



BOERO YACHTCOATINGS APPLICATORS HANDBOOK



YachtCoatings

TABLE OF CONTENTS

I. General notes and Safety

Introduction	page 3
Hygiene & Safety guidelines	page 3

II. Cleaning and proper surface preparation

Painting conditions and environment	page 5
Surface preparation	page 5
Sandblasting	page 6
Sanding	page 6
How to use dry and wet sand-paper	page 6

III. Assessment of Existing Coating Condition

Visual & Physical Examination	page 8
Chemical & Compatibility testing	page 9

IV Troubleshooting

Orange peel	page 10
Craters & Fish Eyes	page 10
Pin Hole's	page 11
Solvent popping	page 11
Runs and/or sags	page 12
Dry spray	page 12
Slow drying	page 13

V. Fairing & Surfacing Process

Fairing	page 14
Surfacing	page 15

VI. Thinners and Solvents

VII. Methods of applying Topcoats

Spray coating	page 19
Brush coating	page 21
Roller coating	page 21

VIII Application by Substrate

Steel	page 22
Aluminum	page 23
Wood	page 25
Fiberglass & Gelcoat, Epoxy glass	page 26

I. General notes and Safety

Introduction

[Boero YachtCoatings](#), a brand of Boero Bartolomeo Spa, will try to provide a clear guideline to improve the application of its products, and therefore improve the quality of the final result, However if, after reading this handbook, you still have specific questions to ask, please contact [Boero YachtCoatings](#)'s Technical Assistance – Yachting Division:

Boero Bartolomeo S.p.A.
Via Macaggi, 19
16121 GENOVA - ITALY
Phone: +39 010 55001

This handbook is intended as a guide for Professional Painters. It is not to be used as a support handbook for DIY (Do It Yourself) applicators. It has been designed to support professional yacht painting by means of providing all useful information for properly trained applicators using [Boero YachtCoatings](#) products. These chemicals can be used safely when utilizing proper safety gear including protective suit, eye ware, chemical resistant gloves, and an OSHA approved respirator which prohibit contact with the skin and inhalation of vapors.

Before starting the application with one of [Boero YachtCoatings](#)'s products, please first review the coating system recommendation for the proper substrate. Next, review each product's technical data sheets included in the back of this book. These sheets comprise further and more detailed information. Please review the label on the packaging for mixing and safety precautions. Safety data sheets (MSDS) and Product Technical Datasheets are available on www.boeroyachtcoatings.com

In order to safeguard the unique quality and performance of [Boero YachtCoatings](#) Yacht Paint Systems, do not mix or add other products, additives, or thinners that are not part of [Boero YachtCoatings](#)'s range of products or are not recommended by [Boero YachtCoatings](#) itself.

Hygiene & Safety guidelines

Please make sure that products used and procedures followed are in compliance with [Boero YachtCoatings](#)'s products and procedures and instructions. Always comply with safety and hygiene guidelines when utilizing [Boero YachtCoatings](#) products while painting yachts. Before starting to paint, it is important to carefully read the instructions printed on the can. Please specifically read the safety label indicating safety measures to be followed for each individual product.

It is important to comply with USA Health & safety standards. Avoid contact of the product with skin, work in well ventilated rooms, and if you are working indoors, use air exhausters, suction fans or air conveyers. The working area next to the coating area must be protected against possible contaminants (e.g. dust); if you are working outdoors, please avoid direct exposure to sunrays when possible and keep away from all dust debris and moisture. Prevent any saline substances from settling on the surfaces. A number of paint components (antifouling paints' components especially) irritate the skin, are noxious if inhaled and sometimes even toxic. Hazards are different according to products and are clearly indicated by means of symbols and with corresponding safety precautions, on safety labels. Do not smoke while coating, While applying products, please wear appropriate protective clothing. Wear clean chemical resistant gloves both when preparing surfaces and for applying coatings. Nearly all paints contain flammable solvents, which evaporate during drying phase: do not inhale their vapors, especially if indoors. Ventilate the room properly, also to avoid any risk of fire or explosion, and wear appropriate respirators.

[Boero YachtCoatings](#) Yacht Coatings recommends personal protection equipment to include fresh air supplied full face mask protection. For current information refer to 3M or equivalent manufacture for OSHA approved safety equipment. It is advisable to use proper protective gloves, suits, respirators and safety goggles. Utilize vacuum assisted sanding

equipment when ever possible. This is most important when sanding antifouling coatings. When you have completed your work, or when having a break for a quick snack, wash your hands with soap and water or hand-washing paste. Never use thinners or solvent-based paint removers to wash your hands.

If you have followed all these suggestions, and should you have any problem, please consult a doctor and show him/her the product's safety label. If the product comes into contact with your eyes, rinse them with abundant cold water. Do not throw liquid paint residue down drainpipes. Throw empty cans in authorized trash containers only.

Adhere to local, state and federal laws and regulations for disposal of all paint and hazardous materials.

II. Cleaning and proper surface preparation

Painting conditions and environment

In preparation for painting any surface, degrease the surface prior to sandblasting or sanding to prevent possible contaminants from penetrating into porous sanded surfaces and therefore contamination from occurring while coating. Clean the surface with fresh water and if necessary you should rub the surface with an effective neutral household cleaner (like Comet) and a 3M Scotchbrite® pad before any other preparation work is performed. Careful observation of the rinse water will tell you when the surface is clean. Break, holes or beading of the rinse water indicate areas which will need to be degreased again until all contaminate is removed. To degrease use [Boero YachtCoatings Sirio](#) and/or [Thinner 693](#).

Use denatured or Isopropyl Alcohol, but always use new solvents

Cleaning Method: After degreasing utilize the two rag method prior to sanding

1. The area to be treated should be cleaned properly of all dust, using dry, clean compressed air to blow while using cotton cloths that are dry, clean and lint free.
2. Wet the surface with a new clean cloth soaked in [Boero YachtCoatings Sirio](#) and/or [Thinner 693](#) (specifically for gelcoat or unpainted metal) or other proper degreasing solvent.
3. Use the dry second new/clean cloth to wipe the surface dry and lift the contamination off the surface. Work small areas (1sq/yard or less) to avoid the cleaning product from drying before the second cloth wipes it clean. Replace cloths frequently and repeat previous steps until the surface is residue free.

Note: change both wet & dry rags frequently. Do not use only one wet cloth, because it will distribute the contamination to other areas of the hull. Renew the cloths to avoid this problem; clean cotton works the best. Make sure the surface is dry before using tack rags.

Tack Rags: Use premium quality automotive style tack rags. This handy device can be used to remove the lightest dust or dirt directly before the paintjob takes place. Tack rags are used before final primer and topcoat applications. They are usually not needed when applying fairing materials or surfaces (however, de-dusting procedures should always be carried out between coats when sanding has taken place). When tacking a primer or topcoat surface, use only high quality automotive re-finishing tack rags. They have the proper type and amount of resin to pick up dust without leaving contamination on the surface. Other tack rags can easily leave a residue that causes fish-eyes and cratering of the topcoat. Be careful not to use excessive hand pressure when using tack rags. A light dusting is all that is necessary, let the resin do the work. Even the best tack rags can leave a resin on the surface if used improperly

Surface preparation

Paint application is not advisable when relative humidity exceeds 90% to avoid the formation of condensation on the coating, the temperature of the surface should be at least 5°F (3°C) above dew point. During the application and curing the min. ambient temperature should be 50 °F since curing is reduced at lower temperatures. Application is not advisable when relative humidity exceeds 90%. The term-hygro-metric survey should be carried out near the surface to be coated. It is important to be sure there is sufficient ventilation when the application takes place in closed areas.

In absence of proper equipment the dew point conditions can be identified as follows: soak a clean lint-free cloth in fresh water and wipe the surface to leave a visible film of water. If the water evaporates from the surface within 10 minutes it may be safely assumed that the surface temperature is safely above the dew point at the time and location. If however the surface remains wet then dew point conditions preclude further work. Do several tests, because factors such as size, draughts or heat sources, etc can make conditions vary widely. Avoid applying topcoats when the temperature can drop below the dew point within 6-8 hours of application

Sandblasting

Sandblast steel to clean **White metal** or **Near-White metal**. In accordance with SSPC-SP5-85 or SSPC-SP10. This should produce a 3-4 mils profile. Be aware of weather conditions at the time of sandblasting to avoid oxidation of the steel. Sandblasted surfaces must be coated by using the appropriate primer such as [Boero YachtCoatings 653 Delta 3000 Anticorrosive Primer](#) or [Boero YachtCoatings 632 Epozinc Epoxy Primer](#) (the treated metal to the standards mentioned above) application before signs of oxidation or color variation (see specification for details)

Power-grind steel with a 16 to 24 grit disk to obtain the correct profile (see specification for details). Sand with coarse discs, be careful not to polish the surface and without ever exceeding the etching, the surface profile (roughness Rz) should be roughly around 2 – 3 mils. Power tool clean in accordance with SSPC-SP3. For interiors or small areas, beforehand consult with our technical staff, in accordance with SSPC-SP2 (Hand Tool Clean). Before proceeding with the application of recommended products, blow thoroughly with the use of uncontaminated, filtered, dry compressed air to remove any residue of dust or dirt. (Do not use rags, use a brush or broom if needed) Apply [Boero YachtCoatings 653 Delta 3000 Anticorrosive Primer](#) before signs of oxidation or color variation.

