



Technical Bulletin # 113, July 14, 2011

Defender Underwater Epoxy Primer 613

USING STATE OF THE ART EPOXY TECHNOLOGY TO DELIVER MAXIMUM UNDERWATER HULL PROTECTION

- High performance underwater primer to DEFEND and PROTECT hulls
- For the prevention and repair of Gelcoat Blistering or hull osmosis
- Contains Mica Platelets to block water from getting into the hull
- Highest Solids means less coats, less cost, less time to apply
- Ideal for Fiberglass, Aluminum, Steel, Keels and Wood Hulls
- Excellent for propellers, rudders and shafts with antifouling paint
- Excellent adhesion to all major brands of antifouling paint



WHO IS BOERO YACHTCOATINGS?

Boero has been manufacturing high quality paints since 1831. The founder, Bartolomeo Boero, was quick to learn the pure aesthetic aspects of paint, with superior protective qualities, would be key to his success. Today, 180 years later the business is still managed by the same family with the same commitment to quality, the environment and aesthetics for the marine market. Genoa, Italy is where the company was started and offers close proximity to the sea and the growing yacht building industry in Viareggio, Italy.

UNDERWATER HULL PROTECTION

WHAT IS GELCOAT BLISTERING OR OSMOSIS ON FIBERGLASS BOATS?

Gelcoat blistering, or osmosis as it is sometimes called is the result of damage below water caused by the migration of sea water into the fiberglass layup of GRP hulls. In some instances water can pass through antifouling or bare hulls by finding passages through the gelcoat and into the laminate of the fiberglass hull. Gelcoat is used in the construction of the hull to, not only look good, but also to protect the laminate from water absorption. In some instances no matter how much care a boat builder takes in building the hull there could be some areas of dry fiberglass fibers within the hull which can absorb water. This water accumulation can build pressure which will want to release and equalize itself to areas of lower pressure. Osmosis is the process by which areas of high concentration of water pressure moves to areas of low water pressure through a semi-permeable membrane or gelcoat in this example. When this water pressure begins to equalize it bumps into the gelcoat and may cause the gelcoat to expand or form a blister before the water pressure is released. These gelcoat blisters will need to be removed by grinding, filling and priming. By removing the blisters and properly sealing these areas the hull will once again be protected from water absorption. This will not only protect the hull but will also protect the value of the boat.

WHAT CAN BE DONE TO PREVENT IT FROM HAPPENING?

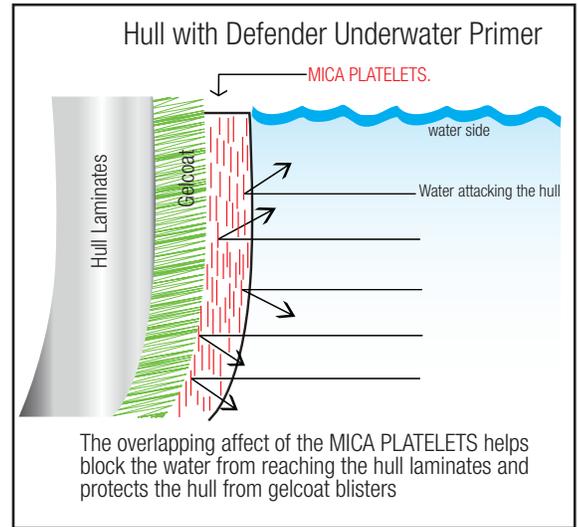
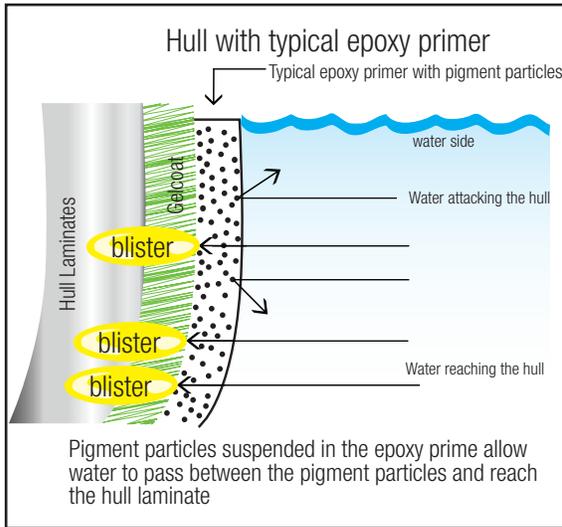
The best approach to avoid gelcoat blistering below water is to add additional thickness of epoxy primer to create a greater water barrier to prevent water from reaching the laminate of the fiberglass hull. By adding 12 mils of epoxy primer to the existing fiberglass gelcoat there will be a greater barrier to keep the water from being absorbed by the hull. But are all epoxy primers the same? The answer to this question is no! Some epoxy primers are more effective at blocking the permeation of water than other epoxy primers. Defender Underwater Epoxy Primer 613 is specifically formulated to exceed all of the important criteria for marine underwater epoxy primers.

