MarineLINE®

DEAL SNAPSHOT



Lab tested, Shell Approved. MarineLINE® Cargo Tank Coating System moves to list of 'Approved' methods for MEG carriage via Shell Cargo Handling Sheet.

OVERVIEW

A vital cargo for Shell to transport via ocean is monoethylene glycol (MEG) which is used in consumer applications and requires the highest purity.

Before the 7th Revision of Shell's Cargo Handling Sheet, Commercial operators of vessels chartered on behalf of Shell and Technical operators of vessels chartered on behalf of Shell were under the restraint that MEG could not be loaded into any lined tank due to the risk of contamination.

After completing a recent study between Advanced Polymer Coating and Shell's chemists, MarineLINE 784® has since been added to the list of approved methods to carry MEG, right alongside stainless steel.

Shell

Cargo Handling Sheet

Ethylene Glycol - All Grades

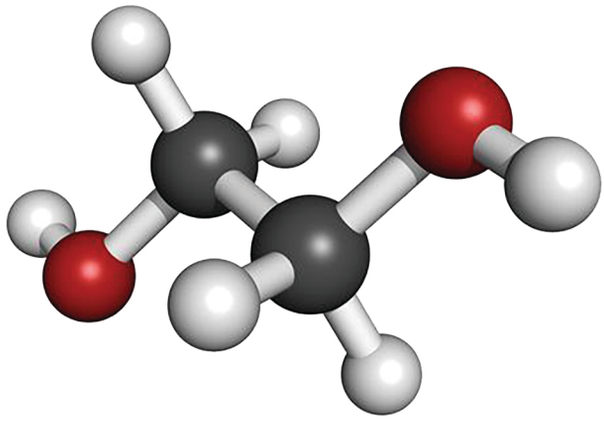
Document Date: 22 April 2022
Revision 22

Cargo Handling Sheets are for the use of vessels chartered on behalf of Shell

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

DEAL SNAPSHOT



What is Monoethylene Glycol (MEG)?

MEG is a vital ingredient for producing polyester fibers, film, polyethylene terephthalate (PET) resins, and engine coolants.

End uses for MEG range from clothing and other textiles through packaging to kitchenware, engine coolants, and antifreeze. Polyester and fleece fabrics, upholstery, carpets, and pillows, as well as light and sturdy polyethylene terephthalate drink and food containers, originate from ethylene glycol.

MEG is a very sensitive chemical cargo and there are a few reasons why it could become off-spec:

Exposure to air for a prolonged period

Exposure to air for one week or more would quickly cause the MEG to deteriorate due to the cargo's oxidation. After loading, the tank has limited air space if the tank is not fully loaded with the cargoes. The cargoes may deteriorate gradually when this situation continues for more than a week without any N_2 injection into the tank. To prevent cargo deterioration, N_2 should be injected into the ship's cargo tank at an appropriate time during the voyage, and the oxygen level of the air in the tank should be reduced.

When MEG comes into contact with air, dissolved oxygen increases, and the oxidation reaction proceeds. Peroxides generate carbonyl compounds such as glycolic aldehyde, glycolic acid, and glyoxal. In case of the amount of such degradation products increases, the absorbance around 200-220 nm increases, which is a sign of MEG degradation.

External Contaminates (such as prior cargoes)

It is imperative to keep the product pure when storing and transporting MEG in an un-lined, stainless-steel tank. The industry's status quo shows that stainless steel should be the only viable option for transporting and storing this commodity due to the perception that all tank linings absorb… but do they?

The answer here is no,
not **ALL** tank linings absorb.



ADVANCED POLYMER COATINGS

MarineLINE® continues to prove to be the exception

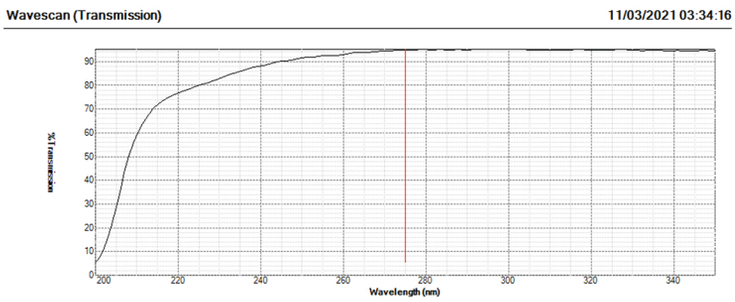
MEG is a vital cargo for Shell to transport via ocean (which is used in consumer applications and requires the highest purity). Transporting MEG in a lined storage tank would offer cost savings and flexibility in terms of what can be transported.

But what if the previous cargo was benzene, which traditionally absorbs into tank linings?

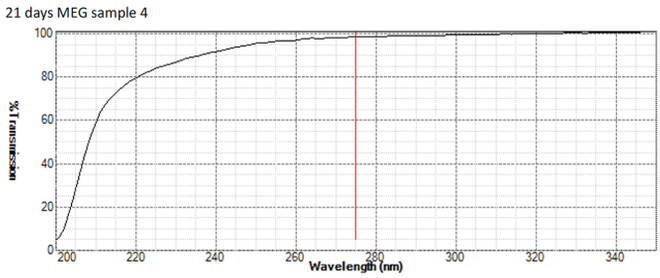
The absorbed benzene in the lining would then contaminate the MEG, making the MEG unusable for consumer applications.

Advanced Polymer Coatings recently conducted a study to show that MarineLINE® 784 would not absorb benzene, ensuring the MEG cargo's purity. MarineLINE 784® panels were immersed in benzene, washed according to the on-board procedure, and then immersed in MEG at elevated temperatures for different amounts of time to see if any benzene could be detected in the MEG. *Actual data from that study is shown below:*

Clean MEG



Benzene immersion followed by 21 days in MEG

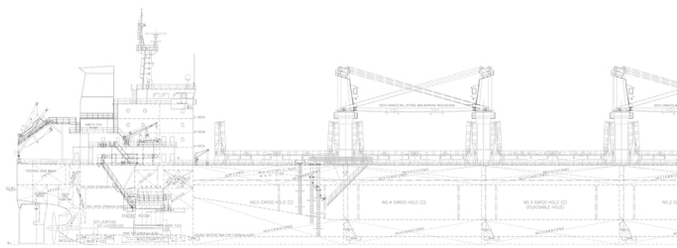


The result?

Stringent analytical testing down to < 0.05 mg/L showed that there was no benzene detected in the MEG, and the UV scans from the APC study shown above support this testing.

This allowed Shell to start carrying MEG in MarineLINE 784® coated tanks as opposed to stainless steel because product purity could be ensured, saving them time and money and increasing flexibility of what could be carried.

So, when you want to eliminate chemical absorption in your lining to maintain product purity of the next cargo being carried, there is only one choice – MarineLINE 784®.



Applying MarineLINE® to Chemical/Product Tankers

Contact your Advanced Polymer Coatings representative for more information on the MarineLINE® Cargo Tank Coating System, and learn how APC's patented polymer tank coating can help optimize your operation.

MarineLINE® 784