Power-grind aluminum with a 24 to 36 grit disk to obtain the correct profile (see specification for details). Sand with coarse discs (mechanical cleaning): the surface layer of the metal must be renewed completely and uniformly, removing any remaining oxidation. Be careful not to polish the surface and without exceeding the etching, the surface profile (roughness Rz) should be roughly around 3 – 4 mils. Before proceeding with the application of recommended products, blow thoroughly with the use of uncontaminated, filtered, dry compressed air to remove any residue of dust or dirt. (Do not use rags, use a brush or broom if needed) Apply [Boero YachtCoatings 653 Delta 3000 Anticorrosive Primer](#) before signs of oxidation or color variation.

Sanding

Sanding improves the primer layers' adhesion to substrates. Sanding between each product promotes inter-coat adhesion. Excessive sanding of surfaces may cut through the primer and may require additional coat of primer to be applied. The best way to use abrasive paper is to use the proper tool or sanding block. Sanding can be accomplished by both hand and power tools. Common hand tools include hand sanding blocks, short boards, or long boards. Air power tools commonly include D.A. (Dual Action) and orbital/random sanders.

Dry sanding: Once sanding is completed, it is necessary to remove traces of dust by wiping the surface with [Boero YachtCoatings Sirio](#) and/or [Thinner 693](#).

Wet sanding: allows to work faster and without creating dust. Once wet sanding is completed, it's necessary to wait for surfaces to be completely dry, in order to avoid any adhesion problems.

How to use dry and wet sandpaper:

Sandpaper Reference Chart

Dry	Wet	How to use it
40 / 60	-	Preparing surfaces before filling with putty or filler remove an old antifouling paint
80 / 100	-	Sanding putty, preparing undercoats, preparing antifouling paints
120 / 180	-	Final sanding of putty or filler
220 / 240	-	Sanding undercoats to eliminate defects of surfaces
280	360 / 400	Preparation for undercoats or enamel
320	600 / 800	Working on undercoats one last time before applying enamel

400	1000 / 1200	Eliminating enamel defects (runs, sags, dirt)
-----	-------------	-----------------------------------------------

Abrasive paper reference 3M numbering system

Abrasive paper grain definition

Abrasive paper no.	"P" grade papers
40 / 80	Very coarse-grained p.
100 / 150	Coarse-grained p.
180 / 240	Medium coarse-grained p.
280 / 360	Fine-grained p.
400 / 600	Very fine-grained p.
700 / 1500	Ultra fine-grained p.

III. Assessment of Existing Coating Condition

The existing surfaces must be inspected to determine the integrity of the old paint system. If the old coating system fails any of the following test, the old coatings must be removed.

Before starting to prepare or re-paint existing painted surfaces, it is essential to identify the type, nature, integrity and condition of the existing coatings. Following this physical assessment, it is then necessary to test the compatibility and chemical stability of the existing coatings with the intended new high performance coating system. The testing sequences described below are a prerequisite to any decisions with regard to the extent and type of preparation required.

Visual & Physical Examination of the general condition of the existing coatings provides an excellent preliminary filter with regard to refinishing options. Often proud Superyacht owners will exercise a simple version of this filter process and initiate a demand for re-coating when color, gloss, distinction of image, or other similar subjective attribute is, to their minds, compromised.

The existence of lowered gloss, color fade, etc does not necessarily constitute a coating system failure, so it is at this point that more specific assessments must be made in order to determine the best course of action. When re-painting is to be undertaken it must be understood that the existing coating system is potentially going to be the foundation for the subsequent re-finish. In light of this, the existing coatings must be carefully assessed for general integrity, inter-coat adhesion, and absolute adhesion to the base substrate. If topcoat delimitation (flaking, peeling, etc) is evident then such areas must be stripped back to the underlying sound coating before undertaking **Cross Hatch Adhesion** test described below. When in doubt plan to remove the entire existing finish coat and conduct adhesion tests on the underlying coatings. If the surface appears sound, with no peeling or flaking, do *not* assume that inter-coat adhesion is sufficient for re-coat maintenance work. Conduct the **Cross-Hatch Test** in a number of areas to ascertain the actual condition.

Cross Hatch Adhesion is conducted using a sharp fresh blade Stanley or NT-Cutter knife, 6 closely-spaced* parallel lines are scribed through the coatings down to the substrate and a further 6 intersecting lines scribed at right-angles to the first set with similar spacing* between the scribes. The line spacing may vary from as little as 1 mm for very thin coatings to 6 mm (3/16 inch) or more for thicker films. Generally on minimally faired full topside systems a (1/8 – 3/16) 5 or 6 mm spacing is desirable. Having scribed the surface, apply a strong self-adhesive packing or duct tape over the cross-hatch and rub it firmly in place with the thumb-pad or a pencil rubber

AS 1580 Method 408.4

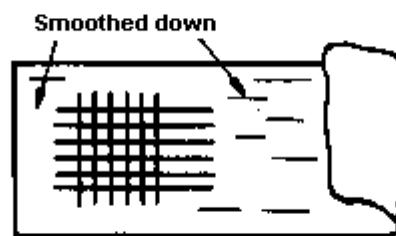


Fig. 1 POSITION OF TAPE WITH RESPECT TO GRID

Gripping the free end of the tape at 180° to the surface, then firmly pull the tape back in one sharp motion

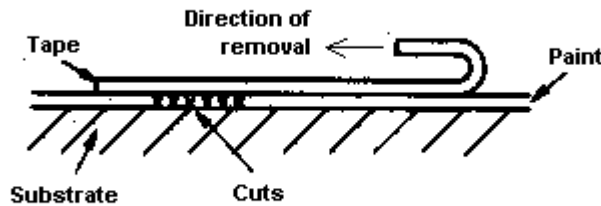


Fig. 2 POSITION OF TAPE IMMEDIATELY PRIOR TO REMOVAL FROM GRID

If any one square of the grid is removed the adhesion has failed. All the failed layers of the coating system must be removed.

Chemical & Compatibility Testing: After visual and physical testing has been completed, and the sound layer(s) of the existing coating system has been identified it is necessary to ascertain the chemical compatibility of the surface to be painted. Saturate a small section of new folded cotton cloth with [Boero YachtCoatings 693 Epoxy Thinner](#) and tape the cotton test cloth onto the scribed area. Leave the cotton test cloth on the surface for 30 minutes after the soak time, remove the wad and examine the surface. If the solvent has dissolved or severely softened any of the coating(s) then the existing system is incompatible, potentially unstable, and must be removed entirely if there is no effect, or slight softening or discoloration has taken place allow the test area to flash off for 30 minutes and repeat the physical cross-hatch test described above. If the test area passes, the system is suitable for over-coating, if the test area fails then the system must be removed down to and including the failed layer.

Coating Compatibility test: This test involves painting a small area approximately 2 ft square with the top coat to be utilized. It is sometimes necessary to test paint a larger area or numerous areas if there are existing concerns Sand the test area, apply the top coat, and allow 24 hours to cure. Conduct cross hatch to confirm inter-coat adhesion. If there is no lifting or chemical reaction the systems are compatible and surface preparation can begin.

Conclusions

If the existing system passes the assessment testing described above or, if underlying coatings in the existing system pass the tests, it is reasonable to replace or repair the necessary coatings. If you have localized damage back to the substrate then such areas should be spot prepared and primed as described in the relevant 'as new' painting system by replacing all missing coatings and continuing with the general repainting coating system adopted for the main job.

For a basically sound but aesthetically 'tired' or worn out topsides finish the re-paint system could be as simple as the stages described below.

