VORANATE T-80 Toluene Diisocyanates

Tank Truck Unloading Procedures

VORANATE T-80 Toluene Diisocyanates are classified as hazardous materials under the Department of Transportation’s Hazardous Materials Regulations. Thus, the unloading of tank trucks must be done in strict accordance with those regulations. VORANATE T-80 TDI is shipped in pressurized and insulated stainless steel tank trucks, equipped for bottom unloading only. Dow recommends that only Department of Transportation specification MC 304 or 307 tank trucks be used.

**CAUTION:** Only properly trained and equipped personnel should be permitted to unload tank trucks. Operators should wear an approved respiratory protective device, and impervious clothing, footwear, gloves, and goggles. For a detailed discussion of health hazards and safe handling procedure, see the handbook for Safe Handling and Storage of VORANATE T-80 Toluene Diisocyanates (Form No. 109-01243) from Dow.

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**Figure 1: Typical Tank Truck Trailer**

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>3/4” Steam Inlet</td>
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<tr>
<td>B</td>
<td>35# Safety Valve and Pressure Gauge</td>
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<tr>
<td>C</td>
<td>Manhole</td>
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<tr>
<td>D</td>
<td>3/4” Dry Air/Nitrogen Connection</td>
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<tr>
<td>E</td>
<td>3” Unloading Connection</td>
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<tr>
<td>F</td>
<td>1/2” Sample Valve</td>
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<tr>
<td>G</td>
<td>Steam Outlet</td>
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<tr>
<td>H</td>
<td>Air Dryer</td>
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<tr>
<td>I</td>
<td>2” Loading Line</td>
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<tr>
<td>J</td>
<td>2” Vent Line</td>
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</tbody>
</table>

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The following is based on use of tank trucks meeting the aforementioned general specifications for tank trucks. Carefully read and understand each of the safety recommendations and precautions listed below:

1. Before attempting to use the following procedure, operators should be thoroughly familiar with the potential hazards associated with the handling and storage of TDI. (See Figure 1.)
2. Position the trailer as level as possible and block the wheels.
3. Carefully check the storage tank into which the contents of the truck are to be unloaded to be certain that it contains TDI and not some other chemical or compound. Also, check the gauge on the storage tank to be sure that there is sufficient room to receive the entire contents of the tank truck.
4. Check all “product identification” or “bulk” tags (usually attached to product outlets, valves or seals) to be certain that the product being unloaded is, in fact, TDI.
5. Check the temperature of the contents. The temperature must be above 16°C (60°F) when the trailer is unloaded.
6. If heating is required, attach a 15- to 25-psi steam supply to the heating coil inlet connection. For better control of the heating process, use a steam pressure of 15 psi. Attach a steam trap, designed for the steam pressure available, to the heating coil outlet connection. Internal coils are not advised because of severe effects due to possible water contamination of the product. Allow the contents to warm until the temperature is at least 20°C (68°F). When the temperature reaches 20°C (68°F), turn off the steam and disconnect the lines. To prevent the heating coils from freezing during cold weather, be sure to drain them or blow them out.

**CAUTION:** Carefully watch the thermometer during heating. Do not allow the temperature to rise above 40°C (104°F).

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1 The authority for approving or certifying respirators is held jointly by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA). (In Canada, refer to the Canadian Standards Association [CSA] standard "Selection, Care and Use of Respirators," Z94.4). For current information on the status of approvals of respirators, e-mail the National Institute for Occupational Safety and Health at pubstatd@cdc.gov, or call 1-800-356-4674.
7. Attach the unloading line. The line should be a clean, dry hose preferably made using Teflon® fluorocarbon or Viton® fluoroelastomer, that can safely withstand unloading pressures.

8. Connect the dry purge gas (preferably nitrogen) line to the tank truck. This line should have a pressure gauge, a safety valve set at 30 psig and a pressure regulator set at 25 psig.

9. Draw off a sample of the contents for analysis. A sample of the contents may be obtained by connecting stainless steel tubing to the sample connection. Flush the sample connection by drawing off at least one gallon of product into a clean, dry container. The sample to be analyzed may now be drawn off into another clean, dry container of whatever size is necessary for testing.

**WARNING:** Do not breathe vapors. Wear proper protective equipment, including an approved respiratory protective device.

10a. If the contents are to be unloaded by purge gas pressure alone, the storage tank should be fitted with a vent scrubber. This will prevent vapors from being vented into the atmosphere during unloading.

**CAUTION:** Do not exceed 25 psig purge gas pressure to unload the tank truck. When the tank truck is empty, the pressure gauge will show a drop in pressure. Close the valve at the storage tank connection first. Then close the truck unloading valve.

10b. If the contents are to be unloaded by pump, either a vapor line connecting the storage tank vent to the tank truck should be installed (closed loop) or a low-pressure, replenishable gas pad must be placed on the tank truck. If a gas pad is used, install a vent scrubber on the storage tank vent. These precautions will not only prevent isocyanate vapors from being vented to the atmosphere, but will prevent a vacuum from being pulled on the tank truck during unloading.

**CAUTION:** Do not use a closed loop system unless the dead air space in the storage tank is free of moisture; e.g., -40°C (-40°F) to dew point. Also, connection hoses should be purged with dry air or nitrogen before hookup. When the trailer is empty, allow the unloading hose to vent down to the storage tank. Be sure to close the valve at the storage tank connection first. Then close the tank truck unloading valve.

11. Shut off the purge gas to the tank truck. Close the tank truck purge gas valve and disconnect the purge gas line. If a closed loop system was used in conjunction with pump unloading, close the tank truck connection valve and the tank vent valve. Then disconnect the hose connecting the two. All connection hoses should now be capped for storage.

**CAUTION:** Unloading must be closely monitored, particularly if there is no automatic cut off in the unloading line. For example, if gas flow is allowed to continue after unloading, the gas flowing into the storage tank could rapidly increase internal pressure. This could cause serious structural damage to the storage vessel.

**NOTE:** The tank should not be cleaned by the customer, nor should the manway be opened for inspection. The cleaning and inspection of the tank truck should be handled by the shipper under carefully controlled conditions, designed to safeguard personnel and equipment.

**WARNING:** Under no circumstances should personnel enter any empty tank truck.