

# Bulk storage and handling of solvents and coalescents

## Introduction

This publication provides information for solvent storage, tank construction materials, and unloading tank cars and tank trucks containing Eastman solvents and coalescents. The discussion and drawings are given as information only and should be used solely as a guide in developing procedures and facilities for handling these materials. Customers must determine for themselves the appropriate procedures and facilities for their operations.

The information in this publication, along with the data and information contained in Eastman's Safety Data Sheets (SDS), needs to be reviewed and understood to help ensure the safe storage and handling of Eastman solvents and coalescents. It is the customer's responsibility to direct and control the unloading of any chemical or material into or from bulk storage and handling facilities.

Federal, state, and local regulations regarding the handling and storage of chemicals may vary widely in the United States. The Federal Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), National Fire Protection Association (NFPA), and a user's insurance company also impose safety standards. In addition, the U.S. Department of Transportation (DOT) prescribes rules and regulations for unloading hazardous materials from tank cars and tank trucks (see 49 CFR 100-199). Knowledge of these and other appropriate federal and state laws and regulations as well as consultation with the proper authority should provide guidance for developing adequate handling procedures and constructing appropriate storage and drumming facilities.

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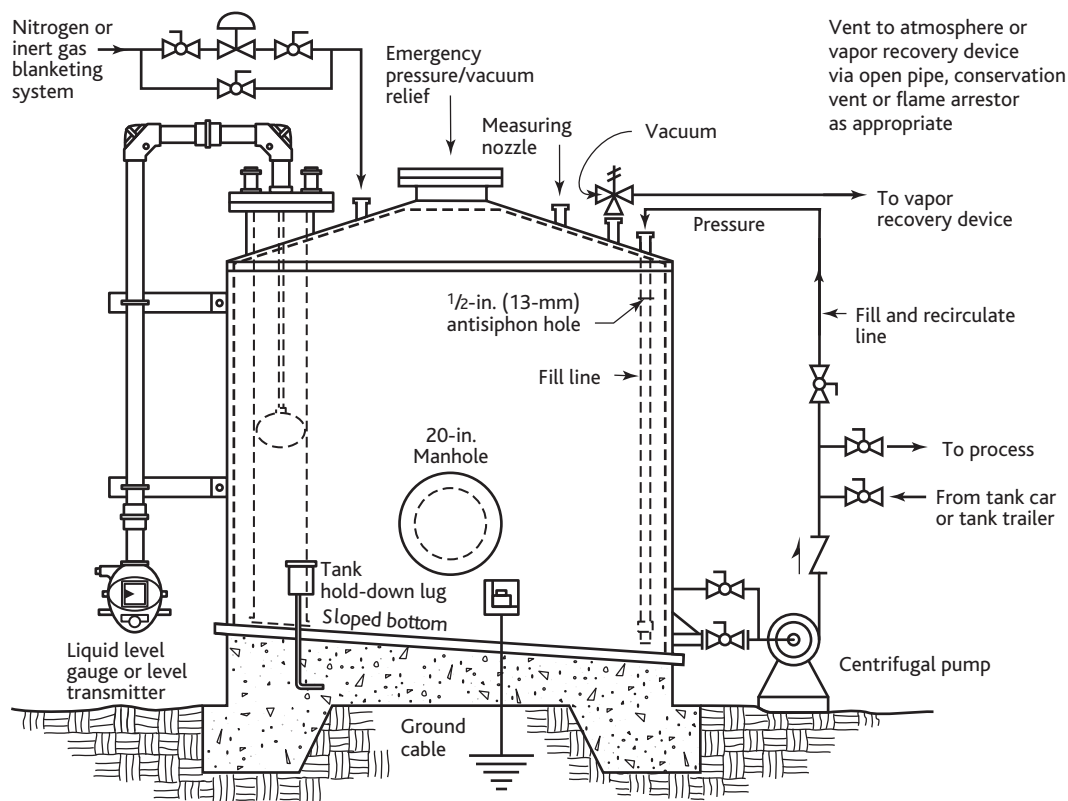
## Storage equipment

Tank construction and facilities for tank car and tank truck handling of Eastman solvents and coalescents are described and illustrated in this publication. The drawings and discussions are given as information only and should be used solely as a guide in storing and handling these products. Customers must determine for themselves the appropriate procedures and facilities for their storage and handling operations.