Boero Defender Underwater Epoxy Primer 613 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, corrosion on aluminium or rust on steel.

Defender Underwater Epoxy Primer 613 is a high build formulation with mica platelets, which form a layered barrier within the coating to block the water from reaching the hull. Unlike other products for this purpose, Defender Primer 613 contains an anti-corrosive pigment to help prevent corrosion and oxidation of aluminium and steel. It is a high solid, fast dry primer that meets all VOC guidelines. 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 one weekend. For these reasons Defender Underwater Epoxy Primer 613 is well suited to be a universal underwater primer to protect the hull under all types of antifouling paint, on all types of hulls. All of the raw materials used in Defender meet or exceed the most stringent US standards for two component epoxy primers. This product will defend the bottom of your hull against the migration of water to the hull surface.

COMPARISON

WHY IS DEFENDER UNDERWATER EPOXY PRIMER 613 DIFFERENT FROM OTHER PRODUCTS?



HOW DOES DEFENDER UNDERWATER EPOXY PRIMER 613 COMPARE TO OTHER UNDERWATER PRIMERS?

Defender is significantly different. Boero has specifically formulated Defender primer to address the shortcomings of older epoxy primers. For that reason Defender has much higher volume solids which means each application will build higher than any other primer for this purpose. Defender is a full 60% solids product. As a result of the higher solids Defender has the lowest solvent emission available on the market. DEFENDER IS THE ONLY PRIMER THAT MEETS EVERY GUIDELINE IN THE US FOR LOW SOLVENT EMISSIONS. By using state of the art high solids technology the boat owner benefits from saving money by purchasing less gallons of paint and also saves labor because only three coats are required rather than five coats from older technology products. Saving time and money while being environmentally responsible makes Defender Underwater Epoxy Primer 613 the best choice on the market today. Here is how Defender Primer compares to other products on the market today:

	Defender Underwater Primer	Interprotect 2000e Primer	Interprotect VOC	Pettit Protect Primer
Volume Solids	60%	45%	45%	56%
VOC	348 grams/liter	464 g/l	408 g/l	352 g/l
Pot Life	7 hours @ 68°F	2.5 hrs. @ 73°F	3 hrs. at 73°F	5 hours @ 70°F
Theoretical Coverage	244 sq. ft./ gal 80 sq. ft./gallon to reach 12 mils DFT	230 ft/gallon 60 sq ft/gallon to reach 10 mils DFT	243 ft/gallon 60 sq ft/gallon to reach 12 mils DFT	225 sq. ft./gal.
Number of coats Minimum & Maximum overcoating window at 95° F	3 minimum @ 12 mil 2 hrs - 6 months	4-5 coats @ 10 mils 2 hrs - 6 months	as required to 2 hrs - 6 months	3 minimum @ 12 mil 2 hrs - 14 days
Minimum & maximum overcoating window with antifouling paint at 95°F	1 hr - 6 months	1-5 hrs	3-5 hours	3-6 hours

Defender Primer has excellent adhesion to all brands of antifouling paints except those containing Teflon®.

