

ADVANCED POLYMER COATINGS

deal snapshot

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

Overview

Monoethylene glycol (MEG) is an important Shell cargo used in consumer applications where purity is critical. Prior to the 7th revision of Shell's Cargo Handling Sheet, MEG could not be loaded into lined cargo tanks due to contamination concerns, making stainless steel the accepted standard.

Following a study with Shell's chemists, MarineLINE® was added as an approved method for carrying MEG alongside stainless steel, supporting high-purity cargo requirements while giving operators greater vessel flexibility.

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

SHELL

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

What is Monoethylene Glycol (MEG)?

MEG is a vital ingredient in the production of polyester fibers, film, polyethylene terephthalate (PET) resins, and engine coolants.

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

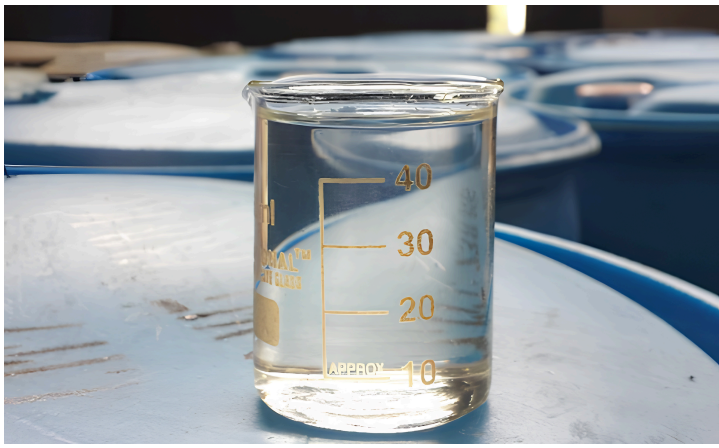
MEG is a very sensitive chemical cargo, and there are a few reasons why it could become off-spec:

Exposure to air for a prolonged period

Exposure to air for one week or more would quickly cause the MEG to deteriorate due to oxidation of the cargo. After loading, the tank has limited air space if it is not fully loaded with cargo. The cargoes may deteriorate gradually when this situation continues for more than a week without any N2 injection into the tank.

To prevent cargo deterioration, N2 should be injected into the ship's cargo tank at an appropriate time during the voyage, and the tank's oxygen level should be reduced.

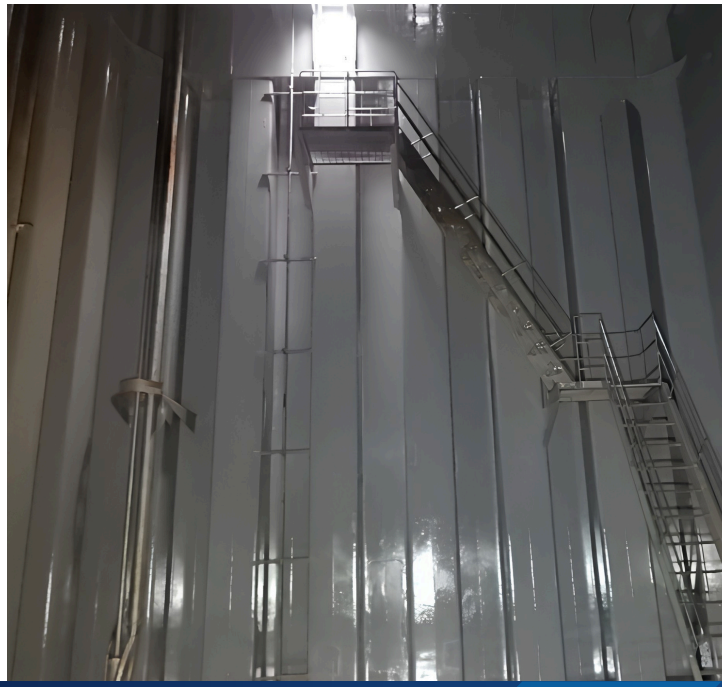
When MEG comes into contact with air, dissolved oxygen increases, and the oxidation reaction proceeds. Peroxides generate carbonyl compounds such as glycolic aldehyde, glycolic acid, and glyoxal. As the amount of such degradation products increases, the absorbance at 200-220 nm increases, indicating MEG degradation.



External Contaminants (such as prior cargoes)

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

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



MarineLINE®

MarineLINE® continues to prove to be the exception

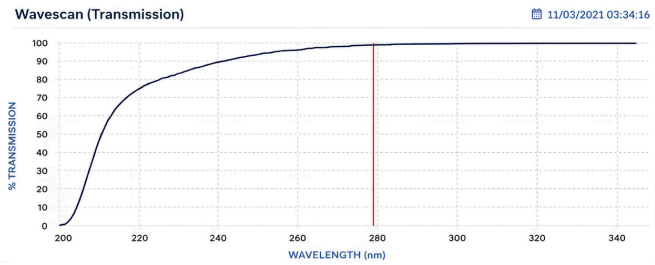
MEG is a vital cargo for Shell to transport by sea (used in consumer applications and requiring the highest purity). Transporting MEG in a lined storage tank would offer cost savings and greater flexibility in what can be transported.

But what if the previous cargo was benzene, which traditionally tends to absorb into tank linings? The absorbed benzene in the lining would then contaminate the MEG, rendering it unusable for consumer applications.

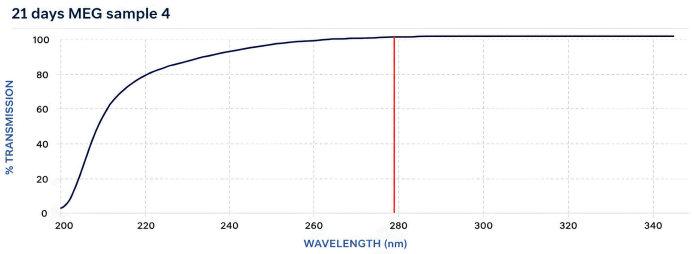
Advanced Polymer Coatings recently conducted a study to evaluate whether MarineLINE® would absorb benzene and potentially impact the purity of MEG cargo. In the study, MarineLINE® panels were immersed in benzene, washed according to the standard onboard cleaning procedure, and then immersed in MEG at elevated temperatures for varying lengths of time.

The testing was designed to simulate a realistic cargo transition scenario and determine whether any residual benzene could be detected after cleaning. **Actual data from that study is shown below ↓**

Clean MEG



Benzene immersion followed by 21 days in MEG



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® 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.

When the next cargo demands purity, MarineLINE® helps minimize chemical absorption and supports cleaner, more confident cargo transitions.

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