Figure 1 is a schematic drawing of a typical storage tank. For the location, fabrication, installation, inspection, and testing of solvent storage tanks, the designer should refer to appropriate standards including the following:

- ASME Boiler Pressure Code, Sect. VIII, Div. 1
- API Standard 510—American Petroleum Institute Inspection Codes
- API Standard 570—Inspection, Repair, Alteration, and Rerating of In-Service Piping
- API Standard 620—Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks
- API Standard 650—Welded Steel Tanks for Oil Storage
- API Standard 653—Tank Inspection, Repair, Alteration, and Reconstruction
- API Standard 2000—Venting Atmospheric and Low-Pressure Storage Tanks
- 29 CFR 1910.106—Flammable and Combustible Liquids
- NFPA 30—Flammable and Combustible Liquids Code

Figure 1 Storage tank



Note: A leak detection system with provisions for secondary containment away from tanks or equipment is recommended.

Bonding and grounding are important to prevent the accumulation of static electricity and provide for its safe discharge. Bonding and grounding are required for all equipment, piping, tank cars, tank trailers, and interconnections. Designers should refer to the appropriate standards including the following:

- API Standard RP 2003—Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents
- NFPA 77—Recommended Practice on Static Electricity

For maintenance of storage tanks and relief devices, it is recommended that the customer establish a schedule for the inspection of the tanks, relief devices, and piping on a regular basis.

### Tank construction materials

The basic construction material suggested for tank storage of Eastman solvents and coalescents is stainless or carbon steel. To reduce corrosion of the tank bottom exterior, a coating should be applied between the tank and foundation.

### Piping

The lines used for transferring solvents and coalescents into and away from the tank may be stainless or carbon steel. Carbon steel lines may cause contamination from rust. The lines should have as few flanged connections as possible.

### Pumps

For solvent transfer, stainless steel centrifugal or positive-displacement pumps with mechanical seals instead of packing glands are suggested. Where suction lift is needed, a centrifugal pump should not be used unless specifically designed for that purpose.

### Valves

Ball and plug valves with Teflon<sup>™1</sup> plastic (or equivalent PTFE<sup>2</sup>) seats, sleeves, and packing should be considered for solvent transfer lines.

### Gaskets

CycleTite<sup>™3</sup> or Teflon plastic (or equivalent PTFE) gaskets should be considered for use with solvents and coalescents.

<sup>1</sup>DuPont

<sup>2</sup>Poly(tetrafluoroethylene)

<sup>3</sup>CycleTite

## Vents

If environmental laws and regulations of federal, state, and local agencies permit, tank vents may be open to the atmosphere. The vents should be angled at 45° from vertical and cut off vertically to prevent rain from entering. It is recommended that solvent storage tanks be provided with a blanket of inert gas or nitrogen and equipped with a pressure/vacuum conservation vent valve piped away to a safe location. Refer to 29 CFR 1910.106 for some federal requirements relative to flammable and combustible liquids. It is recommended that combustible solvents and coalescents handled at or above their flash points be treated as if they were flammable solvents and coalescents.

## Tank fill line

The tank fill line should extend to within 2 to 3 inches of the bottom of the tank to help inhibit the accumulation of static charges.

## Handling

The method of unloading will depend on the customer's equipment. Figures 2, 3, and 4 show typical unloading facilities for transferring solvents and coalescents from tank car to storage tank. All tank trailers and tank cars should be vented or pressurized with inert gas when unloading. Figure 5 illustrates possible arrangements of equipment for tank trailer unloading. The contents may be unloaded by using a pump supplied by the customer