- 1) Thoroughly clean and decontaminate the aged finish.
- 2) Sand existing painted surface with P 120 – P 150 grit
- 3) Apply required high build enamel undercoat [Boero YachtCoatings 962 Epoply Epoxy Undercoat](#) or [Boero YachtCoatings 676 Challenger HS UC Urethane Primer](#) following all instructions and safety precautions. Sand paper no. 320 – 400 (dry-very uniform)
- 4) Apply [Boero YachtCoatings 684 Challenger Hi-Tech](#) or [Boero YachtCoatings 673 Challenger Hi-Solid](#) topcoat following all instructions and safety precautions

IV. Troubleshooting

Orange peel

Description: observed as a dimpled or uneven surface that can be compared with the skin of an orange.

Potential Causes:

- Hot surface
- Inadequate spray equipment and techniques
- Inadequate pressure equipment
- Too high or too low temperatures
- Wrong thinner
- Wrong spray procedure/times
- Wrong over-coating interval

Prevention Techniques

- Choose the appropriate thinner and suitable for environment temperature.
- Use adequate spray equipment, settings and techniques
- Respect re-coating intervals
- Improve the visibility and ventilation

Solution

- Sand and paint again (same instructions as for "Gelcoat" and finishing paints)
- Sand and polish
- Choose appropriate thinner, and respect drying times before re-coating
- Bring top coat to recommended viscosity
- Use adequate spray procedures/times and techniques
- Avoid high temperatures if possible

Craters & Fish eyes

Description: Tiny openings in the finishing coat that look like tiny craters and are caused by contamination of the surfaces to be painted. The use of magnifying glass maybe necessary to determine finish defect.

Potential Causes:

- Inadequate surface cleaning
- Inadequate spray equipment and technique
- Inadequate drying times
- Consequences of past repairs
- Polluted equipment
- Workers using hand creams containing contaminants
- Old finishing coats containing fisheyes
- Wrong thinner
- Wax, Silicon, Teflon, or PTFE on surfaces
- Water or oil in the air used during coating

Prevention Techniques:

- Blow the surface thoroughly with the use of uncontaminated, filtered, dry compressed air
- Clean surfaces with appropriate solvent designed for wax ,grease or contaminant removal, before and after sanding

- Clean off solvents from surfaces by using antistatic cloth
- Use adequate spray techniques, clean equipment and choose the appropriate thinner
- Respect drying times before re-coating

Solution

- If the painted surface is still wet, remove wet paint by washing it off surface with the appropriate thinner and carefully re-clean the surface.
- Empty and clean equipment.
- If covering is dry, clean it by using appropriate contaminant removal product.
- Sand and clean with appropriate surface cleaning products
- Paint again

Pin Hole's

Description: Tiny holes in the finishing coat that have been caused by surface porosity or other defects of undercoat. The use of a magnifying glass maybe necessary to determine finish defect.

Potential Causes:

- Defects in substrate
- Surface porosity of substrate
- Not enough solvent/thinner

Prevention Techniques:

- Seal all porosity and eliminate surface defects before applying a Top coat.

Solutions

- Degrease surfaces
- Sand until you get a smooth surface and, if necessary, apply finish-filler and sand again
- Apply enamel undercoat
- Sand until you get a smooth surface

Solvent Popping

Description: Narrow open swellings, which can be found on film immediately after application. The use of a magnifying glass maybe necessary to determine finish defect.

Potential Causes:

- Wrong thinner
- Hot temperatures or excessive air flow on the applied coating
- Early hardening of the paint film before evaporation of the underlying solvent
- -Improper recoat time
- Excessive wet film or viscosity of material too high

Prevention Techniques:

- Choose the thinner suitable for hot temperatures.
- While applying the top coat, please check dust and respect re-coating intervals
- Improve ventilation: It can be either too much air flow or dead or no air flow across surface.
- Solution
- Sand thoroughly until you get a smooth surface (if necessary, apply finish-filler, sand again and apply enamel undercoat)
- Paint again

Runs and/or Sags

Description: Heavy application of sprayed material that fails to adhere uniformly to the surface.

Potential Causes:

- Incorrect spray viscosity, flash off time, technique, or film thickness.
- Defective spray gun or incorrect gun setup.
- Wrong thinner or reducer.
- Too much thinner or reducer.
- Lighting in the spray-booth is not accurate and the painter is unable to apply coating correctly.
- Surface is contaminated by oil, grease, etc.
- Shop, surface or paint is too cold.
- Low air pressure (causing lack of atomization), holding gun too close, or making too slow a gun pass.
- Incorrect technique of application.
- Paint drops from the gun.

Prevention Techniques:

- Allow surface to warm up to at least room temperature before attempting to refinish.
- Try to maintain an appropriate shop temperature for paint areas.
- Use proper gun adjustment, techniques, and air pressure.
- Don't pile on finishes. Allow sufficient thinner/reducer to flash off, increase drying time in between coats.
- Select proper amount thinner/reducer. Be sure reducer/thinner selected is for the current application temperature.
- Read and carefully follow label or product data sheet instructions.
- Select the thinner or reducer that is suitable for existing environmental.
- Install accurate lighting systems in the spray booth.
- Ensure that the spray gun is in good working order.

Solution:

- Wash off the affected area and let dry until you can sand the affected area to a smooth surface and refinish. For solid colors and clear coats, sanding and polishing is recommended. In the case of a basecoat, refinishing after sanding is necessary.

Dry Spray

Description: Granular texture normally with no gloss at all. This defect is normally limited to small areas.

Potential Causes:

- Incorrect viscosity.
- Improper choice of thinner, reducer or activator; generally, too fast for spray conditions.
- Spraying too fast.
- Air pressure too high.
- Spray gun too far from surface while applying.
- Improper spray gun setup.

Prevention Techniques

- Follow recommendations on the Technical Data Sheet for mixing ratio and reduction, appropriate to spray conditions.
- Adjust spray gun settings, spray pattern, fluid feed.
- Use recommended air pressure.

Solution

- Allow the paint to dry and then sand. After sanding, and depending on the magnitude of the defect, re-spraying or polishing will be necessary.
- Don't pile on topcoats. Allow sufficient flash and drying time between coats.

- Do not dry by fanning with compressed air from the spray gun.
- Stir all pigmented undercoats and topcoats thoroughly.
- Read and carefully follow recommendations in the Technical Data Sheet(s). Additives not specifically designed for a color coat may weaken the final paint film and make it more sensitive to cracking.
- Confirm selection of improper thinner/reducer for existing ambient temperature.
- Improper surface cleaning. When not properly cleaned, primer-surfacer coats may crawl or draw away from the edge because of poor wetting and adhesion.
- Improper drying. Fanning with a spray gun after the primer-surfacer is applied will result in drying the surface before solvent or air from the lower layers is released.
- Finishing grit of sandpaper too coarse.

Slow Drying

Description: Paint takes a longer time to set up or dry than detailed in the Technical Data Sheet.

Potential Causes:

- Wrong activator.
- Incorrect mixing ratio.
- Heavy application.
- Incorrect reducer or activator for spray conditions.
- Poor drying conditions: too humid, insufficient air flow or ventilation.
- Insufficient flash off time between coats.
- Use of non-system activators or reducers

Prevention Techniques:

- Use recommended system activators and reducers, per the Technical Data Sheet.
- Apply recommended film thickness.
- Allow sufficient flash off time between coats.
- Improve spraying and/or drying conditions.

Solution:

- Place the vessel or part in a warmer, more ventilated area. The drying process may be accelerated with the application of heat and improved airflow.

V. Fairing & Surfacing Process

Fairing and surfacing are similar activities with subtle but specific differences. Often both procedures will be used on the same project or surface.

Fairing

In general, fairing involves the use of trowel applied filler putties such as [Boero YachtCoatings 620 Epolight Plus](#), [656 Epolight Win](#) or [605 Epoprofile Epoxy Fillers](#) which can be applied from 1/8 up to 1/2 inch of film thickness. Fairing may often involve creating a new line or shape to the surface, not just filling low areas or dents and dings. [Boero YachtCoatings](#) products used for this process include our light weight (0.6 specific gravity) [Epolight Plus](#) or [Epolight Win](#) (2:1 mix ratio). [Boero YachtCoatings 604 Epomar UltraFine Epoxy Filler](#) (2:1 mix ratio) can be trowled onto the surface to address minor flaws in surface. The additional option of mixing [Epolight Win/Plus](#) with [Epomar](#) for a creamy smoother tight skim or finish fairing material is also an option. If a 1:1 mix product is desired or a mix machine is to be used we offer [Boero YachtCoatings 605 Epoprofile](#) Epoxy Filler.

