

Handling, unloading, and storage requirements for Eastman AdapT[®] products (MDEA and MDEA-based formulations)

1. General handling information

1.1. General

This publication contains general information on the handling requirements for Eastman AdapT[®] products. Eastman assumes no liability or responsibility for any use or misuse, or the results of such use or misuse, of any information, procedure, conclusion, opinion, product, or process provided in this publication.

Users of this information must be guided by the specific requirements of their company, personnel, technology, and manufacturing operations. All persons involved in using, handling, storing, transporting, and disposing of Eastman products have an independent obligation to ensure that their actions are in compliance with current federal, state, and local laws and regulations and should consult their technical and regulatory experts concerning such matters.

For more details, check the relevant Safety Data Sheets found on www.eastman.com or www.adaptsolvents.com or contact your Eastman representative.

1.2. Fire

AdapT MDEA and MDEA-based formulations are considered combustible materials, although they have a flash point of $>100^{\circ}\text{C}$ ($>212^{\circ}\text{F}$). If ignited, AdapT MDEA and MDEA-based formulations will sustain a fire which should only be tackled with proper firefighting equipment. All types of fire extinguishers are effective against MDEA fires.

Firefighters should be equipped with self-contained breathing apparatus.

1.3. Personal protection and first aid

Because AdapT MDEA and MDEA-based formulations are eye irritants, chemical splash goggles should be worn when handling them. If any product enters the eye, rinse immediately with plenty of water (also under the eyelids) for at least 15 minutes and consult a physician. For AdapT 202, it is recommended to wear a full-face mask with ABEK P3 filter during operations where contact with the product cannot be excluded (e.g., coupling/decoupling).

Gloves made of butyl rubber or neoprene provide the best resistance to AdapT MDEA and MDEA-based formulations. Following use, gloves should be rinsed and discarded.

Protective clothing is recommended during the handling of all AdapT products. For packaged products, protective clothing which covers arms, legs, and body is sufficient. For bulk (un)loading operations, it is recommended to wear clothing that offers protection against splashes of liquid chemicals. For AdapT 202, it is recommended to additionally wear a chemical suit (type Tychem[®]/Pyrolon[®]) during operations where contact with the product cannot be excluded (e.g., coupling/decoupling).

If skin contact does occur, the affected area should be thoroughly washed off with water to prevent irritation. Consult a physician if necessary. If AdapT MDEA or MDEA-based formulations are swallowed, dilute with water by drinking 1 or 2 glasses of water and consult a physician.

Ensure that eye flushing systems and safety showers are located close to the working area.

1.4. Waste disposal

Waste AdapT MDEA and MDEA-based formulations should be stored in approved safety-type disposal cans that are properly labeled as to their contents and hazard. Dispose of them in accordance with local regulations.

AdapT MDEA and MDEA-based formulations are biodegradable and may be treated effectively in an industrial wastewater treatment facility of the proper size using activated sludge technology. Nevertheless, disposal of AdapT MDEA and MDEA-based formulations by these routes should not start until approval has been obtained from treatment facility operators.

Empty containers should be taken to an approved waste handling site for recycling or disposal.

2. Unloading

2.1. ISO tank/tank truck



2.1.1. General

Assure that the proper recommended personal protective equipment is used before proceeding with the unloading operation. The tank is unloaded by pumping to the storage under N_2 atmosphere; it is recommended to work with a vapor return line to the tank truck.

2.1.2. Hose requirements

For the transfer of AdapT MDEA and MDEA-based formulations, it is recommended that a stainless steel flex hose with a minimum inner diameter of 2 inches or a steel-braided butyl rubber or Teflon-lined hose be used.

It is recommended that product transfer hoses be equipped with dry disconnection couplings instead of conventional quick disconnects. This type of coupling significantly reduces product losses or spillage should accidental disconnection of the coupler adapter occur or when disconnecting the hose after product transfer.