## Bulk unloading

Figure 2 Tank car top unloading—fixed piping with swivel joints

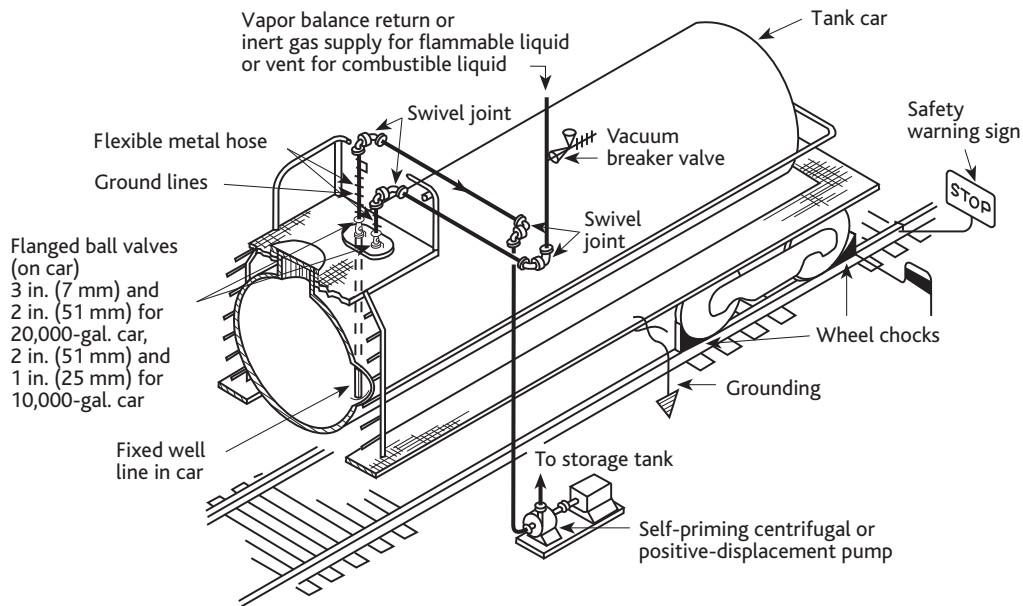


Figure 3 Tank car top unloading—flexible hose with flanged elbow

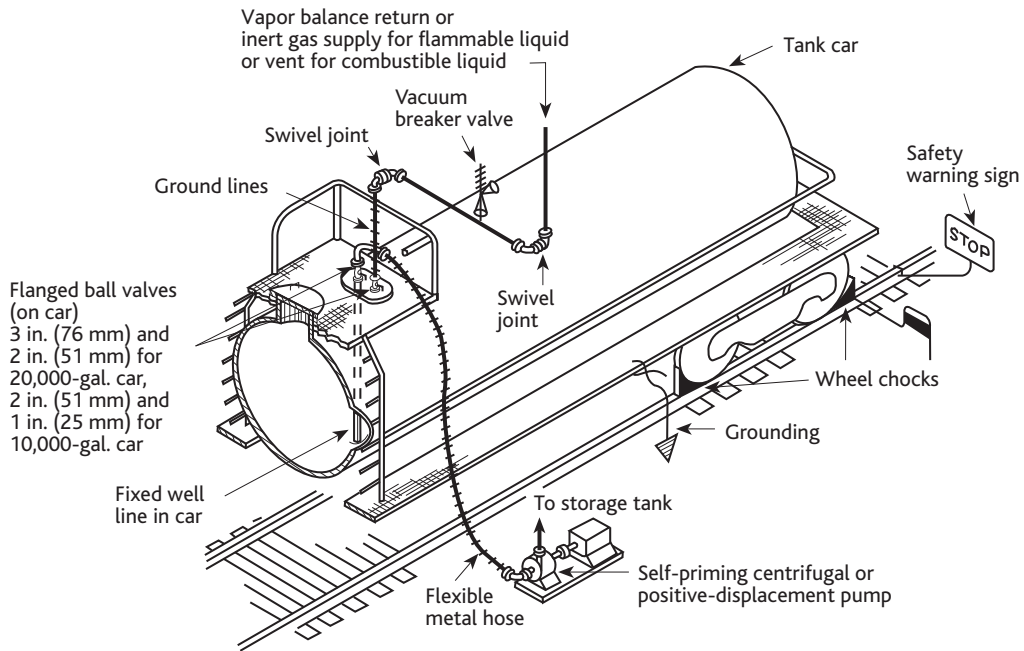
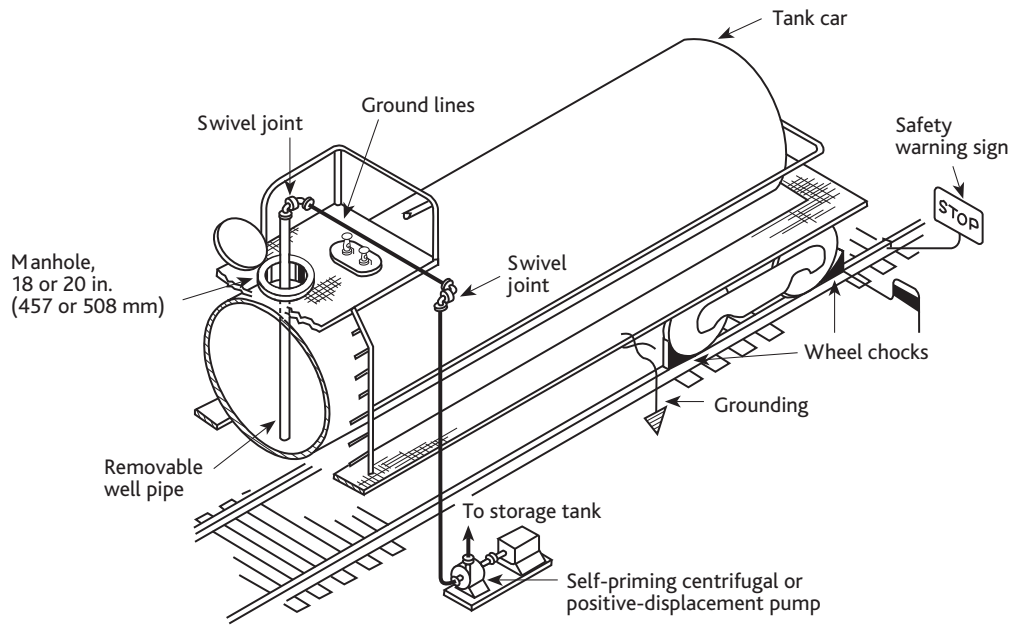


