

Eastman plasticizers

Bulk storage guidelines

This publication contains general information on the bulk storage of Eastman plasticizers, including guidelines for tank components and materials, as well as unloading tank cars and tank trucks. 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 with their technical and regulatory experts concerning such matters.

For specific health and safety information, users of Eastman products should thoroughly review the pertinent Safety Data Sheets (SDS).

Storage equipment

Tank components, construction materials, and facilities for tank car and tank truck handling of these materials are discussed in this publication. See Figure 1 for an example of a typical storage tank for Eastman plasticizers. For the location, fabrication, installation, inspection, and testing of plasticizer storage tanks, the designer should refer to appropriate standards including:

- ASME Boiler Pressure Vessel Code, Section VIII, Division I
- NFPA Standard No. 30—National Fire Codes, Volume 1
- API No. 620—Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks
- API No. 650—Welded Steel Tanks for Oil Storage
- PIP INEG1000—Insulation Design and Type Codes

Tank components and materials

Stainless steel, carbon steel, or 5454 aluminum is suggested for tank construction to store Eastman monomeric and polymeric plasticizers. When using such materials for tank construction, a coating between the tank and the foundation may be necessary to reduce corrosion of the tank bottom.

Piping

The piping used for transferring plasticizer into and away from the tank can be steel except where corrosion or rust contamination is a concern, in which case stainless steel or aluminum can be used. Where sections of piping can be isolated between two closed valves, provisions for pressure relief should be in place, as plasticizers will expand on heating.

Pumps

For plasticizer transfer, centrifugal or positive-displacement pumps are suggested, using similar construction materials as with the associated piping. The pumps should have mechanical seals instead of packing glands. Careful attention should be given to pump selection when suction lift is needed.

Valves

Metal plug valves with PTFE (polytetrafluoroethylene) sleeves or ball valves with PTFE seats, seals, and packing should be considered. The choice of metal should be guided by the same considerations as for piping.

Gaskets

Gaskets made of PTFE or similar materials should be considered for use with Eastman plasticizers. Proper application of torque control or other bolt tensioning practices should be used to ensure a leak-free, reliable seal.

Vents

Assuming federal, state, and local regulations permit it, tank vents may be open to the atmosphere and turned downward to prevent entry of rain, dust, etc. However, it is recommended that plasticizer storage tanks be provided with a blanket of inert gas or nitrogen and equipped with a pressure/vacuum conservation vent valve. The blanket generally is not required for fire prevention, but it will help prevent contamination of the product.

Tank fill line/well pipe

To inhibit the accumulation of static charges, it is suggested that the tank fill line/well pipe extend to within 2 to 3 in. (5 to 8 cm) of the bottom of the tank. The construction standard used to design the tank will determine the maximum fill level.

Heating systems for plasticizer storage

Outdoor tanks may be insulated with a blanket of fiberglass or similar material approximately 2 in. (5 cm) thick. The following suggested heating systems can be adapted to individual outdoor tanks for plasticizer storage. The heating system should be designed to maintain the temperature designated and to prevent overheating.

Electrically heated system

This type of system consists of electrical heating pads attached to the outside surface of the storage tank as shown in Figure 2. A temperature controller is used to maintain the temperature between 60° and 120°F (15° to 50°C), depending on which plasticizer is being stored. The piping for this system should be electrically heat traced. Special care should be taken to ensure aluminum tanks are not overheated as structural damage may occur.