Warning: Do not use automotive body fillers, spot putties, lacquer glazing putties, or similar water sensitive products in fairing projects. These products are not designed for marine applications and will not adhere to the fairing or surfacing coatings. Another potential problem that may occur with use of 'automotive' style fillers is there tendency to absorb and react with moisture that may transmit through the coating film.

Application Procedure

Properly prepare and prime the substrate surface. See surface preparation sections for each substrate for this information. It is recommended that [Delta 3000](#) be applied over the previously primed substrates requiring fairing.

1. Examine the surface for highs and lows. Mark low areas with a pencil. **Do not use felt tip markers or ink pens.**
2. Sand any areas that have excessive thicknesses of existing epoxy coating or that have cured for extended periods with 40-80 grit sand paper. If the substrate is exposed re-prime before applying fairing.
3. Fill prepared surfaces with [Epolight Plus/Win](#) or [Epoprofile](#) our 1:1 machine or hand mixable fairing product. Thoroughly mix the material to a uniform color with no streaks or lumps. Mixing is best carried out on a flat mortar board using a large trowel. Mix in such a way as to avoid inducing or trapping air. Apply [Epolight Plus/Win](#) or [Epoprofile](#) by trowel to an area you can finish in 30-45 minutes. Start with thin coats in low areas and build out to high areas. Allow to cure. Several applications may be necessary to fill large areas. Block and machine sand with 40 to 80 grit paper. Blow off or remove by suction any sanding dust and residue before applying more filler. Stop when the faired surface has a uniform surface, which meets the fairing quality, specified for the project.
4. Finish the surfaces with blends of [Epolight Plus/Win](#) & [Epomar](#) and, after with only [Epomar](#) Filler. Epomar is formulated to address surface imperfections resulting for the fairing process. Epomar is used to seal [Boero YachtCoatings](#) fairing compound products. It can be mixed into the final coat of Epolight Plus/Win; See instructions. [Epomar](#) is designed to save fairing process time by filling low's voids porosity and minor surface imperfections. It can reduce the amount of Delta UCHB required for the project.
5. Use of [Epomar](#) is required as a layer within the [Epolight Plus/Win](#) fairing system; It improves overall hardness, minimizes porosity and fills any unintentional surface pockets caused by air entrapment during the application process.

Epomar Options

- a. Apply [Epomar](#) as a porosity sealer coat to finish faired [Epolight Plus/Win](#) surface
- b. [Epomar](#) mixed into [Epolight Plus/Win](#): Mix separately add up to about 50 % of total mix to fairing material
- c. Apply as spot repair as necessary to "finish" fairing of trowelable material

Note: If you use [Epoprofile](#) you can skim the surface with only [Epomar](#) Filler (also for some works this last stage can be avoided, beforehand consult with our technical staff)

Warning: Do not add reducers, solvents or thinners of any kind to the fillers.

Surfacing

Surfacing is usually accomplished through the use of sprayed coatings which are relatively thick (viscous) products which will fill and cover scratches, dings, pinholes, light crazing, and new construction mold defects. These surfacing products are designed to address relatively minor physical defects on a surface or part which otherwise has a true or fair line.

[Boero YachtCoatings](#) surfacing products include:

[Boero YachtCoatings 604 Epomar UltraFine Epoxy Filler](#) (mix 2:1) that can be used in this application (with trowel or spatula) as tight skim filler for minor imperfections.

[Boero YachtCoatings 636 Delta UC HB Epoxy Undercoat](#) (mix 4:1) to protect the surface treated with epoxy filler able to remove marks and slight imperfections

[Boero YachtCoatings 612 Epospray HB Epoxy Sprayable Filler](#) (mix 3:1) is a epoxy spray fairing

[Boero YachtCoatings 962 Epoply Epoxy Undercoat](#) (mix 4:1) is a finish primer before the application of [Boero YachtCoatings](#) Challenger Top Coats.

The basic requirements:

1. Always seal the completed fairing/surfacing system with at least one full coat of [Delta UC HB](#) (recommended two coats, one coat per day, of 6 mils → 150 µm for a total of 12 mils → 300 µm – DFT),. This will provide the fairing system with a last sealer layer for high protection,
2. Apply one coat of enamel undercoat [Epoply](#) (3 - 6 mils - DFT) or [Challenger HS UC](#) (2,4 – 6 mils DFT)

The application of [Epoply](#) or [Challenger HS UC](#) gives the surface a more uniform finish and enables the high gloss of [Challenger Hi-Tech](#) or [Challenger Hi-Solid](#) finish coat.

NOTE: special attention when applying highbuild primer/undercoat directly on [Epoprofile](#) or [Epomar](#). Make sure the first coat is no thicker then 6 mils DFT.

Surfacing products in the [Boero YachtCoatings](#) Yacht Paint range also include [Epospray](#) (6 – 14 mils DFT, generally as an alternative to [Epomar](#)), Delta UCHB and [Epoply](#). Each product has specific characteristics, which can help to make the surfacing process easier. It is required that all surfaces be properly prepared and sanded before applying the next product and no product be used beyond its recommended maximum dry film thickness.

Application Procedures

- 1 Apply by spray (recommended) or roller a coat of [Delta UC HB](#) (6 mils - DFT). Apply, the next day by spray (recommended) or roller another coat of [Delta UC HB](#) (6 mils - DFT). Roller application of this coat will seal and protect the cured epoxy filler underground. It is preferable to allow at least 1 day (2 days recommended) to dry before starting the sanding.
- 2 Apply by spray a guide coat (mist applied) of epoxy primer. The reason for this mist coat is to give a visual indication of where sanding has been completed. Sand (Long board) all surfaces with 150-220 grit to achieve a fair finish. Check sanded surfaces for any voids. Fill any voids and small imperfections with [Epomar](#) Filler. Allow to cure overnight (12 to 24 hours).
- 3 Apply by spray one coat of enamel undercoat [Epoply](#) (3 – 6 mils - DFT) or [Challenger HS UC](#) (3 – 6 mils DFT)
- 4 Apply by spray a guide coat (mist applied) of epoxy primer. The reason for this mist coat is to give a visual indication of where sanding has been completed. Sand (Long board) all surfaces with 320-400 grit to achieve a fair finish. Check sanded surfaces for any voids. Fill any small imperfections with [Epomar](#) Filler. Allow to cure overnight (12 to 24 hours). Spot apply by spray either one coat of [Epoply](#) to any spot prepared void areas. Allow to cure overnight (12 to 24 hours). Sand (Long board) any void prepared areas with 320-400 grit to achieve a fair

finish.

Minor surface imperfections: Blister/Corrosion Repair

1. Examine the surface for scratches, marks and minor surface imperfections. Mark areas with a pencil. Do not use felt tip markers or ink pens.
2. Sand areas where [Epomar](#) filler is to be applied with 80-grit paper, feathering back edges to sound existing coatings. Blow off the surface with clean, dry compressed air while dry wiping with clean cloths to remove sanding dust and residue.
3. Fill all sanded areas with [Epomar](#) Filler. Thoroughly mix the material to a uniform color with no streaks or lumps. Warning: Do not add reducers, solvents or thinners of any kind to [Epomar](#) Filler. Allow to cure overnight (12 to 24 hours). Block and or machine sand with 120 grit paper, feathering gently back to sound existing coatings. Blow off sanding dust and residue. Check surfaces for any remaining imperfections. Repeat step 3 if required.
4. Apply by roller or spray either one or two spot coats of [Delta UC HB](#) (6 or 12 mils - DFT) to spot filled areas to dry. Block and or machine sand with 150-220 grit paper, feathering gently back to sound existing coatings. Blow off sanding dust and residue.
5. Apply one coat of [Epoply](#) as a enamel undercoat (3 – 6 mils - DFT) or [Challenger HS UC](#) (2,4 – 6 mils DFT) and finish sand to 320-400grit. Remember to use guide coat to identify all imperfections prior to application of any topcoat

Warning: all other surfaces without filler to be coated with undercoat and topcoat must be sanded with 150-180 grit paper

VI. Thinners and Solvents

What is of fundamental importance to get the best results, is the correct viscosity of products on applying them. Follow mixing instructions for every product and add the recommended quantity of thinner to achieve the correct degree of viscosity.

Use the most suitable thinner (20 – 35%) for different climate and user conditions.

