The industry leading cargo tank coating for chemical & product tankers, with superior chemical resistance.
What is MarineLINE®

Key Coatings Benefits

• MarineLINE® 784 from Advanced Polymer Coatings, is the premier cargo tank coating system available for chemical and product carriers, and the only high performance lining that withstands all IMO approved chemical cargoes.

• MarineLINE® is generally recognized as safe (GRAS) for food grade cargoes. MarineLine® 784 coating complies with the FDA and all applicable food additive regulations.

• More chemical resistance than stainless steel, phenolic epoxies and zinc silicate coatings.

• Superior resistance to acids, alkalis and solvents; maximum versatility to carry CPPs, PFADs, Bio-Fuels, and Methanol.

• Virtually non-permeable for assurance of product purity.

• Superior bond strength and adhesion.

• Very low VOC - 99 grams/L (0.80 lbs./gal.).

• Excellent flex stressing.

• Resistance to wear, abrasion and impact.

• Thermal shock resistance -40°C to +150°C (-40°F to +302°F).

Key Performance Benefits

• Shipowners generate strong Return on Investment (ROI).

• Faster, easier, more efficient cleaning due to non-absorption, low surface energy and smooth surface.

• Inspection of tank coating application and curing by MarineLINE® professionals.

• Easy tank cleaning with less slops, and fast drying.

• Minor tank touch-up repairs done easily.

Operational Benefits

Greater Versatility in Switching Cargoes

Choose the right cargo tank coating — MarineLINE® — to take advantage of the greatest sequencing possibilities and the opportunity to carry the most profitable cargoes.

Greater Versatility in Switching Cargoes

- EHC 110
- Benzene
- Fuel Oil
- Sulfuric Acid
- PFADs, 65°C
- Molasses
- Palm Oil
- Acrylonitrile
- Canola Oil
- Acetic Acid
- Many other chemicals*
- Crude Oil
- Stearic Acid, 65°C
- Gas Oil
- Soyabean Oil
- Paraxylene
- Ethanol
- MBTE
- Toluene
- Baseoils
- Phosphoric Acid
- EHC 110
- Benzene
- Fuel Oil
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- Phosphoric Acid

* See Advanced Polymer Coatings MarineLINE®

This 5-year comparison of MarineLINE® versus Phenol Epoxy coatings shows the tremendous difference in Additional Return On Investment. Chart calculations are based on data accumulated from a number of tanker shipowners. 25,000 DWT Tanker, Nine (9) voyages per year @ $20,000 USD per day

1) Three (3) less cleaning days per voyage than Phenol Epoxy (27 more sailing days)
2) 50% less cleaning chemicals used
3) 50% less slops
4) MarineLINE® cargo tank coating is fully cured when leaving the shipyard, so additional income is earned as MarineLINE® can immediately carry all cargoes on the MarineLINE® resistance list.
A History of Performance

The MarineLINE® cargo tank coating has been applied to hundreds of maritime chemical and product tankers, covering millions of square meters of surface.

- The majority of ships coated are over 8 years old with some over 15 years old.
- MarineLINE® has been applied successfully in major shipyards around the world.
- These tankers have carried thousands of different chemicals, including Acids, Caustics, Solvents, Inorganic Chemicals, and Edible Oils, with some tankers changing their chemical cargoes up to 85 voyages a year.
- APC’s MarineLINE® coating withstands the stresses of twisting and bending in rough seas while resisting temperature extremes of the cold Baltic winters to the hot Middle East summers.

Long Service Life Potential

The following UNRETouched photographs of tankers at various inspection intervals provide some insight into the performance of MarineLINE®.

3 Years

4 Years

5 Years

6 Years

11 Years
**Compare Corrosion Resistance and Product Purity**

MarineLINE® covers the widest range of chemicals carried by a marine cargo tank coating. See the full Chemical Resistance list at [http://www.adv-polymer.com](http://www.adv-polymer.com) Corrosion resistance data from published literature.

