immersed after final coat		36h	1 month	24h	1 month	24h	1 month

*The Silic One Tiecoat must be applied to full coverage to ensure adhesion.

After 48 hours surface **must be cleaned with a suitable detergent, rinsed with fresh water and allowed to dry before applying the next coat. Overcoating must be carried out as soon as possible after surface has dried.

Silic One for propellers



CASE 1



Propeller painted with AF

Surface preparation

- Remove old antifouling
- Clean with Hempel's Pre-Clean (for aluminium propellers make sure that Hempel's Pre-Clean has been thinned 1:20)
- Create a palpable roughness by abrading with 40 sand paper or other mechanical methods, preferably abrasive blasting. Wash with freshwater and allow to dry, before applying relevant specification. Apply as fast as possible the primer to avoid oxidation.

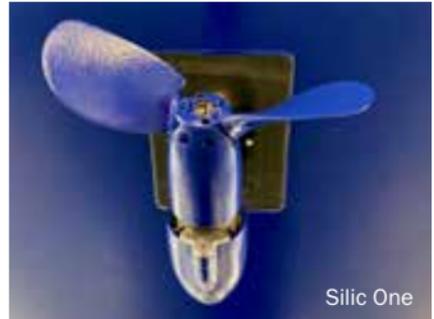
CASE 2



Propeller not painted previously

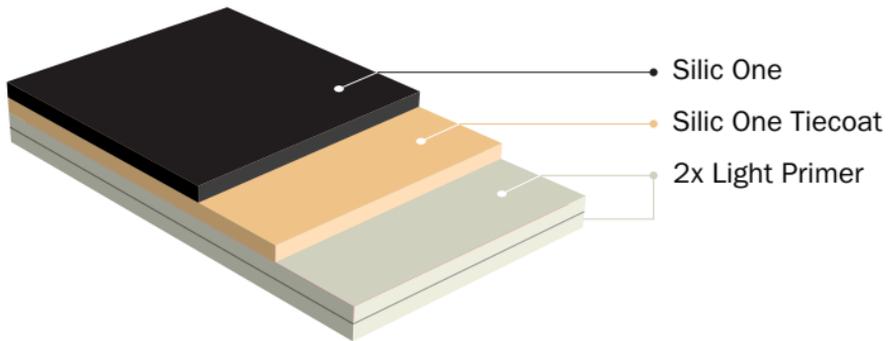
Surface preparation

- Clean with Hempel's Pre-Clean (for aluminium propellers make sure that Hempel's Pre-Clean has been thinned 1:20)
- Create a palpable roughness by abrading with 40 sand paper or other mechanical methods, preferably abrasive blasting. Wash with freshwater and allow to dry, before applying relevant specification. Apply as fast as possible the primer to avoid oxidation.



Application

Apply layers of the system as indicated below:



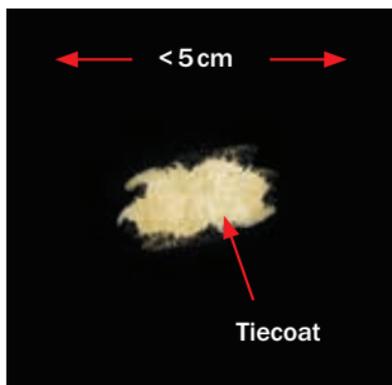
Can be overcoated after:							
Layers	Hempel's	10° C		20° C		30° C	
		Min	Max	Min	Max	Min	Max
1.	Light Primer (thinned 20%)	8h	60d	4h	30d	3h	22.5d
2.	Light Primer (thinned 5%)	8h	60d	4h	30d	3h	22.5d
3.	Silic One Tiecoat	16h	48h	8h	48h	4h	24h
4.	Silic One						
To be immersed after final coat		36h	1 month	24h	1 month	24h	1 month

Repair of damages

It is most important to distinguish if the damaged area is above or below 5 × 5 cm.

Light damage below 5x5 cm

Damage description



Hempel's Silic One is damaged and Silic One Tiecoat (yellow coat) is visible. Hempel's Silic One Tiecoat may also be slightly damaged, but you cannot see through it.