Mix 2: 1 between [Boero YachtCoatings Thinner 696](#) and [Thinner 697](#) in case of temperatures between 15°C and 18°C
[Thinner 697](#) in case of temperatures between 18°C and 35°C

Top coat Accelerator options

Do not over use. Do not exceed recommendations. The improper use of accelerators can jeopardize the longevity of the coating. Use carefully and with limited frequency (add accelerator 672 if needed; it is advisable to treat only up to a gallon of product at the time, in case of large surfaces

Utilization schema for [Boero YachtCoatings](#) thinners

	Short Code	Description	Thinner	Percentage
ANTI FOULING	700619	Altura 619	703	3-5%
	700633	Mistral 633	703	3-5%
	700630	Magellan 630	703	3-5%
	700611	Corsaire 611	703	3-5%
	700622	Scirocco 622	703	3-5%
	700952	Season 952	703	3-5%
	700933	Admiral 933	703	3-5%
	700618	Orion Extra	693	3-5%

	Short Code	Description	Thinner	spray	brush	roller
PRIMERS AND FILLERS	613-001	Defender Underwater Epoxy Primer	693-000	15-25%	5%	5%
	613-000C	Defender Underwater Epoxy Primer	693-000			
	653-171	Delta 3000 Anticorrosive Primer (mix 4:1 with 651)	693-000	10%		
	636-051	Delta UC HB Epoxy Undercoat (mix 4:1 with 651)	693-000	10%		
	962-001	Epoply Epoxy Undercoat (mix 4:1 with 651)	693	15%	5%	5%
	651-00C	Comp B / Hardener for 653 - 636 - 962				
	632-051	Epozinc Epoxy Primer for Steel (mix 3:1 with 632C)	693	10%	5%	5%
	632-00C	Comp B / Hardener for 632				
	676-001	Challenger HS UC: Urethane PrimeR	696/697	30%		
679-000	Comp B / Hardener for 676					
TOP-COAT	673....	CHALLENGER HS	696/697	35%		
	684. ...	CHALLENGER HT	696/697	20-30%	10%	
	685.000	CHALLENGER UV	696/697	20-30%	10%	10%
	678-200	Challenger HS CLEAR	696/697	30%	15%	15%
VARNISHES	667-000	SUNGLOSS Varnish	703	10-20%	10%	10%
	643-000	ALTURA UV Varnish	703	10-20%	10%	5%
	648-000	ALTURA UV MATT Varnish for exterior and interior use	703	10-20%	10%	5%
	685-000	CHALLENGER UV two component Varnish (kit)	696/697	20-30%	10-20%	10-20%
	647-376	BIOWOOD Teak Stain	703		15%	15%
	671-000	POLYWOOD two Component Sealer	696/697	5-20%	5-10%	5-10%

VII. Methods of applying topcoats

Spray coating

CHALLENGER LINEAR POLYURETHANE SYSTEM

[Boero YachtCoatings](#) has been producing a full range of Acrylic, Polyester and Polyacrylic High Solids, topcoats for many years. The Challenger system includes solid colors and metallic colors, as well as, special effect topcoats. The Challenger system utilizes two-component epoxy primer systems and ultra-light weight epoxy fillers. This system has been used on all substrates including wood, fiberglass, aluminum and steel boats. [Boero YachtCoatings](#) has a strong track record of applying coatings systems for boats ranging in size from 20 feet runabouts to superyachts 420 feet in length.

CHALLENGER TOPCOATS

Challenger topcoats are known for exceptional high gloss formulations delivering a mirror like finish. These polyurethane finishes are formulated to deliver a deep, reflective clarity (referred to as distinction of image). They are known for their abrasion resistance and work with mild chemical cleaners. Challenger topcoats contain state of the art UV absorbers to protect the finish from sun and salt water. These UV absorbers provide high gloss and deliver long term color retention. The Challenger Topcoat includes the following products:

[Challenger Hi-Tech Topcoat](#)

This state of the art polyester coating provides unsurpassed abrasion resistance and long term gloss and color retention. It is scuff and scratch resistance while requiring low maintenance. It has exceptionally good chemical resistance to gasoline and diesel fuel and will deliver long service life and durability.

[Challenger Hi-Solid Topcoat](#)

This topcoat is a low VOC, high solids, high gloss Polyacrylic topcoat. It is available in 2000 colors. [Challenger Hi-Solid](#) is low maintenance, easy to clean, easy to repair and can be polished if required. Its hard surface makes it stain resistant. It too is formulated to have exceptional Gloss, DOI and long term high gloss performance.

Equipment Needed: Paint sprayer/application gun (Binks, DeVilbiss, Iwata models)
(Spray nozzle, most frequently used 0.03 – 0.05 inch)

Compressed air: When compressed air is used, paint sprayers and spray nozzles must be clean and oil-free; what's more, please check that the air compressor, filters and the overall equipment are working properly. Separators must be regularly checked to eliminate deposits of contaminants or condensation. Incoming air must be clean and dry not only for spray equipment, but also for dusting surfaces and employing other pneumatic tools. We suggest the following air pressure for a paint sprayer: 35 psi to 60 psi (2.5 – 4 bar). Follow gun manufacture instructions for each type and viscosity of liquid coating. These values might be different according to the equipment used. When long hoses are used, we suggest you set outgoing pressure at sufficient pressure to compensate for 70 - 85 psi (5-6 bar) to prevent ordinary air pressure drops in hoses from occurring. It is important to always check pressure at the gun before proceeding with any coatings application.

When using spray coating, the quantity of product carried by the equipment (air + paint) is proportional to the diameter of the nozzle. In order to get first quality finishing coat, thin nozzles and needles must be used.

We suggest the following diameters for the most frequently used nozzles: .0040 – .0110 of an inch (1.0 – 2.2 mm). This product is provided in two containers: their contents must be fully and carefully mixed before use. If thinning is needed, mix the two components before carrying it out.

[Challenger Hi-Tech](#); Requires 2, or advisable 3 wet coats to achieve required DFT

Dry film thickness	1.6 – 2.4 mils each coat (40 - 60 μ m)
Wet film thickness	4 - 6 mils each coat (100 -150 μ m)
Theoretical performance of the product at the indicated thickness	325 sq feet/gallon (8 m ² /liter)

Challenger Hi-Solid Requires 2 coats to achieve required DFT. When properly applied this product achieves maximum gloss and provide its best longevity in 2 coats

Dry film thickness	1.6 – 2.4 mils each coat (40 - 60 µm)
Wet film thickness	2.4 – 3.6 mils each coat (60 - 90 µm)
Theoretical performance of the product at the indicated thickness	545 sq feet/gallon (13,4 m ² /liter)

Spray application: Apply 2 or 3 coats in sequence

After washing the surface and cleaning the ambient where spraying is to be carried out, apply by spray the **Challenger Hi- Solid** (two coats wet on wet) or **Challenger Hi-Tech** to it (one first thin root coat; then a second and third thicker layers); overall thickness must be 2 mils (50 µm) average microns DFT (example when applying clear coat), For a thicker enamel coat, sand the surface, after 24-48 hours depending on the temperature, by using fine-grained dry sandpaper no. 400 and then reapply the finishing coat.

Before applying, let the catalyzed and diluted product rest for about 10 min. First, apply a tie coat/base coat layer, so that surfaces are very well wetted and paint film is well spread; (often referred to as a medium wet coat) wait for 20 to 30 min. (according to ambient temperature), then apply the second ‘crossed’ layer, checking that the film is smooth and well spread.



Note Vessel returning to service

The applied product must not come into contact with water, or any chemical products Freshly painted surface should not be placed into service in less than 48-72 hours. It is the preferred method to not place into service for at least 7 days.

Spray application information Section

- BINKS : for detailed info please visit www.autorefinishdevilbiss.com/
- DEVILLBISS : for detailed info please visit www.autorefinishdevilbiss.com/
- IWATA : for detailed info please visit www.anestiwata.com/

Thinners and Temperatures of **Challenger Hi-Tech** or **Challenger Hi-Solid**

15°C - 18 °C / 59 °F – 65 °F	Use 696 or 697. These two products can be blended if required
20°C – 35 °C / 68 °F – 90 °F	Use only 697
15°C - 35 °C / 59 °F – 90 °F brush and roller	Use 697 or 698

At higher temperatures increased thinning, until 40% maximum (for Challenger HS SE base matt until 70-80 % maximum).
Note. H.R must be below 90%

Brush coating

In such cases, use first quality bristle brushes, resistant to solvents and thinners used in polyurethane products. Round and oval-shaped brushes are to be used on difficult surfaces, whereas flat-shaped brushes are to be used on flat surfaces. Challenger HT Catalysis ratio 2:1 (with brush catalyst 687.000) catalyzed products last between 8 and 12 hours according to ambient temperature. Before adding the appropriate thinner, wait approximately 10 min. for proper induction to be completed and for correct viscosity to be achieved by thinner [Boero YachtCoatings 697 Thinner](#).