2.1.3. Unloading procedure

1. Chock the wheels of the truck. Attach a certified grounding cable to the frame of the truck or ISO tank.
2. Compare the trailer/ISO tank number with the bill of loading to ensure that the proper shipment is to be unloaded.
3. Assure that the internal and external valves are in the close position. Place a spill pan underneath the outlet nozzle. Carefully remove the cap from the product outlet nozzle. Inspect for cleanliness.
4. Remove the caps from the unloading hose. Connect the unloading hose to the tank truck/ISO tank outlet.
5. Connect the vapor return line to the tank truck/ISO tank. If not present, connect a nitrogen supply hose to the vent valve of the tank truck. Apply about 0.1 barg (1.45 psi) nitrogen to the tank. In this case, ensure that the N_2 flow to tank truck/ISO tank is high enough because a lack of pressure can result in damage to the tank truck/ISO tank.
6. Prepare pump for unloading.
7. Check for leaks at all hose/transfer line connections.
8. Open all valves in the transfer line and the tank inlet valve.
9. Start the unloading pump. Monitor the liquid level in the tank truck/ISO tank. Check for possible leaks at the transfer hose connections.

10. The entire unloading operation should be supervised by the responsible operating personnel.
 11. Once unloading is completed, close all valves on the product discharge line, tank car/ISO tank, and storage tank.
 12. Secure the nitrogen source. Disconnect the nitrogen inlet or the vapor return line.
 13. Secure the transfer pump.
 14. Disconnect the unloading hose, and place the cap over the product outlet. Cap the open ends of the transfer hose.
 15. Clean the discharging area. Dispose of all product collected from cleaning or from the spill pan. Do not discharge into waterways or sewage systems.
4. Remove aluminum-laminated PE-foil seal from the discharge port.
 5. Remove security screw from the valve handle.
 6. To discharge, open the valve by turning the valve handle from a right position to the body to a straight line (clockwise).
 7. The contents of the container will be discharged by gravity.

2.2. Emptying of Schütz Ecobulk containers (IBCs)



1. Empty, preferably through the bottom discharge valve.
2. Loosen top fill cap to allow air to vent container to prevent collapsing (vacuum) of the HDPE inner bottle.
3. Unscrew 2-in. dust cap from front of the valve. Cap with gasket should be replaced on discharge port whenever contents are not being discharged.

2.3. Emptying of drums



1. Use a volumetric pump with dip pipe to empty the drum.
2. Remove the cap seal and open the drum.
3. Place the dip pipe in the opening of the drum.
4. Start the pump and empty the drum.

3. Storage

3.1. Bulk storage tank

AdapT MDEA and MDEA-based formulations are hygroscopic, so they cannot be stored in open storage. The presence of oxygen may affect the color of AdapT MDEA and MDEA-based formulations slightly over time; therefore, the drums need to be stored closed. The product in the system inventory which is recycled all the time to a buffer tank should be kept under nitrogen. If not, you may have a continuous source of oxygen going to your amine treatment system, and this may lead to degradation of the amine solution.

Carbon steel is adequate for storage of AdapT MDEA and MDEA-based formulations. Stainless steel AISI 316L is preferable if color stability is to be maintained over a long period. Copper and copper alloys should be avoided.

3.2. Storage of packed goods (IBCs, drums)

Packed goods should be stored tightly closed in a dry and well-ventilated place. Storage temperatures $>50^{\circ}\text{C}$ (122°F) and $<-20^{\circ}\text{C}$ (-4°F) should be avoided. Sheltered storage will increase the life span of both steel and plastic packaging. At temperatures $>50^{\circ}\text{C}$ (122°F), there is a risk of pressure building up in the packaging which could lead to ruptures or leakages.

3.3. Shelf life of AdapT MDEA and MDEA-based formulations

Typical shelf life of AdapT MDEA and MDEA-based formulations is 24 months from date of manufacturing under proper storage conditions.



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