MarineLINE®

Cargo Tank Coating System for Chemical & Product Tankers

MarineLINE® 784 Trusted by

GOLDWIN SHIPPING

Bahri البحري

GRUPO ELCANO

Chemfleet

Formosa Plastics

ODFJELL

Navig8

BOREALIS MARITIME

Stena Bulk

山东海洋集团有限公司 SHANDONG MARINE GROUP LTD.

SCHULTE GROUP

MOL CHEMICAL TANKERS

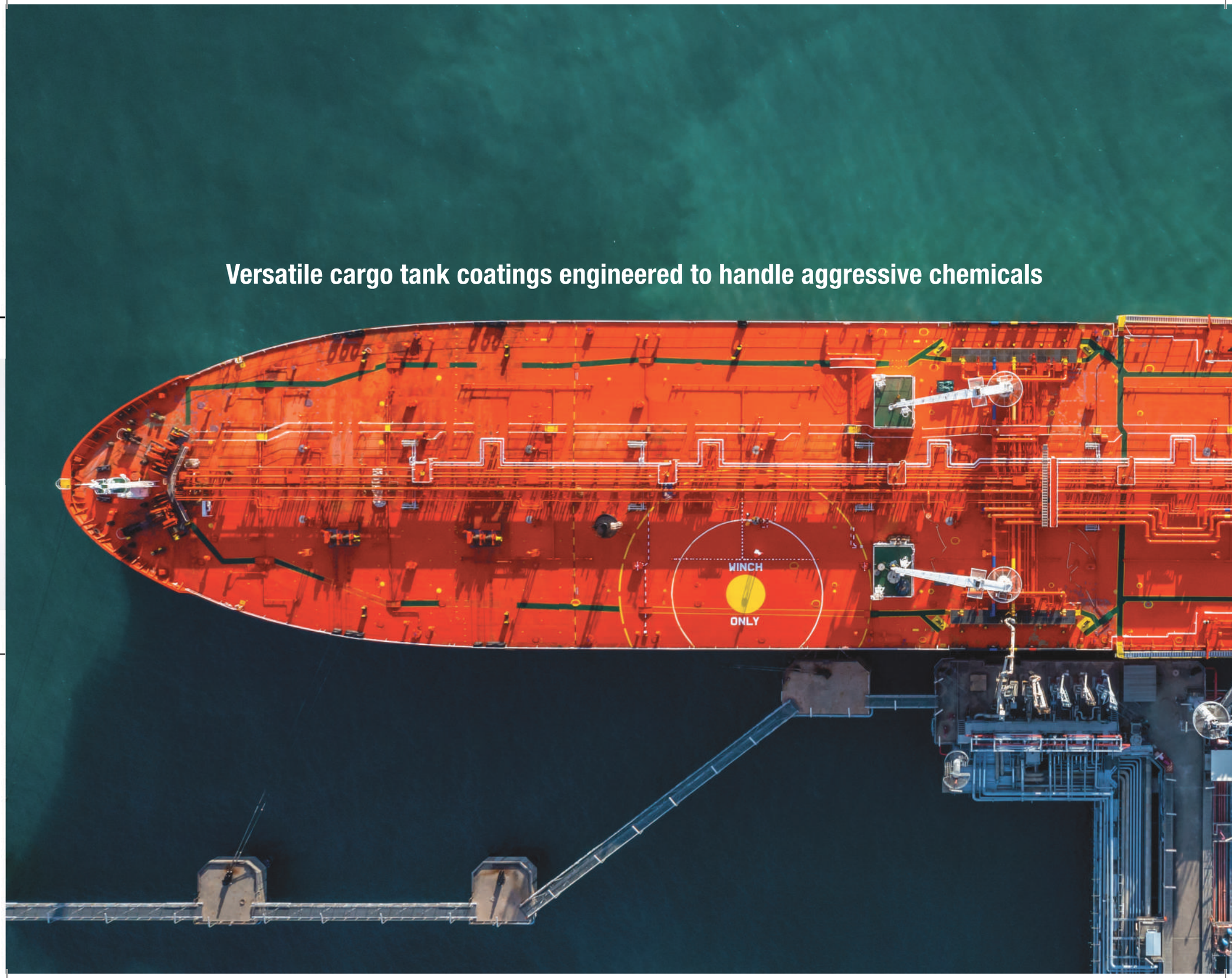
500+
Ships Coated Worldwide

400+
Shipyards

12%
Of Global Chemical Tanker Fleet

#1
Coating Brand for Aggressive Chemicals

Versatile cargo tank coatings engineered to handle aggressive chemicals



Two colors, two coats. One simple decision.

“At Advanced Polymer Coatings, our mission is to provide you with innovative, value-added coatings to protect your assets while also increasing your Return on Investment. We do this daily through continuous improvement to our manufacturing and new product development.

We take great pride in disrupting the norms of the coating industry by providing innovative solutions for your current and evolving needs with innovative, value-added coatings.