Dare To Compare Defender Underwater Primer to Interprotect 2000E

Fiberglass Hull gel coat blistering system with antifouling paint

Interprotect 2000E Two day application Schedule

Day one	
8:00 AM	Get boat final sanding and wipe down
9:00 AM	Apply first coat of Interprotect 2000e
12 Noon	Apply second coat of Interprotect 2000e
3:00 PM	Apply third coat of Interprotect 2000e
Day two	
8:00 AM	Apply fourth coat of Interprotect 2000e
11:00 AM	Apply fifth coat of Interprotect 2000e
4:00 PM	Apply first coat of Interlux antifouling paint

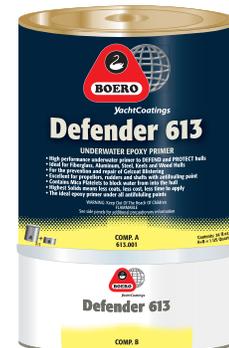
DEFENDER Two day application Schedule

Day one	
8:00 AM	Dewax the hull, sand and wipe down the hull
9:00 AM	First coat of Defender underwater epoxy primer
12 Noon	Second coat of Defender Underwater Epoxy Primer Take the afternoon to go boating with a friend
Day two	
8:00 AM	Third coat of Defender Underwater Epoxy Primer
11:00 AM	First Coat of antifouling paint Take the afternoon to go boating with a friend

Because Defender Underwater Primer is a very high solids primer it will delivers much more coverage per gallon. As a result, you will save time, save money and apply less coats. Three coats of high solids Defender will yield more protective barrier than five coats of Interprotect 2000E. On a 41 foot boat with 480 sq. ft. of bottom it will take only 6 gallons of Defender to deliver 12 mils of protection while on the same boat it will take 8 gallons of Interprotect 2000 to deliver only 10 mils of coverage.

Defender Primer in compatible with all Antifouling paints

PRODUCTS	TEMPERATURE			
	41°F	60°F	73°F	95°F
B SuperNavi Mistral Ablative	8 hrs	5 hrs	3 hrs	1h
O SuperNavi Altura Hard Matrix	8 hrs	5 hrs	3 hrs	1h
E SuperNavi Corsa Aluminum	8 hrs	5 hrs	3 hrs	1h
O 260 Boero Epoxy Filler	8 hrs	5 hrs	3 hrs	1h
P ULTIMA SR	8 hrs	5 hrs	3 hrs	1h
E TRINIDAD SR	8 hrs	5 hrs	3 hrs	1h
T VIVID	8 hrs	5 hrs	3 hrs	1h
I UNEPOXY	8 hrs	5 hrs	3 hrs	1h
T HORIZON	8 hrs	5 hrs	3 hrs	1h
I Micron Extra	8 hrs	5 hrs	3 hrs	1h
N Micron CSC	8 hrs	5 hrs	3 hrs	1h
E Micron 66	8 hrs	5 hrs	3 hrs	1h
L Interlux ACT	8 hrs	5 hrs	3 hrs	1h
U Interlux Fiberglass Bottomkote	8 hrs	5 hrs	3 hrs	1h



Quart Kit

APPLICATION INFORMATION

Boero 613 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, corrosion on aluminum or rust on steel. 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. Unlike other products for this purpose, 613 Defender Underwater Primer contains an anti-corrosive pigment to help prevent corrosion and oxidation of aluminum and steel. It is a high solid, fast dry primer that meets VOC guidelines. 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. For these reasons 613 Defender Underwater Epoxy Primer is well suited to be a universal underwater primer to protect the hull under all types of antifouling paint.

FIBERGLASS HULLS

New or non-blistered Fiberglass Hulls

On new fiberglass hulls that have never been painted, it is essential to carefully remove all of the mold release wax used to manufacture the hull. This wax will prevent paint from sticking to the boat. Working in small areas, saturate a clean rag with 680 Dewaxer & Solvent Wash (Sirio) and apply in circular motion. While the surface is still wet, use another clean, dry rag to completely remove the mold release wax and 680 Dewaxer & Solvent Wash (Sirio) from the hull. Care must be taken not to simply push the wax from one area of the hull to another. Sand the hull with 80 grit sandpaper. Wipe off all sanding dust. Apply the first coat of 613 Defender Underwater Primer as outlined below.