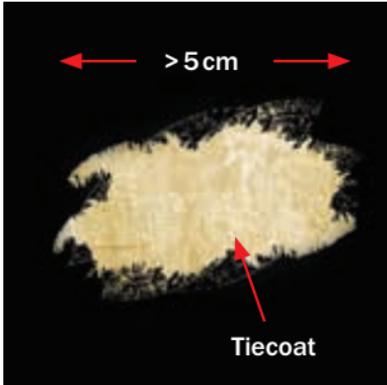
Solution



1. Put 1 layer of Hempel's Silic One on the damage (and complete underwater boat surface when re-painting).

Light damage above 5x5 cm

Damage description



Hempel's Silic One is damaged on a larger area than 5 cm and Silic One Tiecoat (yellow coat) is visible. The tiecoat may also be slightly damaged, but you cannot see through it.

Solution



1. Carefully remove all loose coating.



4. Put on the clean and dry damaged area 1 layer of yellow Hempel's

Silic One Tiecoat on a slightly larger area than the damaged area.



2. Clean the damaged area with boat shampoo.



5. Put 1 layer of Hempel's Silic One on the damaged area

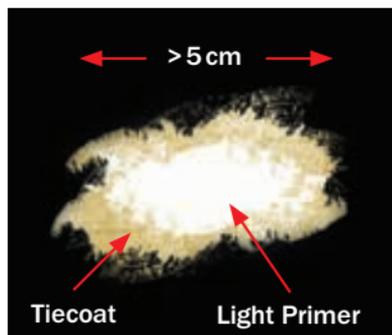
slightly larger than the area with Hempel's Silic One Tiecoat (Apply one coat of Silic One to the entire underwater surface.)



3. Rinse with clean water and let dry.

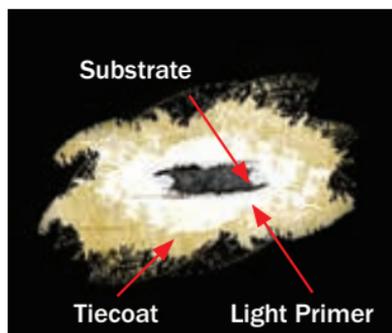
Medium & heavy damage above 5x5 cm

Damage description



Medium Damage

Hempel's Silic One is completely gone, the Hempel's Silic One Tiecoat (yellow coat) is damaged and the white epoxy primer (Hempel's Light Primer) is visible. The epoxy primer might also be slightly damaged but you cannot see through it.



Heavy Damage

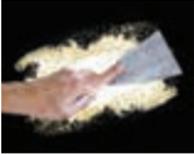
You can see all the way through the coating system to the substrate underneath.



Key Advice

* In case heavy damage above 5x5 cm apply 5 layers of Hempel's Light Primer.

Solution



1. Carefully remove all loose coating.



5. Apply 1 layer of Hempel's Light Primer* (**check Key advice!**) on the damaged area on a slightly larger surface than the damaged area.



2. Clean the damaged area with boat shampoo.



6. After drying, the paint that has been applied next to the repair area and upon needs to be loosened and cut off.



3. Rinse with clean water and let it dry.



7. When the surface is dry, apply 1 layer of Hempel's Silic One Tiecoat (yellow coat) on a slightly larger area than the applied primer area.



4. Sand the damaged area with the sand paper and remove any remaining dust with a cloth.



8. Apply 1 layer of Hempel's Silic One on the slightly larger area than the damaged area which you have already applied with yellow Silic One Tiecoat (apply one coat of Silic One to the entire underwater surface).

Cleaning

High speed motor boats

Hempel's Silic One is **self-cleaning** on motor boats.

Slow speed boats – sailboats

The coating can be cleaned as frequently as desired/required, thus maintaining a perfectly clean surface with extremely low friction.

Hempel's Silic One is **easy to clean**.

You can use one of two following options:



Option 1

Use a high pressure, fresh water wash to clean the surface.

Option 2

Use a dense sponge or a cloth and then rinse with a hose. Be careful not to scratch the surface while cleaning.



Maintenance

Maintenance of Hempel's Silic One is easy and simple. Maintenance cost is lower compared to traditional antifouling. In order to maintain the system, a new layer of Hempel's Silic One should be applied every second year.

The Silic One System performs more effectively if the boat remains in the water. If the boat is used in areas of high environmental conditions, or kept out of the water for an extended period, it may be necessary to apply a new layer of Hempel's Silic One every year.



FAQ

Will I save fuel with Silic One?

Yes, due to easy cleaning of the surface, coating can be free from fouling and the hull will have less friction in the water.

Can I go faster with Silic One?

Yes, the reduced friction of a clean coating will increase speed.