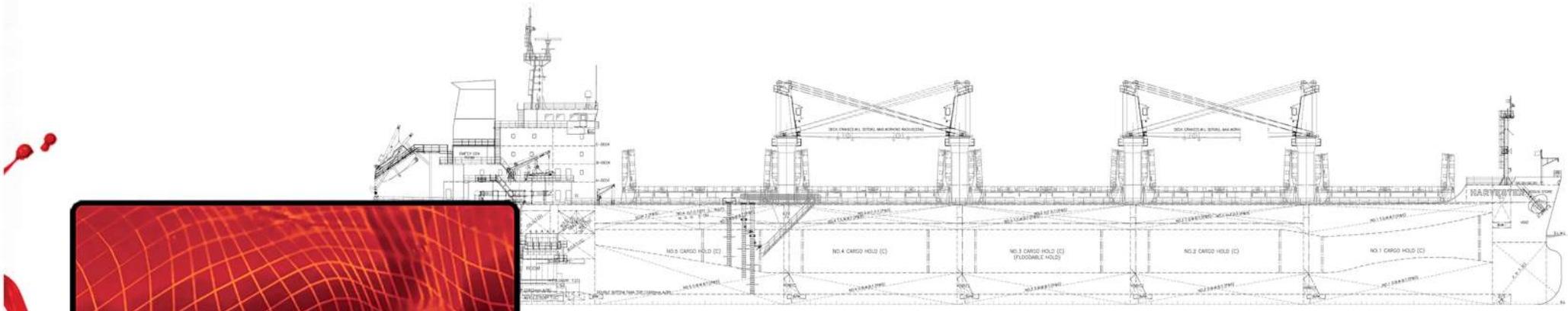
Designed with the shipowner in mind, MarineLINE® was built to enhance vessel operations allowing complete optimization of your trade routes.

With an unmatched level of chemical resistance and impermeable structure, our cargo tank coating system affords minimal cargo absorption resulting in efficient cleaning practices, enhanced product purity, quicker turnaround, and maximum ROI.

It’s time to look at cargo tank coatings as more than just a sacrificial layer.”

David J. Keehan, APC President

MarineLINE® 784 Powered by GRIDLOCK™ TECHNOLOGY



"The more we understand how polymers work, the better the choice can be made to solve corrosion problems."

- Donald J. Keehan, APC Founder

Advanced Polymer Coatings® is proud to bring you our Gridlock Technology™, one of the most groundbreaking discoveries in coating history.

Powered by Gridlock, MarineLINE® outperforms conventional tank lining technologies doubling and even tripling the service life of our MarineLINE® Coating System providing superior chemical resistance, unmatched permeability protection, and strong abrasion and impact resistance.

So, what exactly IS this technology, and what does it afford your operation?

Great question. *Let's dive in...*

The MarineLINE® Advantage: Gridlock explained

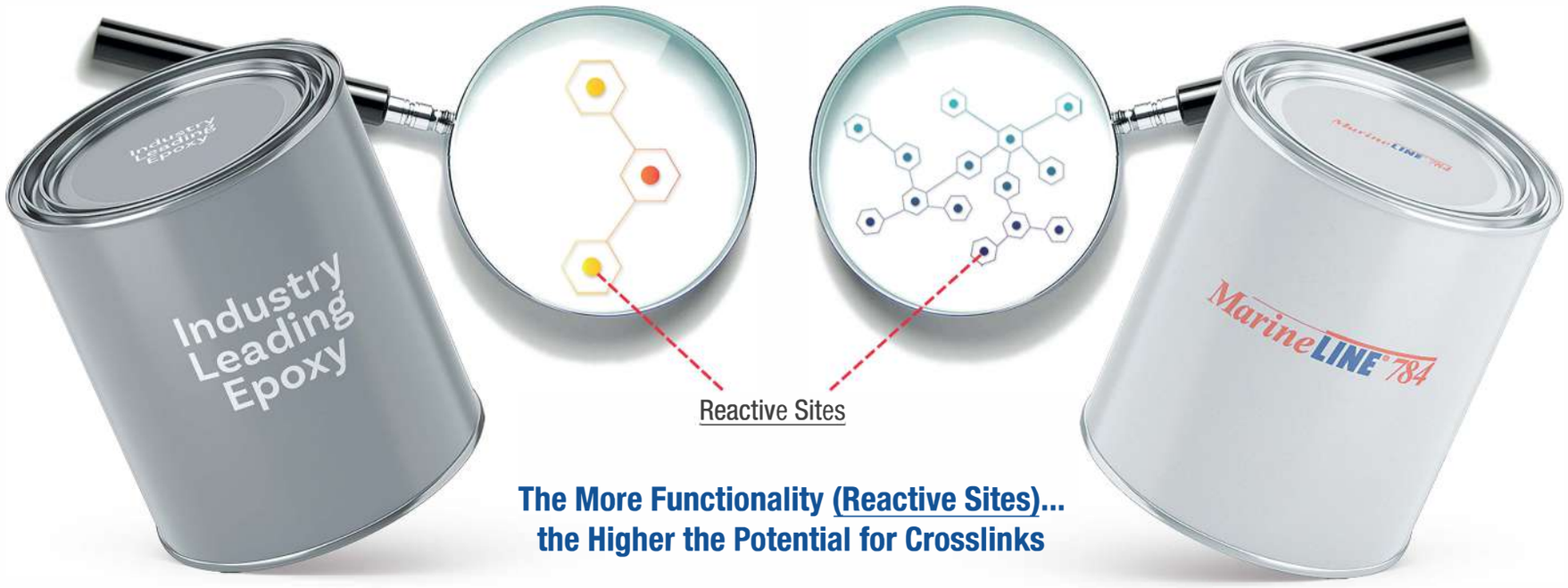
Functionality

Figure 1. Polymer vs. Polymer

The Novolac Epoxy Polymer and APC's Proprietary Polymer in a normal, un-heat-cured state.
Notice the number of reactive sites each polymer contains. The depiction below represents a traditional Novolac/Phenolic Epoxy Polymer, compared to APC's Gridlock Technology™-driven, high functionality polymer that provides our MarineLINE® Coating System with unmatched chemical resistance.

