

Ethanolamines

INEOS Oxide

Storage and Handling Considerations

Safety concerns

Ethanolamines are not dangerous when used and handled properly. Ethanolamines can cause serious injury to the eyes (eye contact with MEA may cause permanent eye damage). Ethanolamines are corrosive to the skin and may cause severe burns. With this knowledge, strict precautions should be developed for handling. Occasional, brief contact with the skin should be thoroughly washed off and should have little adverse effect.

General

Ethanolamines are not corrosive when stored in vessels made of compatible material. Protecting the products from exposure to the air will prevent oxidation, which will lead to discoloration. This practice will also prevent absorption of water if keeping the product anhydrous is important to your application. Products becoming frozen are a concern due to the freezing points of the compounds. A separate technical data sheet addresses this issue.

Storage Tanks

Type 316L stainless steel has been shown to induce extremely low corrosion rates and is the best choice for bulk storage of ethanolamines. If 316L stainless steel is not available, the next best choice is 304L stainless steel. Mild steel or black iron is satisfactory for storage tanks if coloration of the ethanolamine is not a concern.

Aluminum can result in severe corrosion and coloration of the products under certain conditions. Due to severe pitting, aluminum may fail. This problem is accelerated by water and elevated temperatures. Hydrogen generation is also possible during the reaction of aluminum and ethanolamines.

High density polyethylene is acceptable for use with ethanolamines. Other plastics have not demonstrated the same resistance.

Drums

Transport of ethanolamines in drums is a common route of distribution. INEOS uses HDPE (high density polyethylene) and steel drums or polyethylene drums for shipment.

Storage Temperatures

Ethanolamines become very viscous just above their freezing temperature. Because of this, they must be pumped and stored at elevated temperatures. Guidelines for minimum and maximum temperatures for pumping and storing are:

	Minimum	Maximum
Monoethanolamine	27°C (80°F)	38°C (100°F)
Diethanolamine	38°C (100°F)	49°C (120°F)
Triethanolamine	35°C (95°F)	46°C (115°F)

Transport

Ethanolamines can be shipped in bulk by tank truck or rail car. Blue plastic or steel drums are also available. The drum material is picked based on the product. Some products come only in plastic and others in steel drums. A full truck is 80 drums and a full ocean going container is 76 drums. A minimum two-week lead time is required for all products. Depending on shipment location, a minimum order is required, so please check with your local INEOS sales office to determine this quantity.

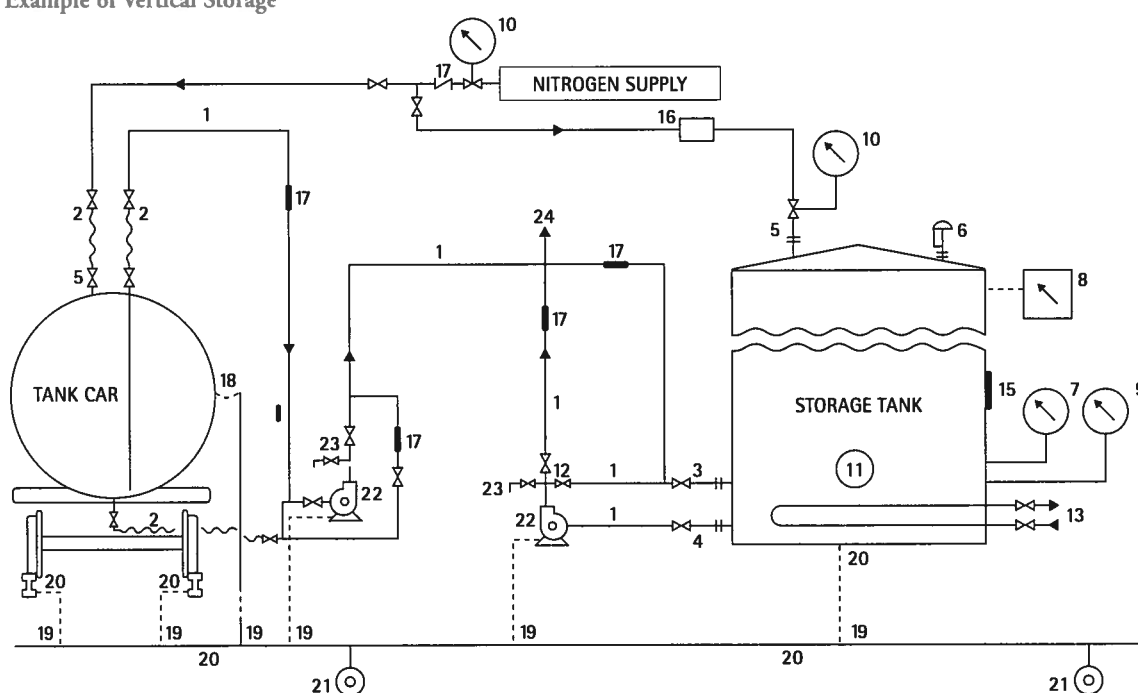
Piping

Stainless steel (316L) is the best material for piping since it can be heat traced and insulated. In some installations, HDPE is used and is satisfactory.

Gaskets/Pump Seals

Only a few materials have been determined to resist attack by ethanolamines. Graphite filled, EPDM, perfluoropolymers and Teflon fluoropolymers below 200 °F are compatible with ethanolamines.

Example of Vertical Storage



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|-----------------------------------|-----------------------|-----------------------------------|
| 1 Heat Tracing | 9 Level Indicator | 17 Check Valve |
| 2 Flex SS Hose with Braided Cover | 10 Pressure Gauge | 18 Approved Ground Connection |
| 3 Product Inlet | 11 Manway | 19 Ground Wires |
| 4 Product Outlet | 12 Pump Recirculation | 20 Copper Conductor (Below Grade) |
| 5 Inert Gas Inlet | 13 Heating Medium | 21 Ground Cone |
| 6 Pressure/Vacuum Relief | 14 Heating Coil | 22 Centrifugal Pump |
| 7 Temperature Indicator | 15 Insulation | 23 Sample Point |
| 8 High Level Alarm | 16 Pressure Regulator | 24 To Process |

For more information on INEOS ethanolamines, call +1-225-242-3005 or 866-865-4767 (toll free in USA and Canada). Please refer to the Material Safety Data Sheet (MSDS) for safe handling information.

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