Can Silic One be applied at low temperatures?

Silic One can be applied down to 10°C.

How sensitive is Silic One to moisture?

Silic One requires a dry surface prior to application. Do not apply Silic One Tiecoat or Silic One when rain is expected or on a wet substrate.

How soon can I launch the boat after applying Silic One?

The boat can be launched from 24 hours to maximum 1 month after applying Silic One.

Can Silic One be applied on top of old antifouling?

Yes! With Silic Seal / Conversion Primer you can apply on top of antifouling in good condition (good condition means = if you would normally apply another layer of antifouling – it is OK to apply Silic One system with Silic Seal / Conversion Primer as well).

Is it possible to overcoat Silic One with traditional antifouling?

Silic One will have to be removed if you want to convert to traditional antifouling. Only fouling release coatings will stick to Silic One.

At what speed will the self cleaning take effect?

At faster speeds the self cleaning will be most effective. Even at lower speed self cleaning is possible with constant use.

Should I be afraid of too slippery surface when lifting the boat on slings?

No, you should simply secure the lifting straps together and to each other to prevent them spreading apart when lifting.

Silic One is soft. Does it encounter a lot of mechanical damage?

When scratching with a nail, the silicone may feel mechanically weak, but when the force is applied on a larger area, for instance with a fender, the silicone has a good abrasive resistance. This is primarily because the coating is soft and absorbs the energy.

What do I do if my Silic One gets a scratch?

It is easy to repair; simply re-build the paint system in the damaged area.

Will it be a problem if the applied surface is not completely smooth?

No, you will have the same performance even though the paint surface is not complete smooth.

Can Silic One for propeller be applied on all types of propeller materials?

Silic One for propeller can be applied on all types of metals and alloys. Epoxy and fiberglass based composites is also possible. Remember to use primer before applying the Silic One System.

How carefully should the pretreatment of the propeller be done?

You should do a proper cleaning and pretreatment (see application instruction). You should not paint on grease and oil.

How do I know if I get enough paint on the propeller?

You should apply as much paint as possible, but without sagging.

Can I polish the propeller during the season?

No, you should not polish the propeller during the season, you can clean it with a soft sponge instead.

Can Silic One be removed?

Yes. You can use Hempel's Silicone Remover available in 5l cans. Contact your local shop for ordering the product.

Painted with Hempel's Silic One





Colnago 35, Croatia



Pershing 72, Italy



AWNiemeyer, Germany



Bavaria 39, Denmark



Aronet, Finland

Topcoats

Paint will enhance the appearance of any surface and offer protection against the elements. (Please see 'Choosing the right paint system' on page 16).

Hempel's Brilliant Gloss

Is a high gloss alkyd topcoat with excellent colour retention. Flexible and resistant to salt water and pollutants. Easy application ensures an exceptional finish. For exterior and interior use above the waterline.



375ml

750ml

2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	20 hrs – 6 days	811 (No 1) (brush)	11.2m ² /l	
20°C	4 hrs	10 hrs – 3 days	808 (No 3) (spray)		

Hempel's Multicoat

A single component semi-gloss topcoat and primer. Ideal for all areas above the waterline requiring a semi-gloss durable topcoat. Can be applied directly to most surfaces. Provides excellent durability with good resistance to water and oil. Can also be used as a complete coating system on new or bare wood: 1st coat thinned 20%, 2nd coat thinned 5–10%, further coats undiluted. Add Anti-Slip granules for a non-slip finish.



750ml

2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	6 hrs	16 hrs – 6 days	811 (No 1) (brush)	11.5m ² /l	
20°C	3 hrs	8 hrs – 3 days	808 (No 3) (spray)		

Hempel's Non-Slip Deck Coating

Is a quick-drying, acrylic, semi-gloss topcoat containing fine granules for an anti-slip finish. Durable with good resistance to weathering and abrasion.

For use on glass fibre, wood and steel. For interior and exterior use above the waterline.



750ml

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	4 hrs	6 hrs – 6 days	808 (No 3)	9.2m ² /l	
20°C	2 hrs	3 hrs – 6 days			

Hempel's Bilge & Locker Paint

A single component high opacity satin topcoat providing excellent durability, with good water and oil resistance for bilges and lockers. Not suitable for permanent immersion.