Novolac Epoxy Polymer

APC's Proprietary Gridlock Polymer



**The More Functionality (Reactive Sites)...
the Higher the Potential for Crosslinks**

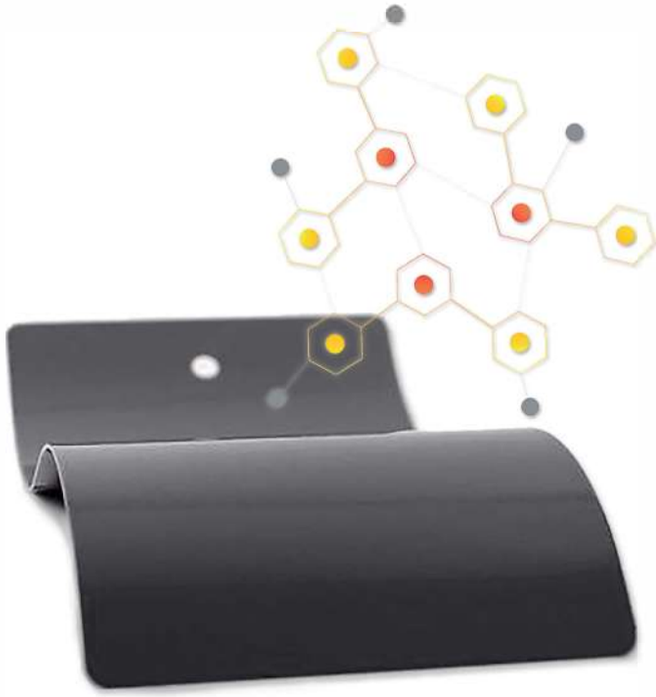
MarineLINE® 784 powered by GRIDLOCK® TECHNOLOGY

Crosslinking

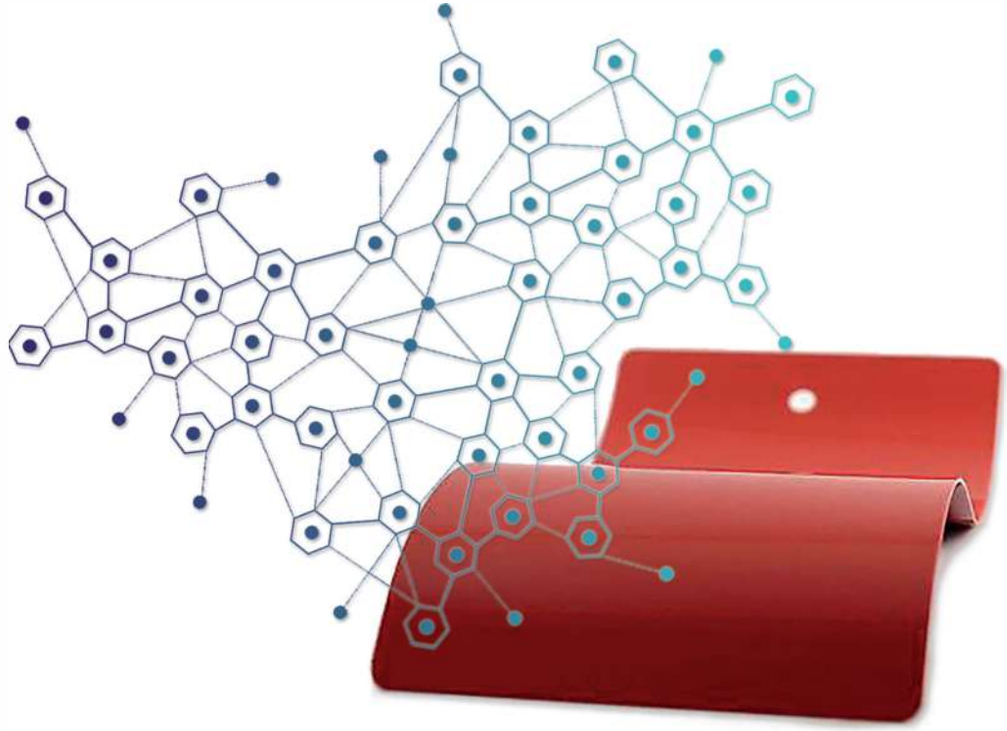
Figure 2. After the Coating is Applied, the Crosslinking Begins...

The Novolac Epoxy binds with curatives, creating the structure on the left, achieving low crosslink density, and leaving it open to chemical attack. APC's Gridlock Technology™ seeks out lower molecular weight reactive components and curatives to form the structure shown on the right achieving the industry's highest crosslink density and closed screen structure which is impermeable to chemical attack.