Figure 1 Storage tank base detail

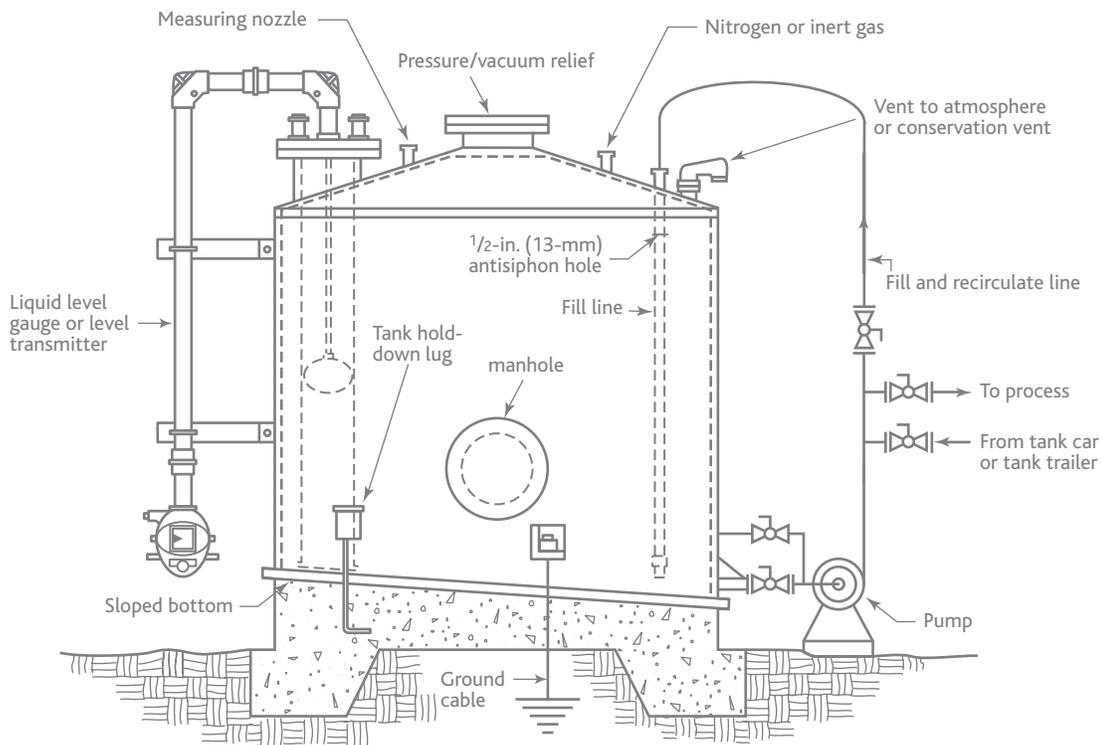
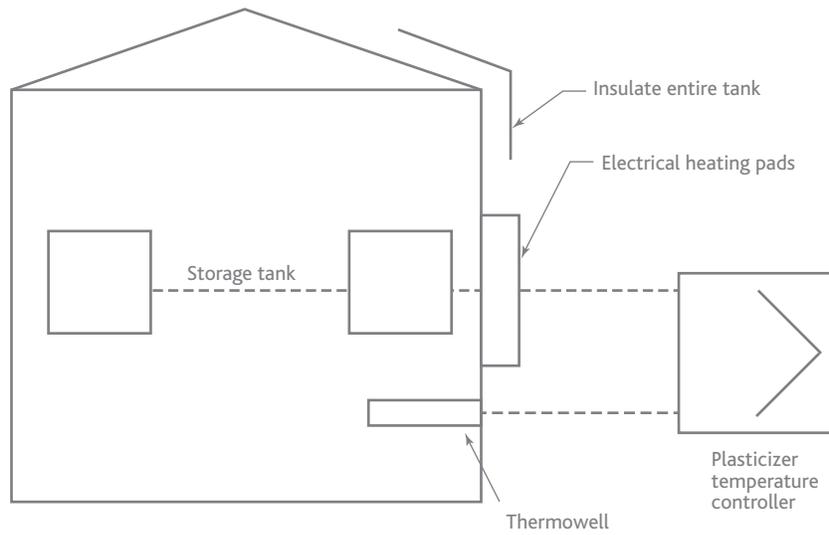