750ml

2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	6 hrs	16 hrs – 6 days	811 (No 1) (brush)	11m ² /l	
20°C	3 hrs	8 hrs – 3 days	808 (No 3) (spray)		

Hempel's Anti-Slip Pearls

For areas such as decks, where you need an anti-slip finish, **Hempel's Multicoat** and **Hempel's Brilliant Gloss** – with the addition of **Hempel's Anti-Slip Pearls** – will give an anti-slip surface that allows colour matching and co-ordinating with other glossed areas.



50g

Hempel's Anti-Slip Pearls can be added to any top coat to give an anti-slip finish where required.

Recommended mix ratio: 50g/750ml

Varnishes

Varnish will protect wood against the elements. And – where the wood is of good quality – enhance the natural beauty of the surface.

Hempel's Favourite Varnish

A single component alkyd based, full bodied, high gloss varnish. For use above the waterline, both inside and outside. Especially easy to use, giving a tough, durable, long-lasting finish, with depth of gloss. Ideal for areas where structural flexibility of the wood is needed.



750ml

2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	8 hrs	12 hrs – 4 days	811 (No 1)	16m ² /l	
20°C	4 hrs	6 hrs – 2 days			

Hempel's Classic Varnish

A single component traditional varnish produced from the highest quality materials, including tung oil. Use inside and outside above the waterline. Excellent flow at application, a flexible finish and long term UV filters ensure an uncompromising finish that will last for a long time.



750ml

2.5L

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	12 hrs	16 hrs – 4 days	811 (No 1)	17m ² /l	
20°C	6 hrs	8 hrs – 2 days			

Hempel's Dura-Gloss Varnish/ Hempel's Dura-Satin Varnish

A single component, urethane modified alkyd with excellent resistance to alcohol and cleaning materials. For inside and outside areas above the waterline requiring a beautiful durable varnish. Quick-drying to an extremely hard and durable high gloss/satin surface, highly resistant to wear and abrasion within hours of application.



750ml

Minimum application temperature: 5 °C

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	6 hrs	8 hrs – 4 days	811 (No 1)	Dura-Gloss Varnish 19,2m ² / l	
20°C	3 hrs	4 hrs – 2 days		Dura-Satin Varnish 17m ² / l	

Hempel's Wood Impreg

Clear alkyd oil with good penetration properties. Used to saturate wood before application of varnish or paint systems. As a first coat for wooden boats and hardwood, interior and exterior, above the waterline.



750ml

2.5L

Temp	Touch dry	Re-coat (min/max)	Thinner/ Tool cleaner	Covers	Tools
10°C	4-12h	16h – none	811 (No1)		
20°C	2-6h	8h – none			

Teak products

Overtime teak's natural golden brown colour will gradually change to a silver-grey shade, then dull down to a dark grey/greenish colour. Using Teak treatment products will refresh the look of the wood by cleaning, restoring the colour and protecting and maintaining the teak.

Hempel's Teak Cleaner

A powder for cleaning all teak areas. Especially good for large areas such as decks, and for wood that's turned dark grey. Removes dirt and marks giving a clean surface ready for you to apply **Hempel's Teak Colour Restorer** or **Hempel's Teak Oil**.

Wet the surface with fresh water and apply a uniform layer of **Hempel's Teak Cleaner**. Leave on for 10 to 20 minutes, using a stiff brush to scrub while the paste is still moist. Thoroughly hose down with clean fresh water before the paste hardens.



750g



Hempel's Teak Oil

Unpigmented teak oil with good penetration to protect wood and make it easier to clean. Helps wood resist both water and dirt, and underlines its original structure. Use to overcoat **Hempel's Teak Colour Restorer** on areas of high usage. Not suitable for use on painted or varnished surfaces.

Apply one saturation coat onto cleaned new wood, previously oiled or preserved wood. Let the **Hempel's Teak Oil** soak into the wood, then remove surplus oil with a clean cloth.



750ml

2.5L



Hempel's Teak Colour Restorer

Pigmented teak oil containing anti-mould agents to prevent discolouration. The wood obtains a golden brown colour after application. For use on new wood as well as on previously treated wood, interior and exterior, above the waterline.



750ml

2.5L

Hempel's Proof 10

Is a bituminous sealing compound. Remains flexible. For caulking of wooden boats and filling of crackings below the waterline.



300ml

Thinners / equipment cleaner

It's important you only use the Thinners recommended for each application. Not doing so, or substituting other proprietary products, will result in an unsatisfactory finish.