Novolac Epoxy Polymer



APC's Proprietary Gridlock Polymer



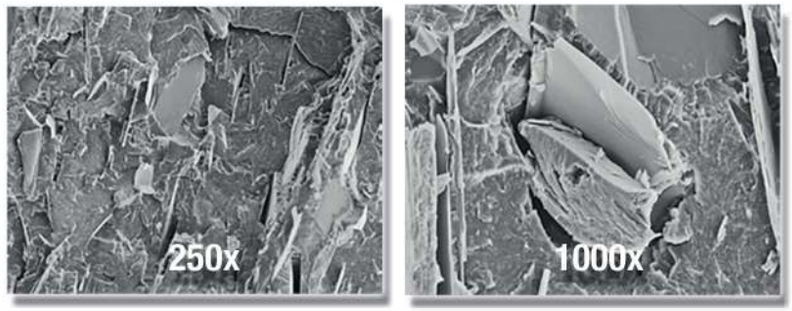
The MarineLINE® Advantage: Gridlock magnified

Density

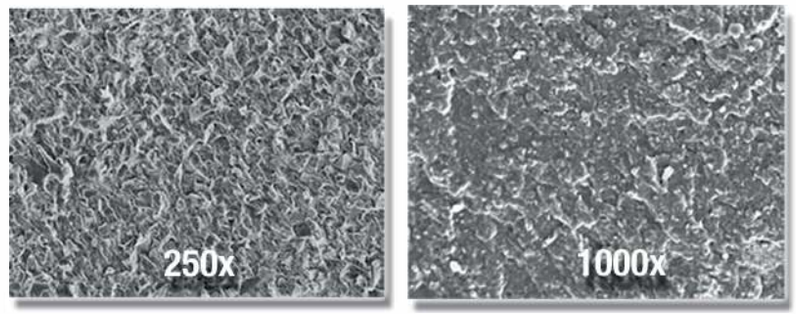
Figure 3. Gridlock Technology™ Magnified

A magnified view of a Novolac Epoxy coating compared to the MarineLINE® Coating System shows the crosslink density achieved through Gridlock Technology™ at 250x and 1000x magnification. The image on the right clearly shows that a higher crosslink density produces a lining that forms a virtually impermeable barrier for maximum substrate protection. *Images courtesy of TUBITAK Research Facility in Ankara, Turkey.*

Novolac Epoxy Polymer



MarineLINE® Coating System



Higher Crosslink Density Delivers:

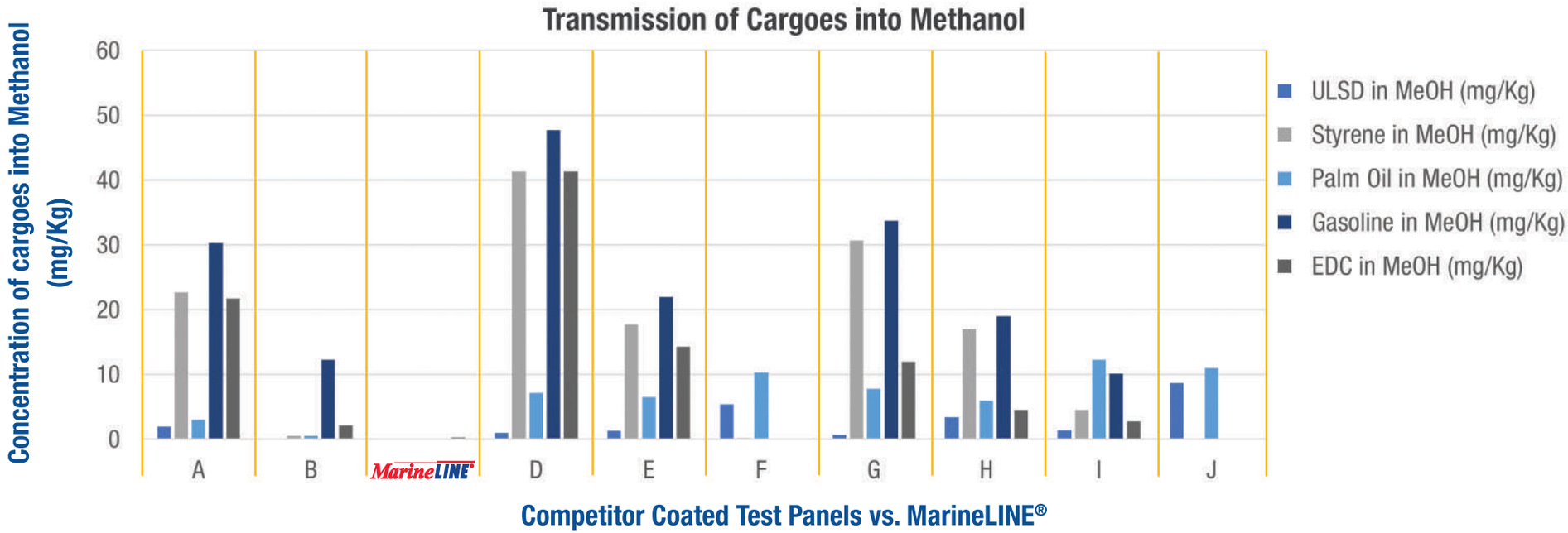
- Higher chemical resistance
- Higher heat resistance
- Higher toughness
- Higher resistance to abrasion

MarineLINE® 784 powered by GRIDLOCK® TECHNOLOGY

Absorption | Desorption | Retention

Figure 4. MarineLINE® vs. The Competition

Efficient cleaning leads to quicker turnaround and less time spent at port. MarineLINE®'s impermeable, smooth surface ensures virtually no absorption of cargoes is present in the lining, getting you trading faster, enhancing your ROI. The chart below shows a range of competitive coated test panels soaked in various cargoes for 21 days, cleaned to industry standards, and then immersed in methanol for another 21 days. The results represent a transmission of the previous cargoes present in the methanol.