Figure 2 Heating by electrical pads

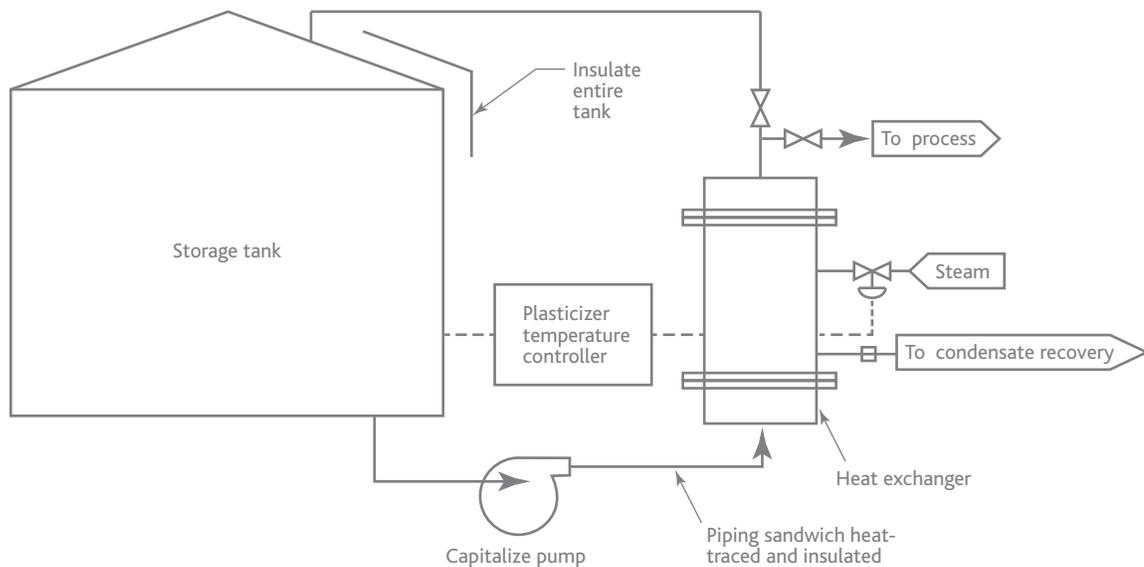


Steam-heated system

This method uses a pump to circulate the plasticizer through a heat exchanger. The exchanger is heated by low-pressure steam, which is controlled by a temperature controller as shown in Figure 3. The pump used for circulation can also be used for transferring plasticizer to feed tanks. To prevent overheating and degradation of product inside the heat exchanger, this system should be activated only when the product temperature must be increased and shut down when no heating is required. The piping for this system should be

“sandwich” heat-traced with low-pressure steam. Sandwich heat tracing involves inserting a pad or full layer of insulation between the steam tubing and the pipe to prevent hot spots and overheating. Additional layers of insulation can be installed around the tubing/pipe assembly. Low-pressure steam is used to further reduce the risk of overheating the product, compared to the use of higher-pressure steam. Low pressure in this case generally includes steam below 100 psia (7 bar), though pressure below 30 psia (2 bar) is better if available.

Figure 3 Heating by heat exchanger



Repurposed tanks

If a tank used previously in another service is being repurposed to store Eastman plasticizer, it should be thoroughly cleaned and decontaminated. A tank that is improperly cleaned can contaminate the plasticizer and cause undesirable issues.

Bulk delivery and unloading

The following pages outline suggested procedures for unloading tank cars and tank trailers and are general guidelines only. The comprehensive Department of Transportation (DOT) regulations should be consulted and observed. It is the user's responsibility to comply with all laws and regulations governing the unloading of tank cars and tank trucks.

Eastman plasticizers are shipped in steel tank cars (rail) and stainless steel tank trailers (road). The usual tank car size is 20,000 gallons (76,000 liters). Tank trailer sizes vary upward from 4,000 to 6,000 gallons (15,000 to 22,700 liters). The unloading area should be provided with an emergency

containment and drainage system to direct the contents of the vehicle to a safe location other than the sanitary sewer or surface waters if a spill occurs. Also, a vapor return line can be used to comply with EPA venting requirements.

Tank car unloading

Unloading operations must be performed only by personnel properly trained in unloading hazardous materials 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 reduce the volume of an accidental discharge.

Figures 4 through 6 show several unloading arrangements for tank cars. In Figures 4 and 5, the unloading lines are connected to the fixed well line in the tank car. This arrangement provides a nearly closed system and minimizes personnel exposure. The unloading method shown in Figure 6 involves lowering a well pipe through the open manway of the car. For top unloading, an access platform is suggested.