SEVERELY BLISTERED HULLS

It is also suggested the applicator print a copy of the Boero Blister Repair and Prevention Bulletin from the www.boeroUS.com web site. Follow the surface preparation recommendations above. Open all blisters and flush with fresh water. Allow as much time as possible to dry out the hull. Be sure the hull bilge is dry during the drying process. Grind the remainder of the gelcoat with 60 grit sandpaper. Apply two consecutive coats of WEST SYSTEM® epoxy resin or the equivalent per label directions. Wash the resin surface with fresh water and a stiff deck brush or heavy Scotchbrite® pad to remove curing residue. Sand the WEST SYSTEM® resin with 80 grit sandpaper. Apply first coat of 613 Defender to the West System resin. Apply 260 Boero Epoxy Filler to low spots and voids in the hull. Sand thoroughly and wipe the surface to remove any sanding residue. Apply two more heavy coats of 613 Defender Underwater Epoxy as described below before applying the antifouling paint. Fiberglass hulls with sever blisters should be inspected by a competent marine surveyor. Boero cannot be responsible for the causes of GRP hull blistering. This 613 Defender Underwater Epoxy Primer system has proven to be the most effective approach to treating blistered fiberglass hulls. It will repair or postpone the return of osmotic blisters.

LEAD KEELS

Disc grind the keel to bright, clean metal. Thoroughly remove sanding residue. Immediately apply the first coat of 613 Defender Underwater Epoxy. Filling and fairing can be completed next. Sand smooth and apply two more coats of 613 Defender Underwater Epoxy.

STEEL HULLS AND KEELS

The steel surface should be sandblasted to SSPC-SP10 white metal blast. Use compressed air to thoroughly clean the steel surface. If sandblasting is not possible, heavily grind surface with 24-36 grit abrasive disc to a uniform, clean and bright surface. Use compressed air only. Immediately apply three full coats of 613 Defender Underwater Epoxy.

ALUMINUM

Grit blast the surface using acceptable media for aluminum. Be sure to remove any aluminum oxide before priming. If grit blasting is not possible, disc grind with 24-36 grit abrasive disc. Remove residue from surface with compressed air. Wipe surface clean with 680 Dewaxer & Solvent Wash (Sirio) and immediately apply the first coat of 613 Defender Underwater Epoxy followed by two more coats.

PREVIOUSLY PAINTED HULLS

All antifouling paint must be removed prior to the application of new epoxy primer. Well adhered 2-part epoxy primers in good condition can be heavily sanded with 60 grit sandpaper and primed with 613 Defender. Epoxy primers in poor condition must be removed. Follow label directions on the application of 613 Defender Underwater Primer.

SYSTEM FOR PAINTING SHAFTS, STRUTS AND PROPELLERS

To improve adhesion to underwater metals, heavy sand the metals with course Emery cloth. Remove all sanding dust. Immediately apply the first coat of 613 Defender reduced 10-15% with 693 Epoxy Thinner. This should be followed by a second heavy coat of 613 Defender without adding thinner. Then apply antifouling as per directions.

How much do I need to apply?

To determine how much is needed for your boat, calculate the wetted surface area by multiplying the "length Overall" LOA times the beam, times 85%. (LOA x Beam x 85% = hull square foot). A 28' Power or sailboat would typically have 240 sq. ft of bottom area. To reach the correct film thickness of 12 mils on the boat it will be necessary to apply 3 gallons of 613 Defender. This can typically be done in three coats. If each coat is applied very thin a fourth coat may be needed to apply the entire amount to protect the hull properly. To achieve 12 mils of dry paint on a hull, assume each gallon will cover 80.2 sq. ft. of hull bottom. This film thickness can be applied in 3 full coats. If all of the Defender is not consumed in three coats apply the remaining paint in a fourth coat.

Required Defender

To reach proper film thickness of 12 mils dry film thickness, apply at a coverage rate of 80 square feet per gallon kit. The following reference chart will provide typical coverage rates for common boat sizes.

Boat size	Square feet	Required Defender at 12 Mils DFT
20 ft	140	1¾ gallons
24 ft	196	2½ gallons
28 ft	240	3 gallons
32 ft	290	3½ gallons
36 ft	340	4¼ gallons
40 ft	410	5 gallons
42 ft	490	6 gallons
53 ft	650	8 gallons

Defender is available in one gallon kits containing the component A can and the component B can in a dedicated cardboard box. Defender is also available in quart kit for small applications and touchup.