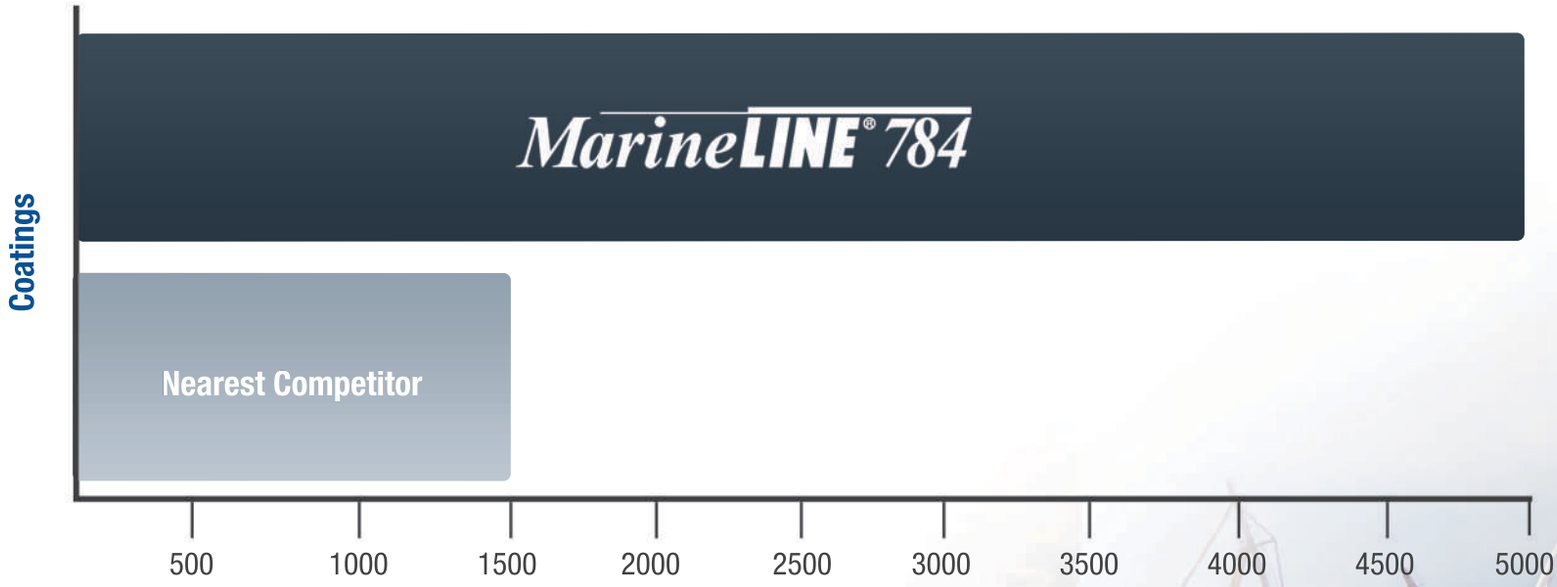
Coated Tanks - See Appendix to Ethylene Glycol CHS for list of banned prior cargoes. Banned prior cargoes do not apply to MarineLINE 784 coated tanks

^ Reference Above: **Shell.com** *Cargo Handling Sheet: Ethylene Glycol - All Grades*, Document Date: 22 April 2022, Revision 22

INDUSTRY LEADING CHEMICAL RESISTANCE

MarineLINE®'s catalog of resistance vs. the competition

In a study of chemical resistance, MarineLINE® boasts superior chemical resistance to a list topping over 5,000, whereas our nearest competition only protects against 1,500 chemicals. A complete list of chemicals tested is available at any time on our searchable Chemical Resistance Guide. Visit www.adv-polymer.com to explore more.



GREATER VERSATILITY WHEN SWITCHING CARGOES

MarineLINE® allows for complete optimization of your trade routes.

This chart shows how easy it is to switch cargoes and take advantage of an almost limitless amount of sequencing possibilities and seize the opportunity to carry the most profitable cargoes.

A complete, searchable list of chemicals available to trade with the MarineLINE® tank coating system can be found on our website.


SCF
Safety Comes First
КАПИТАН ГОТСКИЙ

LIFECYCLE

MarineLINE® cargo tank coating system offers long service life potential

Through proper maintenance and care, the average lifespan of a MarineLINE® coated vessel can cover 15 years, with some vessels on record of being 20+ years in less aggressive services. Compared to the nearest competitor, MarineLINE® often doubles the lifespan of traditional cargo tank coating technologies, ensuring maximum ROI.