Figure 4 Tank car top unloading/fixed piping with swivel joints

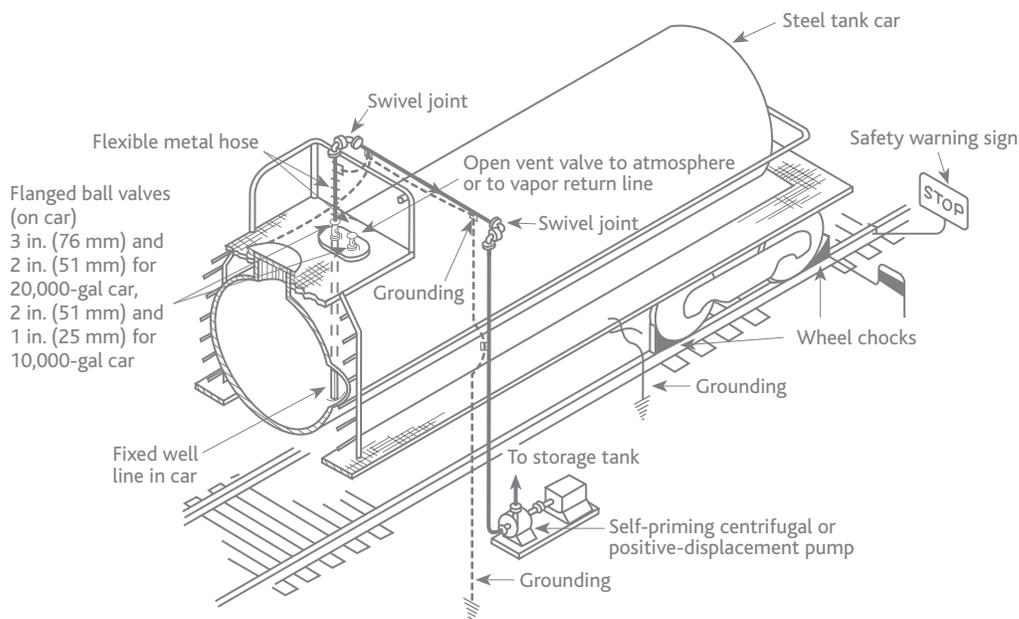


Figure 5 Tank car top unloading/flexible hose with flanged elbow

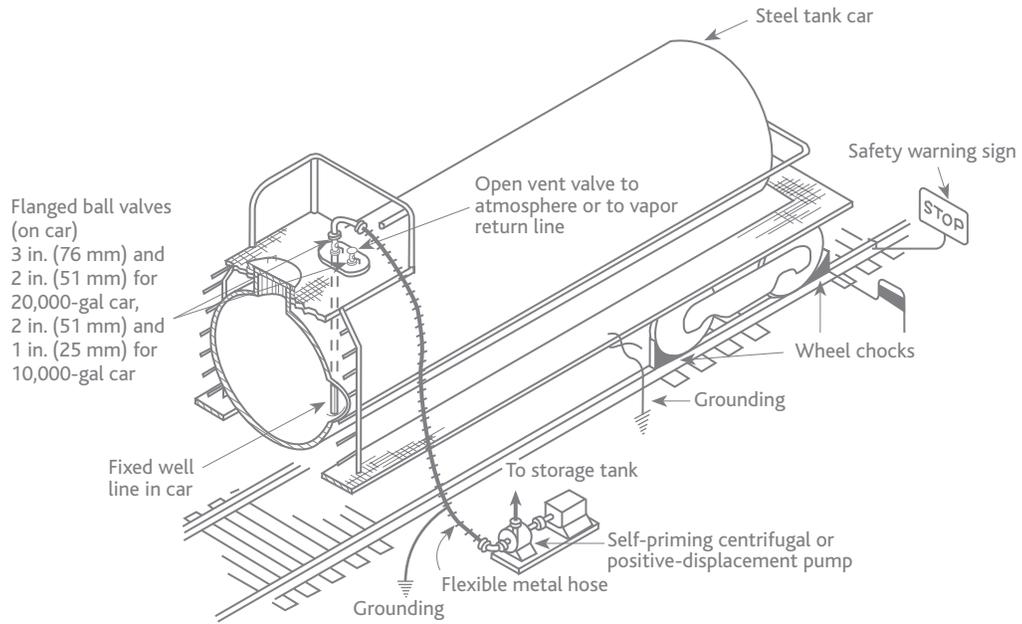
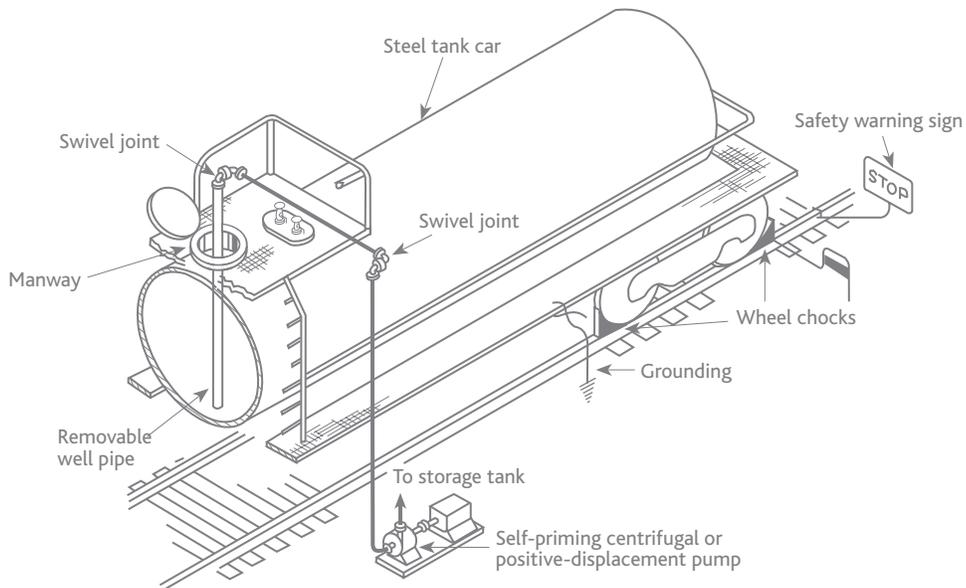