Two coats are to be applied by brush coating; wait 12 to 14 hours before applying the second coat. Hold the brush oblique at 45° and cross brush strokes. Last coat must be applied vertically on surfaces to minimize the creases of the brush and ease the cleaning of surfaces.

In order to obtain a smooth finishing coat, coat of top coat applications. One coat and the next (sandpaper no. 320-400). It is suggested to sand surfaces between the 1st coat and the 2nd

Roller coating

The best method to be used on large surfaces is employing two people working at the same time. One to apply the finishing coat by using a mohair short-bristle roller with phenolic core or a polyurethane foam roller. The other to follow his colleague and brush vertically the product that has been just rolled on. This allows the air trapped in the applied film to be let free. This process is referred to as "**tipping**". To insure good results the brush tipping should closely follow roller application. The use of appropriate additives extremely reduces any surface defects. It is very important to only use urethane resistant rollers. Typically short nap 1/8 inch works best. Foam rollers can slide or leave roller debris in wet film coating. If applying the products as described, the paint rollers can leave a lot of 'micro and macro-foam' air bubbles in the film you have just applied. This foam is difficult to remove and may produce bubbles. It will be necessary to use a brush to remove these air bubbles out of wet paint film.

Example of typical painting sequence applied by roller

- Apply the first coat
- Let it dry for at least 24 hours
- Carefully sand surfaces by using 3M 255 P 320 - P 400
- Blow down with clean, dry, oil free air.
- Use tack cloth to prepare surface for finish coat.
- Then apply the second coat of top coat by following the same procedure described for the first coat

NOTE: Brush and roller application always requires the use of the proper catalyst and /thinners for the proper brushing top coat mixture. Physical data pertaining to two-component products are pertinent to components that have been already mixed, unless differently stated. Thickness of wet film relates to non-diluted products. These values must be increased after dilution. Please check thickness of the applied film by using appropriate tools. If a top coat is "over" reduced/thinned it will require additional coats of paint to yield proper DFT for proper gloss and long term gloss retention.

VIII Application by Substrate

Steel: Surface Preparation:

Steel boats usually require various levels of filling or fairing, particularly adjacent to welds. Fill and fair after completion of surface preparation and priming. Where fairing is required use [Epolight Plus/Win](#) or [Epoprofile](#), which should be applied over either Delta 3000 or **Delta UC HB**. (Refer to system notes).

<http://www.boeroyachtcoatings.com/en/yacht-coatings/fillers/>

Surface Preparation & Priming – Above & Below Waterline

Before Sand Blasting:

1. **Steam clean/water wash;** Wash with high pressure fresh water to remove all traces of grease or oil (if necessary wash with specified thinners). All surfaces to be painted must be clean, dry and without contamination (if necessary use the Bresle method - SSPC-SP12 to check the salinity grade). This water wash will, by evidence of 'breaks', highlight any greasy contamination. Thoroughly clean and degrease all surfaces with [Boero YachtCoatings Sirio](#) and/or [Boero YachtCoatings 693 Epoxy Thinner](#). On any areas with residual oil or greasy contamination it is recommended to perform a solvent clean in accordance with SSPC-SP1. Degreasing with correct Solvent using the two-cloth method. Alternatively use commercial *specified and tested* detergents, steam cleaners or pressure washers. Be sure all detergent residues are rinsed from the surface. Ensure that the water is 'sheeting out' (no breaks in water film) while rinsing. If the water 'breaks' or 'beads' while rinsing, this indicates that contamination is still present on the surface. Spot degrease any affected areas. Repeat rinse, checking for any 'breaks or beads'. Important: Plan your work schedule carefully! Any area, which is abrasive, blasted or power tool cleaned per Step 2 must be primed per Step 3 during the same work shift.
2. **Abrasive blast** to white metal in accordance with SSPC-SP5-85 (Review to match USA spec research SSPC-SP5-85) or to near white metal SSPC-SP10 (respectively corresponding to Sa 3 and Sa 2 ½ - in accordance with SIS 055900:1967 or ISO. 8501-1) to achieve a 3 - 4 mils profile. **Power Tool Clean** in accordance with **SSPC-SP3**: sand with coarse discs, be careful not to polish the surface and without ever exceeding the etching, the surface profile (roughness Rz) should be roughly around 2 – 3 mils . Remove all unsound coatings / corrosion etc. Feather back edges to sound existing coatings.
3. **Blow off** the surface thoroughly with clean, dry, compressed air to remove all blast/grind residue and any dust or dirt. Use a brush or broom if necessary. Caution: Do not use rags to clean this surface. The sharp metal will snag fibers from the rags. These fibers can act as wicks for moisture or other contamination to enter the paint film which can lead to premature failure of the coating system. Proceed to Step 4 as soon as practical or, however before signs of oxidation or colour variation on metal (treated to the standards mentioned above)
4. **Prime** the entire prepared surface with [Boero YachtCoatings 653 Delta 3000](#) Anticorrosive Primer preferably by spray, brush or roller application may require two coats – note fiber wicking caution in 2 above) or [Boero YachtCoatings 632 Epozinc](#) (only spray) Epoxy Primer for steel.

Note: If you plan to measure the thickness of the [Boero YachtCoatings 653 Delta 3000](#) during application, this will only be possible with a wet film thickness gauge. With this comb, you will not measure the roughness of the metal, but only the film thickness of the paint applied. If you measure the film thickness with a dry film meter, then you should take subtract 1 mil of the total. This is the average of the deepest sandblast holes that are actually filled with [Boero YachtCoatings 653 Delta 3000](#).

5. Proceed with the selected [Boero YachtCoatings](#) fairing or surfacing coatings. Seal with primer as soon as possible, not to exceed 12 hours.

Notes:

Use only non-lubricated abrasive discs, sandpaper or "Dry" paper to sand the primer or sand and shape the filler.

Application on Steel (below waterline)

- Apply a thin coat of [632 Epozinc](#) – DFT: 1 – 2 mils (25 – 50 µm) on steel surface after sandblasting.
- Apply one coat of [653 Delta 3000](#) – DFT: 1.6 – 2.8 mils (40 – 70 µm).

Note: If you plan to measure the thickness of the [Delta 3000](#) during application, this will only be possible with a wet film thickness gauge. With this gauge, you will not measure the roughness of the metal, but only the film thickness of the paint applied. If you measure the film thickness with a dry film meter, then you should subtract 1 mil of the total. This is the average of the deepest sandblast holes that are actually filled with [Delta 3000](#).

- Sand the primer by using dry sandpaper no. 180-220;
- Clean the surface with thinner [Boero YachtCoatings 693 Epoxy Thinner](#).
- Apply the first of three coats (see specification for details) of [Defender 613](#). Each coat of [Defender](#) must be WFT: 6 mils → 130 - 150 µm (DFT: 5 – 4 mils → 125 - 100 µm). Before applying the second coat, wait a min. of 3 ½ hours up to a maximum of 3 months (59 - 68 F)
- Wait a minimum of 5 hours after having applied the third coat of [Defender](#)
- Apply the first coat of antifouling after a min. of 4 hours up to a maximum of 3 months (59 – 68° F). The thickness of each coat of antifouling paint applied by spray, roller or brush must be 2 – 2.8 mils (50 – 70 µm) - DFT. Wait a minimum of 12 hours before applying one more coat.

Application on Steel (Above waterline)

- Apply one coat of [653 Delta 3000](#) – DFT: 1.6 – 2.8 mils (40 – 70 µm).
- Sand the primer by using dry sandpaper no. 180-220; clean the surface with [Thinner 693](#) and start fairing (if required) by using [Epolight Plus/Win](#) or [Epoprofile](#) filler (max. 0.40 inch – 1 cm thickness in one coat)
- Wait 24 hours, before sanding the surface with dry sandpaper no. 40 – 80, and then continue fairing. If ambient temperature is higher than 68 °F, a second coat can be applied without sanding after about four hours from the first, which still features a partial curing. Once fairing is almost done, apply one coat of [Epolight Win/ Plus](#) mixed with [Epomar](#), coat's ratio varying from 10 to 50% (suggested mixture: 10 lt. of [Epolight](#), 1 or 3 lt. of [Epomar](#). Before mixing these putties, catalyze them separately.
- Sand with dry sandpaper no. 40 – 80.
- Apply one or two coats of [Epomar](#) to reduce the porosity of the lower layer of filler (overall thickness must be 12 – 80 mils). Alternatively apply one or two coats of [Epospray](#) (overall thickness must be 6 – 14 mils). Sand with dry sandpaper no. 80 – 120.
- Apply two coats of [Delta UC HB](#), 6 mils each (DFT); wait 12 to 24 hours before applying the second coat. Sand with dry sandpaper no. 150 –180: is preferable to allow at least 1 day (2 days recommended) to dry before starting the sanding.
- Apply one coat of enamel undercoat [Epoply](#) (3 – 6 mils – DFT) or [Challenger HS UC](#) (2.4 – 6 mils DFT)
- Sand the surface by using dry sandpaper no. 320-400.
- After washing the surface and cleaning the ambient where spraying is to be carried out, apply by spray the **Challenger HS** (two coats wet on wet) or H.-T. to it (one first thin root coat; then a second and third thicker layers); overall thickness must be 2 mils (50 µm) average microns DFT (example when applying clear coat), For a thicker enamel coat, sand the surface, after 24-48 hours depending on the temperature, by using fine-grained dry sandpaper no. 400 and then reapply the finishing coat.