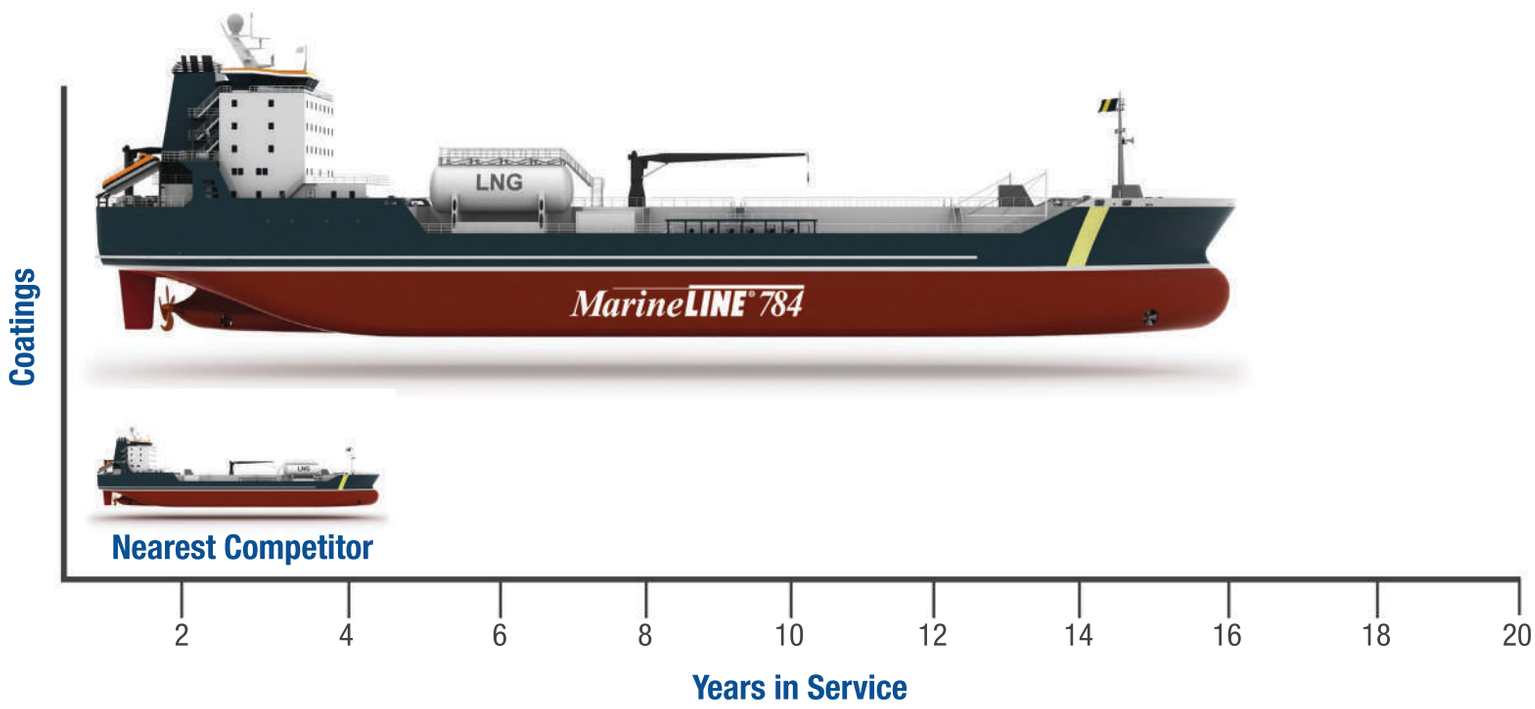


**chart resembles MarineLINE® coated vessels against competitors in similar services*

Advanced Polymer Coatings Offers Turn-key Services

every. step.

PRE-JOB MEETING

Before a single drop of coating is applied, APC Inspection and Heat Cure Specialists meet with all parties involved to walk through expectations, timetables, and responsibilities to ensure the complete coating process goes through efficiently and correctly.

SUBSTRATE INSPECTION

To ensure the maximum performance of your MarineLINE® Coating System, Advanced Polymer Coatings provides inspection services throughout the entire application process, focusing on good surface preparation, correct application, and proper heat cure.

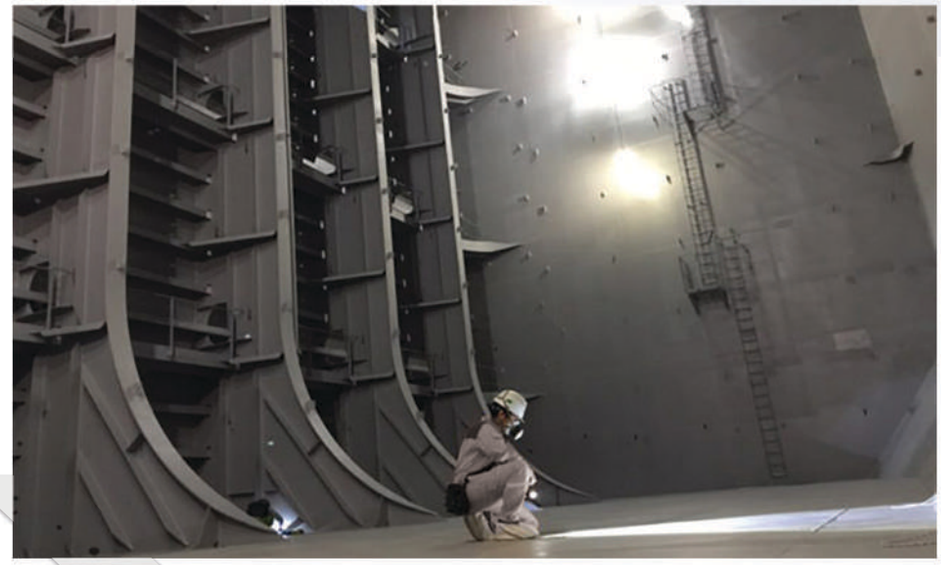
MarineLINE® 784

of. the. way.