613. DEFENDER UNDERWATER EPOXY PRIMER

Boero 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, corrosion on aluminum or rust on steel. Defender 613 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. Unlike other products for this purpose, Defender Primer 613 primer contains an anti-corrosive pigment to help prevent corrosion and oxidation of aluminum and steel. It is a high solid, fast dry primer that meets VOC guidelines. 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. For these reasons **Defender Underwater Epoxy Primer** is well suited to be a universal underwater primer to protect the hull under all types of antifouling paint.

Packaging	1 Gallon kit or 1 Quart kit
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PHYSICAL DATA at 68°F (20°C)

Finish	Matte
Color	Off - White
Volume solids (theoretical)	60%
Specific weight	Base : 12.5 pound/gallon Cure: 7.6 pound/gallon Base + Cure: 11.2pound/gallon
Flash point	73.4°F
VOC (theoretical)	348 g/l

APPLICATION DATA

Mixing ratio		3:1 ratio by volume with base and cure 1 Gallon Kit= 0.75 gallon plus 1 quart cure 1 Quart Kit+ 0.75 quart plus 0.25 cure
Induction time	20 min at 68°F	
Pot Life	7 hours at 68°F	
Thinner		Brush/Roller #693 Epoxy Thinner (0-10%) Conventional Spray/Airless: 693 (15-25% max)
Applications		Brush: Use a natural bristle brush Roller: Use a 3/8" nap solvent resistant roller
		Airless Pressure 2175 psi Gun 0.08 – 0.12 in Spray angle: 65° - 80°

		Conventional Pressure 50 psi Gun 0.066 – 0.07 inch
Dry film thickness per coat	Recommended range by roller/brush	4 mils (100 μm)
Wet film thickness per coat	Recommended range by roller/brush	6,6 mils (165 μm)
Theoretical coverage	Range of 4 mils DFT Total 12 mils DFT on Fiberglass	244 sq. feet/gallon 80 sq. feet/gallon
Number of coats	3 min. to reach 12 mils DFT	
Note	The product is provided in two cans to be mixed entirely and carefully before usage. If thinning is required, do so after mixing the two components together. The physical data of two-component products are after component A and B have been mixed together.	

SURFACE PREPARATION

	<p>For surfaces in poor condition, it is important to completely remove the old paint system to the bare surface.</p> <p>Steel/lead keels: Recommended sandblasting SSPC-SP-10 (SA 2^{1/2}) or disk grinding SSPC-SP-3 (ST3) as an alternative. Immediately after sanding apply the first coat of Defender Primer.</p> <p>Aluminium: Wash the hull to remove any contaminants such as, oil, grease, etc. Blast with anon – metallic blast media, grinding with 36 – 60 grit wheels or sand (for small craft) with coarse Emery cloth. Immediately after sanding apply the first coat of Defender Primer.</p> <p>Wood: Clean and sand with 80-120 sand paper. Apply one coat by brush of Defender thinning 15 – 20%.</p> <p>Fiberglass or GRP: Remove wax or mold release agents with 680 Boero Dewaxer and Solvent Wash (Sirio). Rinse and sand the surface with 60 – 80 grit paper. Apply Defender Primer. If Gelcoat is removed see instructions to apply epoxy resin to properly wet out surface to reduce the potential for gelcoat blistering.</p>
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DRYING TIME

Temperature		41°F		60°F		73°F		95°F	
		Min	Max	Min	Max	Min	Max	Min	Max
Overcoating interval	Itself	8 hrs	6 mon	6 hrs	6 mon	3 hrs	6 mon	2 hrs	6 mon
	Af	9 hrs	3 mon	7 hrs	3 mon	5 hrs	3 mon	3 hrs	3 mon
Touch dry		3.5 hrs		2 hrs		1.5 hrs		45 min	
Hard dry		30 hrs		18 hrs		12 hrs		8 hrs	
Sanding time		30 hrs		18 hrs		12 hrs		8 hrs	
Complete curing		7 days		7 days		7 days		7 days	
Pot Life		18 hrs		10 hrs		7 hrs		2 hrs	

*Drying times and overcoating intervals are referred at DFT 4 mils (100 μ). They will increase with increasing film thickness applied and will vary in function of temperature and humidity. Before re-coating always check that the existing film is “through” dry.