Figure 4 Tank car top unloading—removable well pipe with swivel joints



The following procedures for unloading tank cars and tank trailers are for information only. The comprehensive United States Department of Transportation (DOT) regulations should also be consulted and observed. It is the customer's responsibility to be aware of and comply with all laws and regulations governing the unloading of tank cars and tank trucks.

Eastman solvents and coalescents are shipped in steel, aluminum, or stainless steel tank cars and/or stainless steel and aluminum tank trailers. The usual tank car sizes are 10,000, 20,000, and 30,000 gallons. Tank trailer sizes vary between 4,000 and 6,500 gallons. Compartmented tank trailers or tank cars are available for delivery of mixed loads. The unloading area should be provided with an emergency containment and drainage system to direct the contents of the delivery vehicle to a safe location other than the sanitary sewer or surface waters in the event of a spill. Also, a vapor return can be used to comply with Environmental Protection Agency (EPA) venting requirements.

A properly designed system utilizing vapor return can be used to reduce vapor generation and increase recovery of solvents and coalescents. It is also recommended that a nitrogen or inert gas blanket be used during loading or unloading of materials at or above their flash points.

### Tank car unloading

Unloading operations must be performed in accordance with 49 CFR 174.67. It is recommended that tank cars be unloaded from the top, making it easier to shut off the flow if a transfer line leaks or ruptures. This helps minimize the chance of an accidental discharge. Figures 2 through 4 show several unloading arrangements for tank cars. In Figures 2 and 3, the unloading lines are connected to the fixed well line in the car. This arrangement provides a more nearly closed system and minimizes personnel exposure. The unloading method shown in Figure 4 involves lowering a well pipe through the open manhole of the car. For top unloading, an approach platform is suggested.

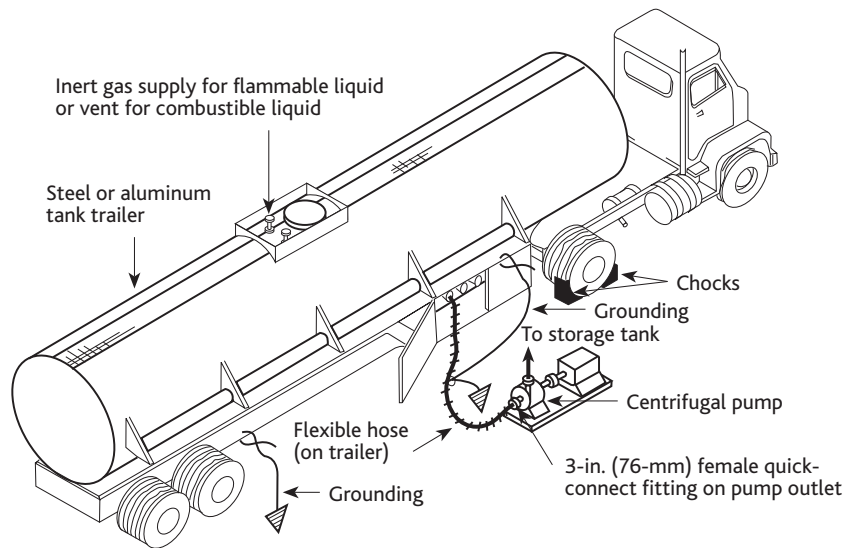
### Typical unloading procedure for tank cars