Figure 6 Tank car top unloading/removable well pipe with swivel joints



Typical unloading procedure for tank cars

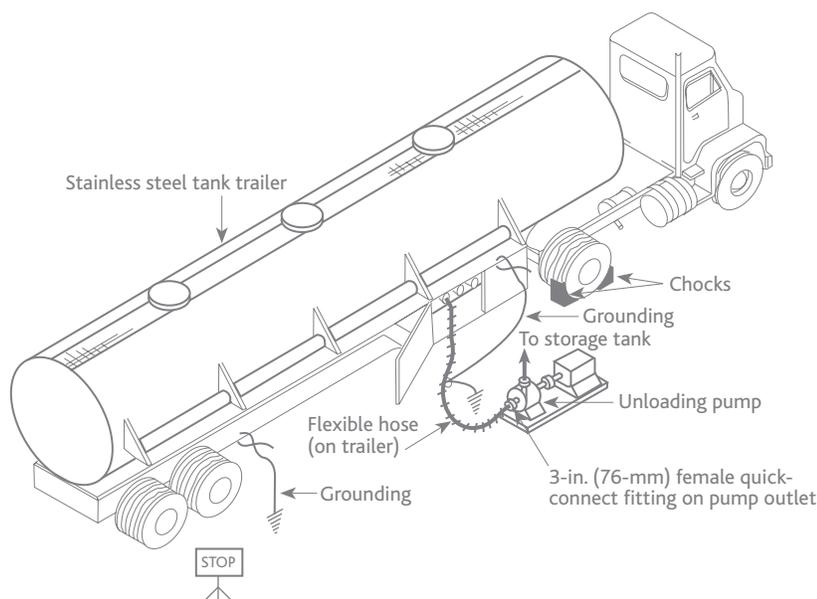
1. Read storage tank liquid level gauge, record reading, convert inventory to appropriate units, and make certain that tank will accept contents of the tank car.
2. Stop the tank car at unloading station and set hand brake. Apply chocks to wheels to help prevent movement of car in either direction. Position warning signs on each side of car along rails and, if necessary, attach derailing devices 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 the shipper before unloading.
5. Depending on type of unloading facilities, connect a flexible stainless steel or chemical rubber hose to outlet valve on car or lower well pipe through manhole.
6. Make certain the car is vented. For top unloading through the tank car's well line, open the smaller ball valve next to unloading line. For bottom unloading, open the manway cover on tank car.

7. Open all valves in transfer line between the tank car and the bulk storage tank. Start the pump and immediately check transfer lines for leaks.
8. Check the liquid level gauge on storage tanks to ensure liquid is being transferred.
9. When the tank car is empty, stop the pump and close valves on car. Close valves in transfer line.
10. Disconnect flexible hose or raise well pipes. Ensure the flexible hose is empty and not pressurized before disconnecting and draining into proper catch containers so that no product is lost onto the ground. Collect the drained material for proper waste disposal. Return any valves or connections on the rail car to their original condition as required by DOT regulations. Remove chocks, warning signs, derails, and switch locks.
11. Record storage tank liquid levels.

