Advanced Polymer Coatings is asked regularly by customers whether certain chemicals/products can be carried in tanker ships lined with the MarineLine® 784 coating system. The carriage of EDC (Ethylene Dichloride) is one of the more commonly asked questions.

EDC has been carried in MarineLine® vessels for more than 15 years. Since this is a common chemical, it is estimated more than 500 ships worldwide with the MarineLine® coating system have successfully carried EDC on numerous voyages.

As illustrated in the extensive MarineLine® 784 Cargo Resistance Guide (www.adv-polymer.com) with thousands of chemicals, EDC is highlighted with a “A” rating, which means “OK to Carry.”

Major classification societies have given their approval for EDC carriage in MarineLine® coated cargo tanks. Various studies and independent tests have also been done to corroborate using MarineLine®, including comparisons versus other types of coatings. A recap of some tests and studies related to EDC carriage is provided here.

**STUDY ONE**

One APC customer has coated more than 30 carbon steel tanks and related projects and has been carrying/holding EDC (ambient to 180°F) without incident. They have been using APC coatings for more than 15 years.
STUDY TWO

In one study, an independent firm in the UK providing tank cleaning and cargo handling advice to the industry, was asked to investigate the impact of MarineLine® on cargo handling and tank cleaning between different cargo grades. One of the tested chemicals was EDC for absorption of the chemical and transmission into subsequent cargoes. Five cargo linings/materials were compared to each other: stainless steel; an industry standard zinc silicate (aged); an industry standard phenolic epoxy; an industry standard high solids phenolic epoxy; and MarineLine® 784 from Advanced Polymer Coatings.

Test panels were immersed in various cargoes for 48 hours, including EDC at 30°C. After immersion, the panels were cleaned according to the Dr. Verway tank cleaning guide. EDC was cleaned via 1) Cold S/W for 3 cycles, 2) Warm (50°C) S/W for 2 cycles, and 3) Steaming. After cleaning, all test panels were “wall washed” with 20ml of methanol and checked.

Final results of the EDC tests showed MarineLine® with the lowest absorbance, thus clearly showing there is significantly less risk of contaminating subsequent cargoes since there are no retained residues.

![Ethylene Dichloride (EDC)](image)

STUDY THREE

Independent Genoa laboratory, ‘Laboratoria Chimico Merceologico’, tested EDC as well as a series of 97 other chemicals for chemical and corrosion resistance. The EDC tests showed … “that the quality was not affected by the contact with the [MarineLine®] coating.” And, “the visual examination of the [MarineLine®] coating did not show any damage or alteration”, and “the results indicate that upon completion of the washing of the box with salt and fresh water, no residue of Ethylene Dichloride remained in the [MarineLine®] coating.”
STUDY FOUR

At the request of FOSFA International for an onboard ‘real life’ test, APC approached a customer to do immediate last cargo test in a MarineLine® coated tank, and they agreed where EDC was tested as the last cargo prior to loading the next cargo.

The ship’s tanks had been coated with MarineLine® in 2007. The method of cleaning was 1) Forced Ventilation followed by 2) Butterworth Saltwater (ambient) for 4 hours.

The date of loading EDC was June 11, 2010 and the date of discharge of EDC was July 23, 2010.

The next cargo loaded was a 50% Caustic Soda solution, loaded on August 14, 2010 and then discharged September 21, 2010.

RESULTS: Two sets of sample bottles sealed and stamped containing 50% Caustic Soda from the vessel were delivered to Polymer Diagnostics, Inc. for analysis of any EDC in the 50% Caustic Soda Solution. Polymer Diagnostics’ conclusions stated that the cargo contained no EDC above the detection limit (2 mg/kg) of the analytical equipment, thus no EDC residue was shown to have been in the tank after the EDC was discharged and the tank had been cleaned.

STUDY FIVE

In a laboratory test report by Dr. Verwey Labs from July 2005 to test for retention of liquid chemicals and subsequent migration of the chemical into vegetable oil, MarineLine®-coated test plates were immersed in Ethylene Dichloride (EDC) liquid for 30 days at ambient (24°C) lab temperature.

All the test plates were then washed with hot seawater, then briefly with freshwater, and dried for 2 hours at ambient lab temperature. Panels in the EDC immersion were then immersed in refined sunflower seed oil for 30 days at room temperature. Then the sunflower seed oil was subsequently analyzed for the presence of traces of EDC.

RESULTS: In the analysis of the sunflower seed oil used for the immersion test of the EDC exposed panels, the Ethylene Dichloride (EDC) content was “not detectable less than 0.01 mg/kg (<0.01 ppm).”

STUDY SIX

In studies certified or performed by DNV, Dr. Verway Labs, and other independent labs, EDC was one of a group of chemicals studied regarding product purity. These chemicals were tested both before, and after, 30 days of immersion. EDC was found to have the same purity (as measured to 0.001PPM), as indicated in this chart with other chemicals shown.