Thinning paint can improve its flow characteristics, increase spreading rate and the ability to be absorbed – all making it easier to work with. However, exceeding the maximum recommended ratio of **Hempel's Thinners** can adversely effect the product. When paint is thinned, the dry film thickness will be thinner when the solvents have evaporated and it may be necessary to apply another coat to obtain the required film thickness.

Hempel's Thinner 811 (No 1)
Hempel's Thinner 871 (No 2)
Hempel's Thinner 808 (No 3)
Hempel's Thinner 845 (No 5)
Hempel's Thinner 851 (No 6)
Hempel's Degreaser
Hempel's Paint Stripper

Note: With two pack products, only thin the mixed product.

Key Advice

The solvents/thinners used in some paints can dissolve plastics. Make sure your painting tools can stand the kind of solvent being used, and be careful with any plastic containers you use.

Don't pour thinners into drainage systems – use facilities available for this.



Boatcare

A boat will need maintaining during the season to ensure it keeps its good appearance and sailing capabilities and the coating system is maintained. How much maintenance and care is needed will depend on the environment in which the boat is sailed.

Clean

Hempel's Pre-Clean

High strength cleaner and degreaser for pre-cleaning gelcoat and painted surfaces to remove fuel, oil, grease, wax and silicone. Use prior to painting and for deep cleaning. It can also be used for cleaning bilges. Dilute 1 part **Hempel's Pre-Clean** to 20 parts water for general cleaning, 1:10 for more demanding cleaning. Use to clean brushes covered in part cured paint. Do not use on bare or untreated wood which may absorb the water.



1L

Minimum application temperature: 5 °C

Renew

Hempel's Custom Marine Polish

Liquid polish which cleans, polishes and protects gelcoat painted and varnished surfaces. Contains silicone which cures on the surface to create a protective barrier and clear gloss.



500ml

Protect

Hempel's Wax TecCel

Premium high performance liquid wax with TecCel technology, for a long lasting, deep gloss, tough protective finish on gelcoat, painted and varnished surfaces.

Apply with a soft cloth, polish by hand or with a polishing machine, allow to dry for 5–10 minutes, polish away any residue with a clean cloth leaving a high gloss mirror like finish.



500ml

Minimum application temperature: 5 °C

Reference

- Calculating areas to be painted
- Health and safety
- Troubleshooting
- Technical terms

Calculating areas to be painted

Abbreviations

LOA = Length Overall
 LWL = Length Waterline
 B = Beam
 D = Draft
 F = Freeboard

Conversions

1 foot = 0.305 metres
 1 metre = 3.28 feet
 1 sq foot = 0.093 sq metres
 1 sq metre = 10.763 sq feet
 1 UK gallon = 4.546 litres
 1 litre = 0.22 UK gallons
 1 US gallon = 3.785 litres
 1 litre = 0.264 US gallons

Litres required

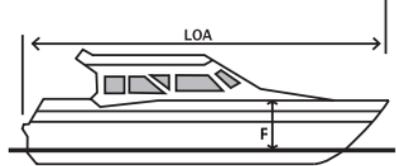
Total surface area

Recommended coverage rate of relevant paint

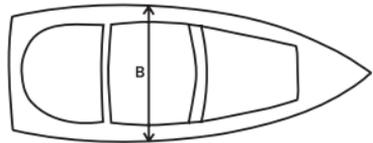
Key Advice

Check our Paint calculator app on hempelyacht.co.uk

Deck & Topside Surface Areas

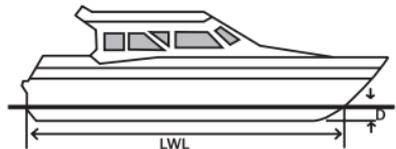


$$(LOA + B) \times (F \times 2) = \text{Topside area}$$

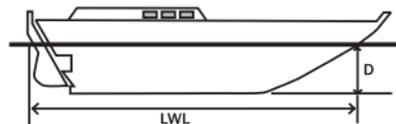


$$LOA \times B \times 0.75 = \text{Deck area}$$

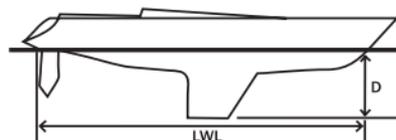
Underwater Surface Area



$$LWL \times (B + D) \times 0.85 = \text{Underwater area}$$



$$LWL \times (B + D) \times 0.75 = \text{Underwater area}$$



$$LWL \times (B + D) \times 0.50 = \text{Underwater area}$$

Health and Safety

By law, all paint products must display details of Health and Safety precautions. Here are the warning symbols most commonly found on our products, with a brief description.