Tank trailer unloading

A cargo tank must be attended by a qualified personnel at all times during unloading in accordance with 49 CFR 177.834(i). The tank trailer unloading diagram (Figure 7) shows the liquid being unloaded through a stationary pump. Alternatively, a pump on the tractor can be used to transfer the liquid from the trailer to the storage tank.

Figure 7 Tank trailer unloading/stationary pump



Typical unloading procedure for tank trailers

1. Read the storage tank liquid level gauge, record reading, convert inventory to appropriate units, and make certain that the tank will accept contents of the tank trailer.
2. Position the tank trailer at the unloading station and set hand brake. Apply chocks to trailer wheels to help prevent movement in either direction. Position warning signs.
3. Attach a ground wire to the tank truck.
4. Read and record the 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 the information on shipping papers, check with the shipper before unloading.
5. Connect a flexible stainless steel or chemical rubber hose to the tank trailer outlet and to quick-connect fitting on inlet of the stationary pump (Figure 7) or to the inlet of pump on the trailer. If a trailer pump is used, connect a second flexible hose from the trailer pump outlet to a fitting on storage tank fill line.
6. Make certain flexible hose connections are connected correctly. Open valves in line between the trailer and storage tank.
7. Open the trailer manual outlet valve and hydraulic outlet valve. Start the pump.
8. Check transfer lines for leaks. Check the storage tank liquid level gauge to ensure liquid is being transferred.
9. When the tank trailer is empty, stop pumping and close the hydraulic outlet valve and manual valve on the trailer. Close valves in the transfer line.
10. Before disconnecting hoses, be sure they are empty and not pressurized. Drain hoses into proper catch containers, ensuring no product is lost onto the ground. Collect the drained material for proper waste disposal.
11. Remove chocks from the trailer wheels.
12. Record the storage tank liquid level.

Safety precautions

Safety information

A Safety Data Sheet (SDS) providing toxicity information, physical and chemical data, and spill and emergency response information has been provided for each Eastman plasticizer. The user should review this publication before handling, storing, or using any Eastman plasticizer. Copies are available at www.eastman.com or through your Eastman representative.

The information in this publication, along with the SDS, needs to be reviewed and understood to help ensure the safe handling of Eastman plasticizers. It is the customer's responsibility to direct and control unloading of any chemicals or materials into or from bulk storage and handling facilities.

Personal protective equipment

Personal protective equipment (PPE) such as gloves, goggles, face shields, boots, and aprons—appropriate for the chemical being handled—should be specified, readily available, and worn by persons involved in the storage operation. Materials stored or handled at temperatures above 50°C (122°F) may present a thermal burn hazard and require appropriate protective wear. It is recommended that customers evaluate their handling and use procedures and select PPE appropriate to their needs. Consult the SDS for recommended practices and hazards.

For more information on the handling of Eastman plasticizers, see publication L-275 or contact your Eastman representative.



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**Eastman Chemical Company
Corporate Headquarters**

P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

Telephone:
U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other Locations, (1) 423-229-2000
Fax: (1) 423-229-1193

Eastman Chemical Latin America

9155 South Dadeland Blvd.
Suite 1116
Miami, FL 33156 U.S.A.

Telephone: (1) 305-671-2800
Fax: (1) 305-671-2805

Eastman Chemical B.V.

Fascinatio Boulevard 602-614
2909 VA Capelle aan den IJssel
The Netherlands

Telephone: (31) 10 2402 111
Fax: (31) 10 2402 100

**Eastman (Shanghai) Chemical
Commercial Company, Ltd.**

Building C, No. 399 Shengxia Road,
Pudong New District
201210, Shanghai, P.R. China

Telephone: (86) 21 6120-8700
Fax: (86) 21 5027-9229

Eastman Chemical Japan Ltd.

MetLife Aoyama Building 5F
2-11-16 Minami Aoyama
Minato-ku, Tokyo 107-0062 Japan

Telephone: (81) 3-3475-9510
Fax: (81) 3-3475-9515

Eastman Chemical Asia Pacific Pte. Ltd.

9 North Buona Vista Drive
#05-01 The Metropolis Tower 1
Singapore 138588

Telephone: (65) 6831-3100
Fax: (65) 6732-4930

www.eastman.com

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