A = Good at ambient temperatures  L = Limited Service  N = Not recommended

### Chemicals with Phenolic Epoxy and Modified Epoxy Open Screen Structures

**Aggressive Chemical Molecules Penetrate into and through the polymer groups attacking both the inner polymer structure and the substrate.**

<table>
<thead>
<tr>
<th>Aggressive Chemical Molecules</th>
<th>Substrate Corrosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substrate</td>
<td></td>
</tr>
</tbody>
</table>

### Chemicals with Phenolic Epoxy and Modified Epoxy Screened Structures

**The MarineLINE® Closed Screen Structure**

**Aggressive Chemical Molecules Cannot penetrate the high density Surface. Inner polymer structure and Substrate protected from chemical attack.**

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Phenolic Epoxy</th>
<th>Stainless Steel</th>
<th>Modified Epoxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic Acid, Glacial</td>
<td>A - L N</td>
<td>A -</td>
<td>A -</td>
</tr>
<tr>
<td>Acetone</td>
<td>A L A A</td>
<td>DGE (diethylene glycol)</td>
<td>A A A A</td>
</tr>
<tr>
<td>Acetonitrile</td>
<td>A L - L</td>
<td>Diesel Oil</td>
<td>A L A A</td>
</tr>
<tr>
<td>Alcohols or Acidic Beverages (Wine/Gritic Juices)</td>
<td>A L A A</td>
<td>Diphenylidicyanate</td>
<td>A A - A</td>
</tr>
<tr>
<td>Acrylonitrile, 35°C</td>
<td>A L A N</td>
<td>EDC (ethylene dichloride or dichloroethane)</td>
<td>A L A A</td>
</tr>
<tr>
<td>Alkanes / Alkylates</td>
<td>A L A L</td>
<td>Ethylene Glycol</td>
<td>A L A L</td>
</tr>
<tr>
<td>Alkyl Amines / Aniline Oil</td>
<td>A L A L</td>
<td>ETHE (ethylenetributyl ether)</td>
<td>A A - A</td>
</tr>
<tr>
<td>Baseoils / Baseoil 70N</td>
<td>A L A L</td>
<td>Ethane</td>
<td>A A A -</td>
</tr>
<tr>
<td>Benzene</td>
<td>A L A A</td>
<td>Ethanol</td>
<td>A L A A</td>
</tr>
<tr>
<td>Biodiesel / Biofuels</td>
<td>A L A L</td>
<td>Fish Oil</td>
<td>A L A L</td>
</tr>
<tr>
<td>Bunker Oils</td>
<td>A L A L</td>
<td>FAME (Fatty Acid Methyl Esters)</td>
<td>A L A L</td>
</tr>
<tr>
<td>Butane</td>
<td>A A A A</td>
<td>Fatty Acid / RCNO</td>
<td>A L A L</td>
</tr>
<tr>
<td>Butanoic</td>
<td>A A A A</td>
<td>Fatty Alcohols</td>
<td>A L A L</td>
</tr>
<tr>
<td>Calcium Nitrate</td>
<td>A L L A</td>
<td>Fuel Oil</td>
<td>A L A A</td>
</tr>
<tr>
<td>Canola Oil</td>
<td>A L - L</td>
<td>Gas Oil</td>
<td>A A - A</td>
</tr>
<tr>
<td>Cashew Nut Oil</td>
<td>A L - L</td>
<td>Gdrolite</td>
<td>A L A A</td>
</tr>
<tr>
<td>Castor Oil</td>
<td>A L A L</td>
<td>Hexane / Heptane</td>
<td>A A A A</td>
</tr>
<tr>
<td>Caustic Potash Solutions</td>
<td>A - L L</td>
<td>Hydrocracker Buttons</td>
<td>A - - -</td>
</tr>
<tr>
<td>Caustic Soda</td>
<td>A L L L</td>
<td>Hydrid SO</td>
<td>A - - A</td>
</tr>
<tr>
<td>Coconut Oil (Crude and refined)</td>
<td>A A L L</td>
<td>IPA (isopropyl alcohol)</td>
<td>A L A A</td>
</tr>
<tr>
<td>CORLAS Amine 1 / 150SN / 400SN</td>
<td>A - L - A</td>
<td>Irganox Irganzone</td>
<td>A A A A</td>
</tr>
<tr>
<td>Corn Oil (Crude and refined)</td>
<td>A L A L</td>
<td>Jet Fuel / AVGAS</td>
<td>A A A A</td>
</tr>
<tr>
<td>Cottonseed Oil (Crude and refined)</td>
<td>A L A L</td>
<td>Lard (animal fats)</td>
<td>A L A L</td>
</tr>
<tr>
<td>CPP - Clean Petroleum Products</td>
<td>A - - -</td>
<td>Linolefins</td>
<td>A L - -</td>
</tr>
<tr>
<td>Crude Oil</td>
<td>A - - -</td>
<td>Linseed Oil (crude and refined)</td>
<td>A L A A</td>
</tr>
<tr>
<td>Crude Oil (NHC)</td>
<td>A - - -</td>
<td>LSS Diesel Oil (Low Sulfur and Ultra low sulfur)</td>
<td>A A - -</td>
</tr>
<tr>
<td>Crude Palm Oil</td>
<td>A L - L</td>
<td>Lube Oi</td>
<td>A L A A</td>
</tr>
<tr>
<td>CSS (Calcic Soda Solutions)</td>
<td>A L - L</td>
<td>Marine Diesel</td>
<td>A A A A</td>
</tr>
<tr>
<td>Cumene</td>
<td>A A A A</td>
<td>MEG (monooxyethylene glycol or ethelyne glycol)</td>
<td>A A A A</td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>A A A A</td>
<td>MX (methyl ethyl ketone)</td>
<td>A L A A</td>
</tr>
<tr>
<td>Ethanol</td>
<td>A L A L</td>
<td>Methanol</td>
<td>A L A L</td>
</tr>
<tr>
<td>Ethylene Glycol Monomethyl Ether</td>
<td>A L A L</td>
<td>Methyl Acetate</td>
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<tr>
<td>Ethylene Glycol Monopropyl Ether</td>
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<td>A L A L</td>
<td>Methyl Acetate</td>
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<tr>
<td>Ethylene Glycol Monobutyl Ether</td>
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<td>Ethylene Glycol Monopropyly Ether</td>
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*This is Only A Reference Guide. This is an abbreviated listing of MarineLINE® capabilities. See MarineLINE® Chemical Resistance Guide for full capabilities. The end user is responsible for determining if MarineLINE® is the appropriate coating for the specific application involved.*
To ensure the performance of MarineLINE®, it is imperative that APC provides inspection services throughout the entire application process. APC focuses on the importance of good surface preparation, correct application and proper heat cure, in a 6-Step approach. MarineLINE® has set the benchmark regarding heat curing, and spark testing the entire tank surface.