CONDITIONS DURING APPLICATION

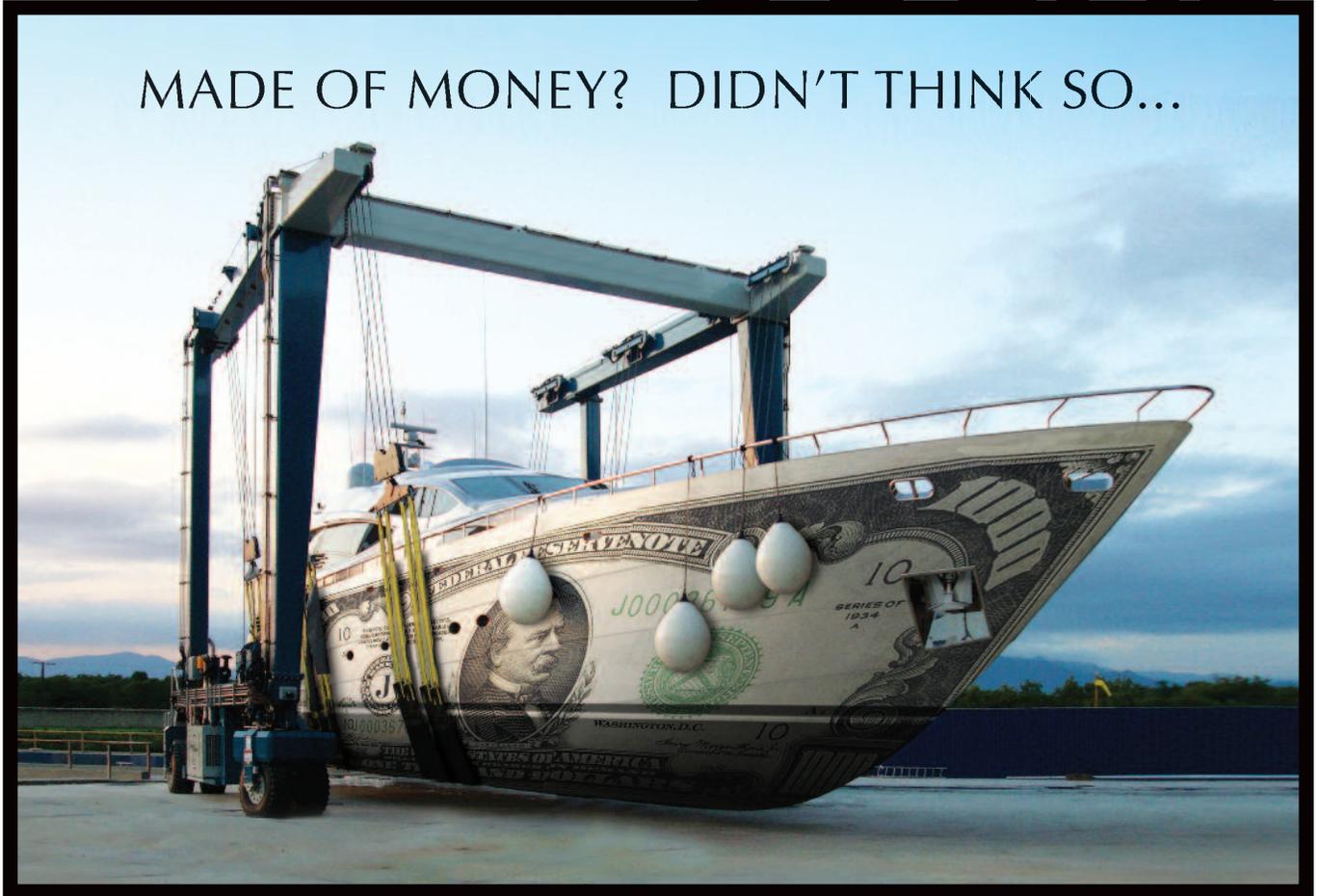
To avoid the formation of condensation, the temperature of the surface should be at least 5°F above dew point. During the application and curing the min. ambient temperature should be 50 °F, since curing is reduced at lower temperatures. Application is not advisable when relative humidity exceeds 80% The term-hygrometric 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.