Notes:

* Use only non-lubricated sandpaper or “Wet (only for topcoat)-Dry” paper. If lubricated papers have been used or are suspected to have been used then surfaces must be thoroughly degreased using specified Degreasing Solvent

Aluminum: Surface Preparation & Priming – Above & Below Waterline

Before blasting:

- 1 **Water wash and degreasing** (see info above in Steel section).
- 2 **Full sweep abrasive blast** utilizing a non-metallic blast media (USA 4-6 mils) or Power tool clean (e.g. grind using a 24 to 36 disc*) to remove all unsound coatings / corrosion, etc (feather back edges to sound existing coatings):

surface layer of the metal must be renewed completely and uniformly, removing any remaining oxidation. Be careful not to polish the surface and without ever exceeding the etching, the surface profile (roughness Rz) should be roughly around 3 – 4 mils (up to 5 mils with Full sweep abrasive blast).

Note: If you plan to measure the thickness of the [Delta 3000](#) during application, this will only be possible with a wet film thickness gauge. With this gauge, you will not measure the roughness of the metal, but only the film thickness of the paint applied.

If you measure the film thickness with a dry film meter, then you should subtract 1 mil of the total. This is the average of the deepest sandblast holes that are actually filled with [Delta 3000](#).

- 3 **Blow off** the surface thoroughly with clean, dry, compressed air to remove all blast/grind residue and any dust or dirt. Use a brush or broom if necessary. Caution: Do not use rags to clean this surface. The sharp metal will snag fibers from the rags. These fibers can act as wicks for moisture or other contamination to enter the paint film which can lead to premature failure of the coating system. Proceed to Step 4 as soon as practical or within the day of preparation.
- 4 The surface must be primed immediately after preparation as described above. For best results the surface should be sprayed with [Boero YachtCoatings 653 Delta 3000](#) Anticorrosive Primer.
- 5 Proceed with the selected [Boero YachtCoatings](#) fairing or surfacing product.

Notes: Use only non-lubricated abrasive discs, sandpaper or “Dry” paper.

Application on Aluminum (Above waterline)

- Apply one coat of [Delta 3000](#) – DFT: 1.6 – 2.8 mils (40 – 70 µm).
- Sand the primer by using dry sandpaper no. 180-220; clean the surface with [693 Epoxy Thinner](#) and start fairing (if required) by using [Epolight Plus/Win](#) or [Epoprofile](#) filler (max. 0.40 inch – 1 cm thickness in one coat)
- Wait 24 hours, before sanding the surface with dry sandpaper no. 40 – 80, and then continue fairing. If ambient temperature is higher than 68 °F, a second coat can be applied without sanding after about four hours from the first, which still features a partial curing.
- Once fairing is almost done, apply one coat of [Epolight Win/Plus](#) mixed with [Epomar](#), coat’s ratio varying from 10 to 50% (suggested mixture: 10 lb. of Epolight, 1 or 3 lb. of [Epomar](#). Before mixing these putties, catalyze them separately.
- Sand with dry sandpaper no. 40 – 80.
- Apply one or two coats of [Epomar](#) to reduce the porosity of the lower layer of filler (overall thickness must be 12 – 80 mils). Alternatively apply one or two coats of [Epospray](#) (overall thickness must be 6 – 14 mils). Sand with dry sandpaper no. 80 – 120.
- Apply two coats of [Delta UC HB](#), 6 mils each (DFT); wait 12 to 24 hours before applying the second coat. Sand with dry sandpaper no. 150 –180: is preferable to allow at least 1 day (2 days recommended) to dry before starting the sanding.
- Apply one coat of enamel undercoat [Epoply](#) (3 – 6 mils – DFT) or [Challenger HS UC](#) (2.4 – 6 mils DFT)
- Sand the surface by using dry sandpaper no. 320-400.
- After washing the surface and cleaning, apply by spray the Challenger High Solids (two coats wet on wet) or High Tech to it (one first thin root coat; then a second and third thicker layers); overall thickness must be 2 mils (50 µm) average DFT (example when applying clear coat). For a thicker enamel coat, sand the surface, after 24-48 hours depending on the temperature. Use fine-grained dry sandpaper no. 400 and then reapply the finishing coat.

Notes: Use only non-lubricated sandpaper or "Wet (only for topcoat)-Dry" paper. If lubricated sand paper has been used or are suspected to have been used the surfaces must be thoroughly degreased using specified [Boero YachtCoatings](#) Degreasing Solvent.

Application on Aluminum (below waterline)

- Apply one coat of [Delta 3000](#) - DFT: 1.6 – 2.8 mils (40 - 70 µm).
- Sand the primer by using dry sandpaper no. 180-220.
- Clean the surface with [Thinner 693](#).
- Apply the first of three coats (see specification for details) of [DEFENDER 613](#). Each coat of [DEFENDER](#) must be WFT: 6 mils → 130 - 150 µm (DFT: 5 – 4 mils → 125 - 100 µm). Before applying the second coat, wait a min. of 3 ½ hours up to a maximum of 3 months (59 - 68 F)
- Wait a minimum of 5 hours after having applied the third coat of [DEFENDER](#)
- Apply the first coat of antifouling after a min. of 4 hours up to a maximum of 3 months (59 – 68° F). The thickness of each coat of antifouling paint applied by spray, roller or brush must be 2 – 2.8 mils (50 – 70 µm) - DFT. Wait a minimum of 12 hours before applying one more coat.

WOOD: Surface Preparation:

The following surface preparation information is recommended for all but the most severe cases of deterioration on a wooden boat. The selected [Boero YachtCoatings](#) finish coat, and possibly underlying intermediate coatings, may crack over working seams and joints. In the case of a repaint, if the existing paint on the boat is cracking over a seam or joint then it is likely that cracking will be repeated after re-painting. The wood must be clean dry, and well seasoned. The humidity content of the wood must be below 18%. Never paint wet or green timber; painting such timber will almost certainly result in blistering of the coating system. Sand the surface smooth with 40 to 100 grit non-lubricated* paper. Blow off the surface with clean, dry, compressed air while wiping with clean (lint-free) rags to remove sanding dust and residue.

Application on wood (above the waterline)

Ambient and substrate temperature must not be lower than 55° F or higher than 86° F; substrate temperature must not be lower than 50° F and > 5° F from dew point. Relative humidity must be lower than 90%

- Sand with dry sandpaper grit no. 40 – 80.
- Apply one coat of [Epomar](#) to reduce the porosity of the lower layer of filler (overall thickness must be 12 - 80 mils). Alternatively apply one or two coats of [Epospray](#) (overall thickness must be 6 - 14 mils).
- Sand with dry sandpaper no. 80 – 120.
- Apply two coats of [Delta UC HB](#), 6 mils each (DFT); wait 12 to 24 hours before applying the second coat.
- Sand with dry sandpaper no. 150 –180: is preferable to allow at least 1 day (2 days recommended) to dry before starting the sanding.
- Apply one coat of enamel undercoat [Epoply](#) (3 - 6 mils - DFT) or [Challenger HS UC](#) (2.4 – 6 mils DFT)
- Sand the surface by using dry sandpaper no. 320-400.
- After washing the surface and cleaning the ambient where spraying is to be carried out, apply by spray the **Challenger High-Solids** (two coats wet on wet) or **Challenger High Tech** to it (one first thin root coat; then a second and third thicker layers); overall thickness must be 2 mils (50 µm) average microns DFT. For thicker enamel coat, sand the surface, after 24-48 hours depending on the temperature, by using fine-grained dry sandpaper no. 400 and then reapply the finishing coat.