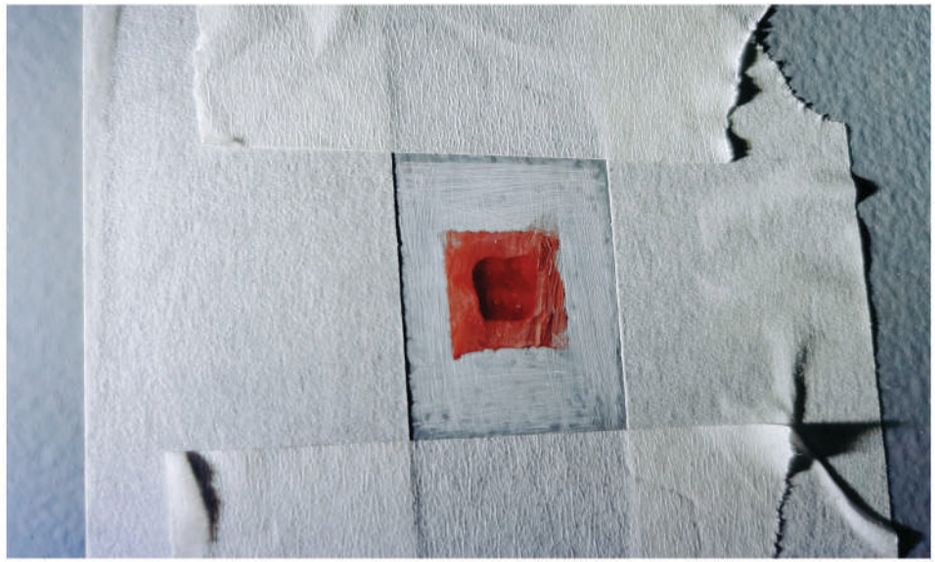
APPLICATION STARTS

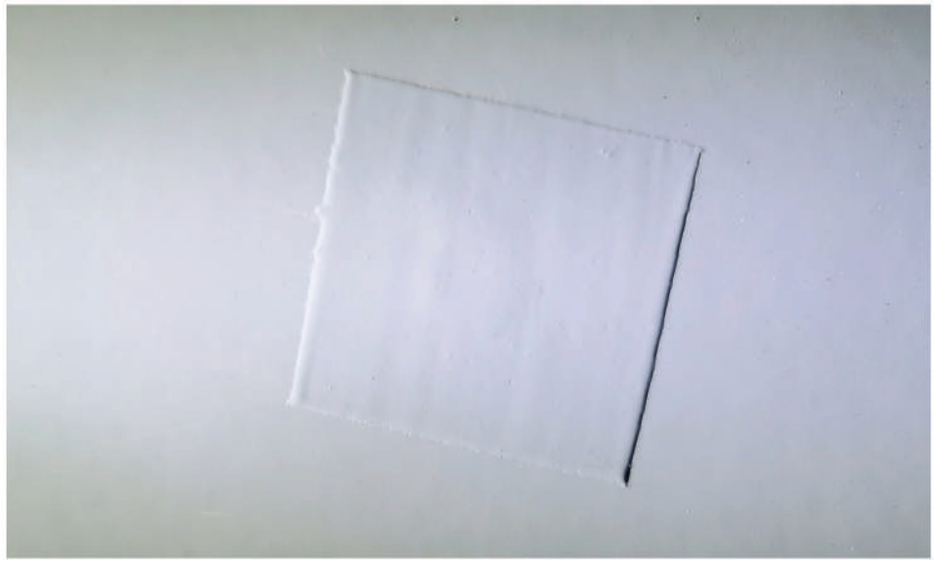
Members of the APC Technical and Inspection Teams work with shipyards and contractors to confirm proper environmental conditions are obtained throughout the coating process and also serve as a knowledge center for any questions that may arise during the application.

HEAT CURE AND POST-INSPECTION



APC uses proprietary heat cure equipment to ensure your MarineLINE® Coating System cures appropriately, allowing your tank coating to achieve maximum chemical resistance. After heat cure is complete, the APC Inspection team scours the tanks to check for any inconsistencies to guarantee your newly outfitted vessel endures the long haul.