SAFETY RULES & NOTE

	<p>Avoid contact with the skin and eyes. In case of contamination or with oral contact, immediately contact a doctor. Use in well ventilated areas, in enclosed areas use aspirators, fans and air ventilators. Wear a proper mask, goggles, and gloves when applying the product</p>
	<p>The applied product must not come in contact with water, chemical products or submitted to mechanical stress before the curing is completed. The wet film thickness is referring to an undiluted product. If the product is thinned this value increases. The above information is given to the best knowledge of Boero Bartolomeo Spa, based on laboratory tests and practical experience. However, as the product is often used under conditions beyond our control. Only the quality of the product can be guaranteed. Boero Bartolomeo Spa reserves the right to change the given data without notice. Further notes can be found in the “General recommendations” in the BoeroUS.com website. For explanations, updates or further information contact Boero Bartolomeo Spa. This Technical Data Sheet replaces all previous sheets for this product.</p>

BOERO

MADE OF MONEY? DIDN'T THINK SO...



BOERO ANTI-FOULING PAINTS LAST LONGER. IT'S THAT SIMPLE.

A boat is a big investment. A clean bottom will reduce friction and drag and improve fuel efficiency. That is why Boero antifouling paints contain **Ever-Clean Antifouling Technology** to fight fouling and reduce fuel consumption (while reducing the boats carbon footprint.) Try one of three premium antifouling paints at an attractive price and see why many superyacht captains and boat owners select Boero.

Boero Mistral Extra 633 Advanced Self-Polishing Ablative antifouling paint is the longest lasting multi-seasonal, formulation designed to provide maximum fouling resistance. It has 50% more biocide than the Micron brand to fight strong fouling conditions. It can be hauled and re-launched without repainting. It is formulated to wash away at a controlled rate constantly releasing enough slime-fighting ingredients. In fact, Mistral Extra 633 actually becomes smoother with age.



Boero Altura Extra 619 is an **Advanced Hard Matrix**, protective antifouling paint formulated for use in the highest fouling areas. Its high biocide formulation works exceptionally well for high-speed boats or sailing boats alike. **Ever-Clean Antifouling Technology** has unprecedented resistance to barnacles, slime and algae and will perform for extended periods of service. Its hard surface is abrasion resistant and can be scrubbed if desired.



Boero Corsa Extra 642 Antifouling is an environmentally responsible formulation resistant to slime, algae, barnacles and other fouling organisms. It is copper oxide free and its low VOC levels meet every guideline throughout North America. Corsa 642 is an excellent choice for those seeking a low metal content product. Corsa is well suited for fiberglass, aluminum, steel and wood hulls. It will deliver multi-season performance and can be hauled and re-launched without repainting.



BOERO, FAMILY OWNED FOR 180 YEARS
BOERO NORTH AMERICA
www.BOEROus.com



BOERO

SOMETIMES MORE IS MORE



MORE PAINT SOLIDS MEANS LESS COATS. IT'S THAT SIMPLE.

Now there is a proven high performance epoxy primer called **Defender Underwater Epoxy Primer 613**. This high solids formulation has mica platelets to block water from reaching the hull. Three coats of Defender delivers 12 mils of protection while the other brand requires five coats. **That is 40% less labor to apply more protection, saving time and money.**

It is a fact that fiberglass hulls can absorb water and gain weight. Weight effects the way the hull moves through the water and can adversely impact speed and fuel efficiency. In some cases water penetration can cause gelcoat blistering leading to hull damage, expensive repairs and extended time out of the water. Using a good quality epoxy primer has proven to be an effective solution to protect the hull and defend it from damage caused by water penetration.

If the hull already has gelcoat blistering, Defender's high solids formulation will be your best labor savings solution to repair the hull. Defender is also fast drying and easy to sand. It delivers ultra low VOC which is better for the environment, and is an excellent choice for lead or steel keels as part of a sealing and fairing system.

At Boero, we have raised the bar for underwater epoxy primers!

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