Chlorinated Organics
Product Transfer System Design Considerations
For Top Unloaded Solvent Tank Cars

Features of OxyChem’s Top Unloaded Solvent Tank Cars
• No Bottom Outlets
• 20,000 Gallon Normal Capacity (at 2% outage)

All Valves are Mounted in a Protective Housing on Top of the Tank Car:
• 3” Liquid Unloading Valve
• 3” Air/Vapor Return Valve
• 150 psig Safety Relief Valve
• ¾” Sampling Valve

Product Transfer System

Design Considerations
A. Self Priming Pump
For utilization of a pump to transfer product from a top unloaded tank car it must be capable of priming itself. The pump specification must take into consideration that solvents are heavy and have relatively high vapor pressures - see Table 1 for density, viscosity, and vapor pressure curves. An improperly designed pump will not be capable of maintaining a prime, and will either be unable to transfer product, or do so with reduced performance.

In the event the pump requires service, block valves should be installed on the reservoir’s discharge line, as well as a double block and bleed valve arrangement on the suction line supplying the reservoir and pump inlet. With the exception of the bleed valve, all valves should be opened before start-up and closed immediately upon completion of the product transfer.

Pump transfers will allow the vapors displaced in the receiving tank to be returned to the tank car (the concept of vapor balancing or closed-loop transfers).

B. Non-Self Priming Pump Transfers
Facilities which have pumps without a built-in priming chamber can upgrade the pump by installing a priming reservoir with a capacity of at least 25% greater volume than the volume of the suction hose used in the transfer. Reservoirs should be permanently secured to the pumping station and elevated above the pump suction port. The reservoir is typically top-filled by a ½ inch supply line connected to the suction hose. Discharge is transferred from the bottom of the reservoir to the suction port of the pump by a ½ inch pipe, typically. In this design, the reservoir should be able to withstand the Net Positive Suction Head (NPSH) expected from the pump upon start-up and should be affixed with a pressure and vacuum relief device.

Because pressure is applied to the tank car, the vapors displaced in the receiving tank cannot be returned to the tank car. OxyChem does not condone release of Hazardous Air Pollutants (HAP) to the atmosphere. Capture and control of vapor emissions is necessary when transferring chlorinated organics from one vessel to another. A floating...
roof receiving tank, use of carbon drums for scrubbing or a vapor recovery system, such as a flare or other treatment device is necessary to prevent vapors from being emitted to atmosphere.

A surge of air/nitrogen pressure may occur through the transfer system and receiving tank when the tank car goes empty.

OxyChem requires pressure to be removed from the tank car before returning it to our shipping point due to safety considerations.

D. Pump Assisted with Air/Nitrogen Pressure
To maintain the prime on a pump it may be necessary to apply a slight pressure to the tank car.
A ¾” or 1” bypass line with block valve between the suction and discharge line is necessary to allow the suction hose to fill with liquid and the vapor/air in the suction hose to pass to the discharge line. This operation should take place before starting the pump. Once pumping has begun, the bypass line valve should be closed.

This method of transfer may introduce contaminants to the product if the air pressure system is not designed to remove moisture and oil.

Because pressure is applied to the tank car the vapors displaced in the receiving tank cannot be returned to the tank car. OxyChem does not condone release of Hazardous Air Pollutants (HAP) to the atmosphere. Capture and control of vapor emissions is necessary when transferring chlorinated organics from one vessel to another. Unless a floating roof receiving tank is being utilized, use of carbon drums for scrubbing or a vapor recovery system, such as a flare or other treatment devices is necessary.

A surge of air/nitrogen pressure may occur through the transfer system and receiving tank when the tank car goes empty.

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<table>
<thead>
<tr>
<th>Solvent</th>
<th>Specific Gravity @ 25/25 °C</th>
<th>Vapor Pressure @ 21 °C, mm Hg</th>
<th>Liquid Viscosity @ 25 °C, cP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Tetrachloride</td>
<td>1.59</td>
<td>100</td>
<td>0.90</td>
</tr>
<tr>
<td>Chloroform</td>
<td>1.48</td>
<td>169</td>
<td>0.54</td>
</tr>
<tr>
<td>Ethylene Dichloride</td>
<td>1.25</td>
<td>71</td>
<td>0.50</td>
</tr>
<tr>
<td>Methylene Chloride</td>
<td>1.32</td>
<td>376</td>
<td>0.42</td>
</tr>
<tr>
<td>Perchloroethylene</td>
<td>1.62</td>
<td>15</td>
<td>0.81</td>
</tr>
</tbody>
</table>
Basic Chemicals

Equipment Suppliers - The following vendors are known to sell equipment that may be needed in a product transfer system. This list is not all-inclusive and is not an endorsement of these companies.

Pumps
- Goulds Pumps
  240 Fall St.
  Seneca Falls, NY 13148
  (315) 568.2811
  www.goulds.com

- The Duriron Co./Pump Division
  PO Box 1145
  Dayton, OH 45401
  (513) 226.4000

Air Compressors
- Atlas Copco
  1800 Overview Dr.
  Rock Hill, SC 29730
  (803) 817.7200
  www.atlascopco.us

- Gardner Denver Inc.
  1800 Garner Expressway
  Quincy, IL 62305
  (217) 222.5400
  www.gardnerdenver.com

- Sullair Corp.
  3700 E. Michigan Blvd.
  Michigan City, IN 46360
  (800) 785-5247
  www.sullair.com

Load Racks
- HEMCO Industries
  2408 Darbach St.
  Houston, TX 77092
  800.501.7044
  www.hemcoind.com

- Carbis Sales
  1430 W. Darlington St.
  Florence, SC 29501
  800.948.7750
  www.carbis.net

Further Information: More detailed information on transferring solvents is available upon request through the OxyChem Technical Service Department. Call or write to:

OxyChem Technical Service Department
6200 S. Ridge Rd.
Wichita, Kansas 67215
800-733-1165 Ext. 1
OxyChem_Tech_Service@oxy.com

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