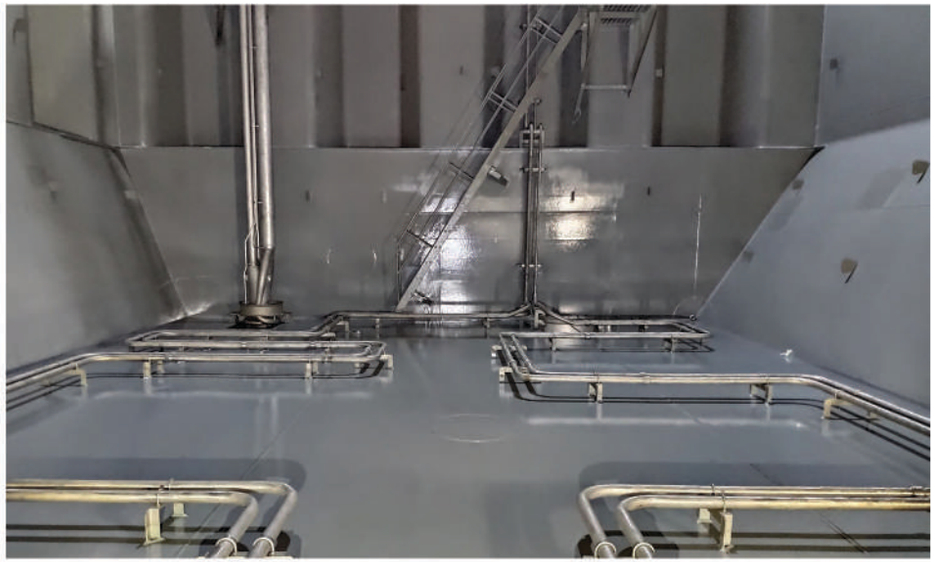
FIELD REPAIRABLE

MarineMEND Kits offer repairability on-site

The MarineMEND Repair Kit System is designed for minor repairs of MarineLINE® coated tanks. The repair procedure is used when the coating has minor mechanical damage.

This smartly packaged, two-part kit is efficient and effective for repairs made on the go to keep your operations in motion. Contact your MarineLINE® Sales Representative for more information on ordering MarineMEND.

MarineMEND



5 years

YOUR VESSEL, PROTECTED

APC offers warranty through Helvetia Insurance

APC has joined with Helvetia Group, a Swiss-based insurer, to offer a specialized insurance program to warranty the application and performance of MarineLINE® cargo tank coatings.

The insurance program covers shipowners and operators on the MarineLINE® tank coating for a specified warranty period of up to 5 years. With the Helvetia program, APC offers customers a proper ‘turn-key’ solution for their cargo tank coating.

DESCRIPTION

MarineLINE® is the premier cargo tank coating system for chemical and product carriers. MarineLINE® is formulated with a patented polymer, designed and engineered with high functional groups per molecule. When heat cured, MarineLINE® coating forms 3-dimensional, screen-like structures with up to 784 crosslinks, which far surpasses epoxies that only deliver two functional groups with only four crosslinks.

FEATURES

Virtually non-permeable for assurance of product purity
Faster, easier cleaning
Maximum versatility to carry a wide range of cargoes
Excellent flex stressing
FDA compliant; GRAS - Generally recognized as safe for food grade cargoes
Superior bond strength and adhesion
Resistance to wear, abrasion and impact
Thermal shock resistance -40°C to +150°C (-40°F to +302°F)
ABS ISO 9001:2015 Certification

TYPICAL PROPERTIES (MIXED, AS SUPPLIED)

Stock Colors	Grey, Red
V.O.C. Level/Gal.	130 grams/L (1.09 lbs./gal.)
Pot Life	75 minutes @ 20°C (68°F)
Viscosity Reduction	Reduce with Toluene
Solids by Volume	85%
Recommended System Film Thickness (dry) mils average (Topcoat & Basecoat)	Steel: 12 mils (300 microns)
Finish	Gloss
Theoretical Coverage	1 coat = 2.8 m2/liter @ 300 microns DFT
Application Method	Airless spray, brush, roller
Shelf Life	12 months

Proven cargo tank coatings engineered for the long haul

The information provided by Advanced Polymer Coatings, Inc. (APC) for the application or repair of APC coatings is based upon protective coating industry standards and knowledge gained through observation of professional applicators throughout the world that have successfully applied APC coatings. APC does not exercise any control over selection of the applicator that applies or repairs APC coatings. By providing information APC is not representing, directly or by implication, that an applicator that is provided with this information will achieve a result that will pass without objection in the trade or industry, otherwise referred to as MERCHANTABILITY, or will meet the vessel owner's protective coating requirements, otherwise referred to as FITNESS FOR A PARTICULAR PURPOSE. The only warranty provided by APC through its information and literature is that all APC products when delivered will have been manufactured in accordance with APC's manufacturing procedures, will be accurately labeled, and when mixed, applied and cured in a controlled environment in accordance with APC's current written application guidelines will withstand chemical corrosion as set forth in APC's chemical compatibility reference guide. The chemical compatibility reference guide and current application guidelines are available at www.adv-polymer.com. Any customer specific express warranty can only arise from a written warranty extended by APC to the specific customer identified in the writing. APC DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE THAT ARE CONTAINED IN ARTICLE 2 OF THE UNITED STATES UNIFORM COMMERCIAL CODE AND ANY SIMILAR WARRANTIES CONTAINED IN THE LAWS OF OTHER COUNTRIES WHERE APC PRODUCTS ARE DELIVERED OR APPLIED. ALL CONTRACTS FOR THE SALE OF APC PRODUCTS SHALL BE GOVERNED BY THE UNIFORM COMMERCIAL CODE WITHOUT REGARD TO ANY STATE VARIATIONS.

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