Notes: Use only non-lubricated sandpaper or "Wet (only for topcoat)-Dry" paper. If lubricated papers have been used or are suspected to have been used then surfaces must be thoroughly degreased using specified Degreasing Solvent.

Application on wood (below the waterline)

Ambient and substrate temperature must not be lower than 55° F or higher than 86° F; substrate temperature must not be lower than 50°F and > 5 ° F from dew point. Relative humidity must be lower than 80% .

- Apply one coat of [Delta 3000](#) - DFT: 1.6 – 2.8 mils (40 - 70 µm) on new or perfectly clean wood (see specification for details).
- Sand the primer by using dry sandpaper no. 180-220; clean the surface with [Boero YachtCoatings Thinner 693](#)
- If required, putty and smooth holes and imperfections by using [Boero YachtCoatings 260 Epoxycoque Filler Quick Dry](#) or [604 Epomar](#).
- Sand with dry sandpaper no. 80 – 120 sandpaper
- Apply two coats of [Delta UC HB](#), 6 mils each (DFT); wait 12 to 24 hours before applying the second coat. Refer to TDS for recoat schedule at various temperatures.
- Apply the first coat of **Antifouling Paint** on top of [Delta UC HB](#), after a minimum of 12 hours and not more than a maximum of 24 hours (59 – 68° F with [Delta UC HB](#)). Each coat of antifouling paint should be applied to a thickness of 2 – 2.8 mils DFT. The antifouling paint can be paint applied by spray, roller or brush. Wait a minimum of 12 hours before applying the second coat of antifouling paint.

Note: To improve the barrier protection, apply three coats of [Defender Underwater Epoxy Primer](#) as outlined in the directions.

Fiberglass (GRP) & Gelcoat, Epoxy glass:

Surface Preparation (with or without filler):

The Gelcoat must be clean and dry with moisture levels measuring below 10%.

Clean surface, degrease and De-Wax

- Degrease the surface using either a cloth and solvent or **680 Boero YachtCoatings Sirio** and/or [Thinner 693](#). Be sure all detergents are rinsed off the surface.
- Sand the surface smooth with dry 150 to 180 grit non-lubricated paper.
- Sand (no-profiled) surface smooth with 220 to 280.
- Blow surface with clean dry, compressed air while wiping with clean (lint-free) rags to remove sanding dust and residue.

Application (with filler):

Ambient and substrate temperature must not be lower than 55° F or higher than 86° F; substrate temperature must not be lower than 50°F and > 5°F from dew point. Relative humidity must be lower than 80%

- Apply one coat of [Delta 3000](#) - DFT: 1.6 – 2.8 mils (40 - 70 µm).
- Sand the primer by using dry sandpaper no. 180-220; clean the surface with [Boero YachtCoatings 693 Epoxy Thinner](#)
- Start fairing (if required) by using [Epolight Plus/Win](#) or [Epoprofile](#) filler (max. 0.40 inch - 1 cm thickness in one coat)
- Wait 24 hours, before sanding the surface with dry sandpaper no. 40 – 80, and continue fairing. If ambient temperature is higher than 68° F, a second coat of [Epolight Plus](#) can be applied without sanding after about four hours from the first, which still features a partial curing. Once fairing is almost done, apply one coat of [Epolight Win/Plus](#) mixed with [Epomar](#), coat's ratio varying from 10 to 70% (suggested mixture: 10 liters. of [Epolight](#), 1 or 3 liters of [Epomar](#). Before mixing these putties, catalyze them separately.
- Then sand with dry sandpaper no. 40 – 80.
- Apply one coat of [Epomar](#) to reduce the porosity of the lower layer of filler (overall thickness must be 12 - 80 mils). Alternatively apply one or two coats of [Epospray](#) (overall thickness must be 6 - 14 mils).
- Sand with dry sandpaper no. 80 – 120.

- Apply two coats of [Delta UC HB](#), 6 mils each (DFT); wait 12 to 24 hours before applying the second coat.
- Sand with dry sandpaper no. 150 –180: is preferable to allow at least 1 day (2 days recommended) to dry before starting the sanding.
- Apply one coat of enamel undercoat [Epoply](#) (3 - 6 mils - DFT) or [Challenger HS UC](#) (2.4 – 6 mils DFT) (Maximum thickness must not exceed 5.6 mils WFT → 2.4 mils DFT).
- Sand the surface by using dry sandpaper no. 320 – 400.
- After washing the surface and cleaning the ambient where spraying is to be carried out, apply by spray the [Challenger Hi-Solid](#) (two coats wet on wet) or [Challenger Hi-Tech](#) to it (one first thin root coat; then a second and third thicker layers); overall thickness must be 2 mils (50 µm) average microns DFT. For a thicker enamel coat, sand the surface, after 24-48 hours depending on the temperature, by using fine-grained dry sandpaper no. 400 and then reapply the finishing coat.

Fiberglass (GRP) & Gelcoat, Epoxy glass (Above the waterline)

Application (without filler)

** Ambient and substrate temperature must not be lower than 55° F or higher than 86° F; substrate temperature must not be lower than 50°F and > 5 °F from dew point. Relative humidity must be lower than 80%

Apply one coat or more as needed of enamel undercoat [Epoply](#) (3 – 6 mils - DFT) or [Challenger HS UC](#). (2.4 – 6 mils DFT) Sand the surface by using dry sandpaper no. 320 – 400.

Challenger Hi-Tech

After washing the surface and cleaning the environment where spraying is to be carried out, apply the first of three coats of [Challenger Hi-Tech](#). to it (one first thin tie/base coat; then a second and third thicker layer); overall thickness must be two mils (50 µm) average microns DFT.

Challenger Hi-Solid

After washing the surface and cleaning the environment where spraying is to be carried out, apply the first of two coats of [Challenger Hi-Solid](#). To it (one first 3/4 coat; then a second full layer); overall thickness must be 2 mils (50 µm) average microns DFT. For a thicker enamel coat, (examples when applying a clear coat) sand the surface, after 24-48 hours depending on the temperature, by using fine-grained dry sandpaper no. 400 and reapply the finishing coat following the above-mentioned procedure.

Fiberglass (GRP) & Gelcoat, Epoxy glass (Below waterline)

- Apply one or more coats (see specification for details) of [Defender 613](#). Each coat of [Defender](#) must be WFT: 6 mils → 130 - 150 µm (DFT: 5 – 4 mils → 125 - 100 µm). In case a second coat is applied, wait a min. of 3 ½ hours up to a maximum of 3 months (59 - 68 F)
- Apply the first coat of antifouling after a min. of 4 hours up to a maximum of 3 months (59 – 68° F). The thickness of each coat of antifouling paint applied by spray, roller or brush must be 2 – 2,8 mils (50 – 70 µm) - DFT. Wait a minimum of 12 hours before applying one more coat.

Osmosis Prevention System

[Defender Underwater Epoxy Primer](#): Is a water resistant two-component epoxy primer to **protect** and **defend** hulls from water migration that can cause damage to the hull. This damage can come in the form of osmosis or gel-coat blistering on fiberglass. [613 Defender Underwater Primer](#) is a high build formulation with mica platelets, which form a layered barrier within the coating to block the water from reaching the hull. Its high solids formulation delivers 30 percent more dry film

protection per gallon. This makes it possible to apply more dry film thickness in three coats rather than the old technology that requires five coats. That is 40% less labor to apply.

This fast dry primer meets all current VOC guidelines in the USA. Due to its fast drying properties, **multiple high build coats can be applied in a single day**, making it easy to complete priming and painting in two days.

Application

- At a temperature of 73° F apply a first coat of [Defender](#) WFT 6 mils, this should be followed after min of 3 hours by a second coat of another WFT 6 mils. When applied at different temperatures you should review the technical datasheet for the correct overcoating interval.
- Apply the first of two coats of antifouling after a minimum of 5 hours (at 73° F and a maximum of 3 months without sanding. You should make sure that the surface is clean if a longer period has passed by before overcoating.

Osmosis Repair System

The [613 Defender Underwater Epoxy Primer](#) is ideally suited to repair gelcoat blistered fiberglass hulls. Its high solids formulation when used with [Boeroguard](#) result in the ideal repair for damaged hulls. This system will save the applicator time when compared to other products on the market. Refer to the [Boero YachtCoatings](#) web site for further details. It is also recommended to print a copy of the [Defender](#) Technical Bulletin for complete details on this system. Go to www.boeroyachtcoatings.com for more information.