	Corrosive May destroy living tissue on contact.
	Dangerous to the environment May present an immediate or delayed danger to one or more components of the environment.
	Harmful May cause damage to health.
	Irritant May cause inflammation to skin or other mucous membranes.
	Highly flammable May catch fire in contact with air, only needs brief contact with ignition source, has very low flash point or evolves highly flammable gases in contact with water.
	Extremely flammable Has an extremely low flash point and boiling point, and gases that catch fire in contact with air.
	Chronic health hazard Respiratory sensitizers (can cause e.g. asthma)

General good practice

- Refer to safety/product data sheets for product information and content.
- Always read the label thoroughly and contact us if you're not sure how to use the products.
- Wear the appropriate personal protective equipment (PPE).
- Provide adequate ventilation for the product used. If necessary, use a respirator. Don't breathe vapour/spray.
- Open cans with care.
- Immediately clean up spills.
- Do not eat or drink in the vicinity of stored or applied paint.
- Do not swallow. If swallowed, immediately seek medical advice and show the container/label.
- Some products may cause irritation, always seek medical advice if you're concerned.
- Where possible, removed antifouling paint should be collected and disposed of safely.
- Contact your local authority for information on waste disposal.

Troubleshooting

The most common causes of failures: poor surface preparation and cleaning; too smooth surface; moist surface; wood with high moisture content; insufficient priming; missed coating intervals.

Fault	Causes	What to do
Application marks	<ul style="list-style-type: none"> • Wrong application tools. • Temperature too hot, causing paint to cure too quickly and not allowing the product to flow naturally. • Temperature too cold, making the product too thick and difficult to distribute evenly. 	Abrade back to flat even surface and refinish, considering application tools and conditions.
Blistering – small swollen areas, surface may feel like sandpaper to touch	<ul style="list-style-type: none"> • Surface contamination before paint application. • Solvent entrapment due to paint being applied too thickly or over-coated too soon. • Moisture entrapment during coating. • Paint applied when humidity was too high. 	Check for any other areas that may have a similar problem, abrade back all blisters, fill where necessary and recoat
Blushing – white milky appearance on film	<ul style="list-style-type: none"> • High humidity can cause the thinners to evaporate too fast. • Water condenses on the relatively cold surface and the subsequent moisture creates blushing. 	Abrade back until blushing is cleared, and recoat considering the relative humidity and temperature.
Chalking – poor gloss, powdery surface	<ul style="list-style-type: none"> • Prolonged exposure to Ultra Violet rays. • Poorly mixed paint. 	For a permanent cure, abrade back and recoat ensuring the paint is properly mixed.
Cracking/ Crazing – appearance of shattered glass	<ul style="list-style-type: none"> • Extreme temperature changes during paint. • Incompatible overcoating. • Paint applied too thickly or over-coated too soon. 	Abrading back and repainting may cure this. However it's more likely the complete coating needs to be removed and an appropriate coating applied, in accordance with recommended specification.

Fault	Causes	What to do
<p>Fish Eyes – small holes in the paint film</p>	<ul style="list-style-type: none"> • Appears during painting due to silicone or oil contamination on the surface. 	<p>Abrade back until contaminated area can be degreased, allow to dry and recoat.</p>
<p>Loss of gloss</p>	<ul style="list-style-type: none"> • High humidity, cold conditions and dew fall will cause the paint to cure with a low gloss level. • Ultra Violet degradation over a period of time. 	<p>Abrade back and repaint.</p>
<p>Lifting or Peeling – paint lifting or peeling from surface</p>	<ul style="list-style-type: none"> • Poorly prepared surface. Incompatible overcoating. • Moisture on the surface. • High moisture level in wood. • Overcoating times exceeded. 	<p>Remove loose paint, abrade, degrease and recoat in accordance with recommended specification.</p>
<p>Orange Peel – surface mottled like orange skin</p>	<ul style="list-style-type: none"> • Primarily occurs when spraying due to poor flow caused by poor atomisation, insufficient thinning, paint applied too thickly or overcoated too soon. Can also occur with some roller applications. 	<p>Abrade back to an even flat surface and recoat. If using a roller, it may be necessary to lay off using a brush or pad after roller application.</p>
<p>Runs – running of wet paint into uneven rivulets</p>	<ul style="list-style-type: none"> • Paint has been over thinned. • Too much paint applied. 	<p>Abrade back to an even flat surface and recoat.</p>
<p>Sags – partial slippage of paint in thick areas like wide runs</p>	<ul style="list-style-type: none"> • Paint applied too thickly. 	<p>Abrade back to an even flat surface and recoat.</p>
<p>Wrinkling – surface resembles the skin of a prune</p>	<ul style="list-style-type: none"> • Paint applied too thickly causing solvent entrapment. • Paint applied in direct sunlight causing the surface to dry too quickly resulting in solvent entrapment (uncured paint) under the surface. 	<p>If the paint hasn't hardened, remove with a scraper, clean surface with Hempel's Degreaser or Hempel's Thinners and recoat. On a cured surface, abrade to a flat even surface and recoat.</p>