1. Read storage tank liquid level gauge, record reading, convert inventory to gallons, and make certain that tank will accept contents of tank car.
2. Spot tank car at unloading station and set hand brake. Apply chocks to wheels to help prevent movement of car in either direction. Position warning sign on each side of car along rails and, if necessary, attach derailing device to rails or lock switch to spur track involved.
3. Attach a ground wire to tank car.
4. Read and record tank car number, numbers on metal tape seals located at various openings on car, and product identification tags on manhole and bottom outlet. If these do not agree with information in shipping papers, check with shipper before unloading.
5. Depending on type of unloading facilities, connect flexible stainless steel or chemical rubber hose to outlet valve on car, or lower well pipe through manhole.
6. Make certain car is vented. For top unloading through flexible well line, open smaller ball valve next to unloading line. For bottom unloading, prop open manhole cover on car a few inches. For flammable material, start inert gas purge.
7. Open all valves in transfer line between tank car and bulk storage tank. Start pump and immediately check transfer line for leaks.
8. Check liquid level gauge on storage tank to ensure liquid is being transferred.
9. When tank car is empty, stop pump and close valves on car. Close valves in transfer line. For flammable material, stop inert gas purge.
10. Disconnect flexible hose or raise well pipe. Walk all flexible hoses into proper catch containers, ensuring no product is lost onto the ground. Collect the drainings for proper waste disposal. Close up car to its original condition as required by DOT regulations. Remove chocks, warning signs, derails, and switch locks.
11. Read storage tank liquid level gauge and record reading.

## Tank trailer unloading

A cargo tank must be attended by a qualified person designated by the customer at all times during unloading in accordance with 49 CFR 177.834(2). Tank trailer unloading connections (Figure 5) show the liquid being unloaded through a stationary pump.

Figure 5 Tank trailer unloading stationary pump



## Typical unloading procedure for tank trailers

1. Read storage tank liquid level gauge, record reading, convert inventory to gallons, and make certain that tank will accept contents of tank trailer.
2. Position tank trailer at unloading station and set hand brake. Apply chocks to trailer wheels to help prevent movement in either direction.
3. Attach a ground wire to tank truck.
4. Read and record tank trailer number, numbers on seals located on various openings on trailer, and product identification tags on manhole and bottom outlet. If these do not agree with information on shipping papers, check with shipper before unloading.
5. Connect flexible stainless steel or chemical rubber hose to tank trailer outlet and to quick-connect fitting on inlet of customer's pump (Figure 5).
6. Make certain flexible hose is connected correctly. Open valves in line between trailer and storage tank. Open dome lid or vent valve. For flammable liquids, start inert gas purge. Proceed with unloading.
7. Open trailer manual outlet valve and trailer hydraulic outlet valve. Advise that customer's pump may be started.
8. Check transfer lines for leaks. Check storage tank liquid level gauge to ensure liquid is being transferred.
9. When tank trailer is empty, close hydraulic outlet valve, stop pump and close trailer manual outlet valve. For flammable liquids, stop inert gas purge. Close dome lid or trailer vent valve. Close valves in transfer line.
10. Disconnect and walk all hoses into proper catch containers, ensuring no product is lost onto the ground. Collect the drainings for proper waste disposal.
11. Secure all manholes, valves, closures in closed position and verify no leaks.
12. Remove chocks from trailer wheels.
13. Read storage tank liquid level gauge and record reading.

## Safety precautions

### Information

A Safety Data Sheet (SDS) providing toxicity information, physical and chemical data, and spill and emergency response information is available for each Eastman solvent. The user should review this publication before undertaking to handle, store, or use any Eastman solvent. For copies, contact your Eastman representative.

### Protective clothing

Protective clothing such as gloves, goggles, face shields, boots, and aprons—appropriate for the chemical being handled—should be readily available and should be worn by personnel involved in the handling operation. Consult the SDS for recommended practices.

### Technical assistance

If you have questions concerning the handling of Eastman solvents and coalescents, contact your Eastman representative. The information in this publication, along with the data and information contained in Eastman's Safety Data Sheets, needs to be reviewed and understood to help ensure the safe handling of Eastman solvents and coalescents. It is the customer's obligation to direct and control unloading of any chemicals or materials into or from bulk storage and handling facilities.



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