**Insurance Warranty through Helvetia Insurance**

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

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

Trygge Möller, Managing Director, Terntank Ship Management AB, says

"Our fleet of 4 new tankers, all employing the latest technologies, represents the future of shipping. That includes the MarineLINE® cargo tank coating, with the best tank surface for easily switching cargoes."


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**Long Service Life Potential**

Taking care of your MarineLINE® cargo tank coating with proper cleaning and regular maintenance can provide years of profitable service. Well maintained MarineLINE® tanks have been in service 10+ years, and are still performing well. For some tanks, minor coating repairs have been made using the MarineMEND Repair system.

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**Easy Cleaning**

MarineLINE® 784 has an ultra-smooth, glossy, low energy surface that reduces venting time, uses less cleaning chemicals and less fuel/energy for cleaning equipment, and leads to faster turnaround.

A wide range of approved cleaning detergents and chemicals can be used to clean and prepare the coating for next cargoes allowing the shipowner/operator to maintain the coating with minimal effort.

A number of shipowners have provided examples of their MarineLINE® cleaning practices which APC readily shares with others upon request. A properly cleaned and maintained MarineLINE® cargo tank coating should provide excellent service for many years.

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**SHIPOWNER VIEWPOINT**

Niclas Kappelin, Managing Director, North Sea Tankers, explains the

CLEANING BENEFITS of MarineLINE®

"A well maintained MarineLINE® coating, with its very smooth surface, helps NST gain a quick turnaround in port, and provides effective cleaning from the wide range of products that we transport."

MarineLINE® Sets The Benchmark For Easy Cleaning.
**MarineLINE® After Sales Services**

- Proper tank coatings care provides years of service
- Proper repair training
- Repair planning
- Performance monitoring
- OBI’s

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**Simple Coating Repair for Small Areas**

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

(Top) MarineMEND coating repair in progress. (Below) Finished

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