Technical terms

Alkyd

Synthetic binder soluble in white spirit.

Ambient temperature

Room temperature, or temperature of surroundings.

Amine Sweat

A layer of amine carbonate that can form on the surface of an epoxy after application, usually caused by high humidity. Must be removed prior to over-coating.

Antifouling

Paint formulated to discourage marine organisms from settling on the hull surface.

Biocide

Active ingredient added to a coating to repel/discourage unwanted organisms responsible for microbiological degradation.

Burnish

The act of rubbing a paint film to produce a smooth polished finish.

Compatibility

Ability of two or more materials to be mixed together without causing undesirable effects.

Corrosion

Process of deterioration by chemical, electrochemical or microbiological reactions resulting from exposure to the environment.

Cure

The conversion of paint from a liquid to a solid.

Density

Ratio of weight to volume.

Drying

The process by which a film passes from liquid to a solid state.

Hempel's Epoxy

Synthetic resin containing epoxy groups.

Fairing

To produce a smooth outline, improve appearance and reduce drag.

Flow

Property of a coating material that enables levelling.

Gelcoat

Outermost pigmented polyester layer on fibreglass structures.

Gloss

Optical property of a surface, characterised by its ability to reflect light specularly.

Key

Quality of the surface or previous coating which assists adhesion of a subsequent coat, ie a rough or abraded surface provides a mechanical grip for the applied film.

Levelling

Ability of a coating material to flow-out after application, minimising any surface irregularities caused by the application process.

Micron

Metric unit used to designate film thickness. 1/1000 millimetre.

Opacity

Ability of a coating to obliterate the colour or the difference in colour of a substrate.

Polyester

Synthetic resin used for the manufacture and maintenance of fibreglass structures.

Polyurethane

A durable synthetic resin used in single or 2 pack topcoats.

Pot Life

The useful life of a 2 pack product immediately after it has been mixed.

Primer

Paint applied to a non painted or prepared substrate to give protection, and/or in readiness for subsequent coatings.

Sag/Sagging

The downward flow of paint as a result of being applied too thickly.

Solvent

A liquid used to dissolve or disperse paint and other oils.

Solvent entrapment

Solvent trapped in an apparently dried paint film making it soft and vulnerable.

Substrate

Surface to be coated.

Hempel's Thinner (Solvent, Diluant, Reducer)

A liquid used to adjust the viscosity and drying time of a paint.

Tiecoat

A coating with good adhesion and low reaction used to improve inter-coat adhesion.

Topcoat

The final paint applied in a coating specification.

Ultra Violet (UV)

Light energy that can break chemical bonds leading to wear and fading of paint films.

Undercoat

Paint applied prior to a topcoat to give a consistent colour and surface profile.

Urethane

Synthetic binder in an alkyd structure providing a durable topcoat.

Viscosity

A product's thickness or ability to resist flow.

Water-borne

A paint that uses water as a solvent or thinner.

Paint Manual

2022

As a world-leading supplier of trusted coating solutions, Hempel is a global company with strong values, working with customers in the protective, marine, decorative, container and yacht industries. Hempel factories, R&D centres and stock points are established in every region. Across the globe, Hempel's coatings protect surfaces, structures and equipment. They extend asset lifetimes, reduce maintenance costs and make homes and workplaces safer and more colourful. Hempel was founded in Copenhagen, Denmark in 1915. It is proudly owned by the Hempel Foundation, which ensures a solid economic base for the Hempel Group and supports cultural, social, humanitarian and scientific purposes around the world.

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