GENERAL INFORMATION
CONCERNING THE HANDLING
OF
AROCLOR 1254

By

W. E. Alexander

Monsanto Chemical Company
Phosphate Division Engineering Department
Anniston, Alabama

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A P P E N D I X

A. GENERAL

Characteristics of Arcolor 1254

Form: Yellow tinted viscous oil.
Color: A.P.H.A. 150 maximum.
Acidity: (Mgm. KOH per gram) 0.01 maximum
Coefficient of Expansion: 0.000661 cc/cc/deg.C. (25 deg. - 65 deg.C)
0.000367 cc/cc/deg.F. (77 " -149 " F)
Density - Specific Gravity 25 deg./25 deg.C : 1.538 to 1.548
1.48 at 80 deg. C
1.40 at 160 " C
Pounds per Gallon: 12.83 at 25 deg. C.

Distillation Range - ASTM-D-20 Mod: 365 deg. - 390 deg. C
689 - 734 " F

Evaporation Loss - ASTM-D-6 Mod: 163 deg.C. - 5 hrs. - 1.06 to 1.28%
100 " C - 6 " - 0.4% maximum.

Flash Point: None
Fire Point: None
Pour Point: 8 deg. to 12 deg. C.
46 " to 54 " F.

Viscosity - Saybolt Universal Seconds (ASTM-D-88)
210 deg. F (98.0 deg. C) 43.5 - 48.5
130 " F (54.4 " C) 260 - 400
100 " F (37.8 " C) 1800 - 3800

Thermal Conductivity: 0.22 cal./gm./deg.C. at 0 deg. C
0.365 " /gm./deg.C. at 100 deg. C.

Vapor Pressure: 7 mm.Hg. at 200 deg. C.
80 mm.Hg. at 275 " C.
520 mm.Hg. at 350 " C.

Solubility: Insoluble in water. Readily soluble in most organic solvents. Slightly soluble in the common alcohols.

Resistivity: 100 x 10^9 at 100 deg. C. minimum. (Ohm Cm.)
Dielectric Constant: 4.15 - 4.35 at 100 deg. C.
Refractive Index: 1.6370 to 1.6390 at 25 deg. C.

Hazards

The fumes from Aroclor 1254 are quite obnoxious and are, when inhaled excessively, dangerous and hazardous. When handling this material in relatively closed areas, ample ventilation (hoods in extreme cases) should be provided for removal of the fumes from the working area. The fumes attack the mucous membranes of the nasal passages and irritation of the membranes and slight lung congestion may result from excessive inhalation of the fumes.

The handling of Aroclor is carried out at temperatures ranging from 75 deg. C. to 130 deg. C., thus presenting a minor hazard of burns resulting from contact with the hot liquid. Such burns require no special treatment.

Precautions in Handling

Aroclor 1254 will readily absorb traces of moisture. It is essential that the material be kept from contact with water. All air coming in contact with the Aroclor should be properly dried by passing through a dehumidifying unit such as a calcium chloride breather, activated alumina breather, or other similar dehydrating agent units. Calcium chloride breathers on all storage and handling tanks have been found to be completely satisfactory.

B. STORAGE TANKS AND HANDLING EQUIPMENT

Although Aroclor 1254 is but slightly corrosive to metals, it promotes corrosion(by oxidation) of iron and steel. Hence, no handling equipment should be of steel construction where it comes in contact with Aroclor. All process piping handling Aroclor must be galvanized. All wetted pump parts must be either stainless steel or bronze. (Worthington Worthite pumps have been found to be completely satisfactory for this service.)

Storage and handling tanks may be of steel construction if properly metallized with zinc-tin, or aluminum on the interior surfaces coming in contact with the Aroclor. The metallizing should be done according to the following procedure:

1. Clean an area of the surface by sandblasting, or a similar method, to give a perfectly clean and roughened surface. The area cleaned should not be greater than can be completely metallized within a few hours after cleaning.

2. If zinc - tin metallizing is used, a coating of zinc 0.005 inches thick should be sprayed on the cleaned surface. This is followed immediately by a coating of tin 0.007 inches think.

3. Metallization with aluminum has been found acceptable.

All storage and handling tanks should be amply provided with dehumidifying breathers such as calcium chloride, activated alumina, etc. units. This is essential in order to prevent moist air from coming in contact with the Aroclor. A moisture content above 35 p.p.m. adversely affects the dielectric constant and the resistivity of the Aroclor.

Storage tanks must be provided with ample heating coil surface to supply sufficient heat to the material to bring it to the proper temperature for pumping, etc. Heating coils should be either metallized steel, or, preferably, steel coils which have been galvanized after fabrication. It is recommended that the steam pressure on all heating coils should not exceed 100 pounds per square inch gage; lower pressures should be used where practicable. It is essential that all steam coils be completely free of even minute leaks, since this would introduce water into the Aroclor.

Before a newly constructed storage tank is filled with Aroclor, it should be heated to a temperature of at least 100 deg. C. to expel the moist air. The new tank should be dried as much as is possible before charging. It would be beneficial to heat the tank, allow it to cool and pull in dry air through the dehumidifying breather, heat again, etc., until the tank is full of comparatively dry air before the initial filling of the tank is started.

Aroclor 1254 must be heated to 75 deg. C to 90 deg. C. for pumping or other transportation through pipe lines, etc. When extremely rapid handling is desired, it is permissible to heat the material up to 130 deg. C. It is not advisable to hold the material at such temperatures over extended periods of time, however.

All handling pipe lines must be traced with steam lines and insulation applied over the two lines in order to keep the handling lines and the material up to the desired pumping temperature.

C. TANK CARS, THEIR UNLOADING, RETURN, ETC.

Aroclor 1254 is shipped in two types of tank cars, both of which are either aluminum lined or zinc - tin metallized. One type of tank has the heating coils inside the tank which are in direct contact with the Aroclor. The other type of tank is a double shell tank with heating coils between the inner and outer shells. Both types of tank are tested for 60 pounds pressure and their steam coils are tested for 200 pounds.

Before unloading the Aroclor, it is necessary to bring it to pumping temperature in the tank car. The steam coil outlet may be either trapped or throttled with a valve. It is recommended that steam pressures be limited to 100 pounds, particularly in the case of the coils being in direct contact with the Aroclor. It will require from 6 hours to 12 hours to bring the material to pumping temperature (75 deg. C. to 130 deg. C.), depending on weather conditions. After the tank car is emptied, the steam coils must be blown clear of water and properly capped.

Aroclor 1254 must be unloaded by displacement with dry air. There are either two or three connections on the tank car dome, depending on the car type. When three connections are found, there is one 2 inch unloading connection which extends to the bottom of the tank, one 1 inch air inlet connection, and one pressure safety vent which is adjusted to release any pressure in excess of 60 pounds. The vent connection is hooded for protection. When only two connections are found, one is a 2 inch unloading connection and the other is the safety vent. In this case, it is necessary to remove the safety vent and introduce the displacement air through that connection. When unloading is complete, all connections must be replaced as received. It is requested that the empty tank be sealed immediately after the connections are broken in order to keep the tanks filled with dry air during return shipment.

It is essential that the displacement air used for unloading be thoroughly dried by some dehumidifying unit such as a calcium chloride, activated alumina, or similar dehydrating agent drying unit. Required air pressures for unloading will depend upon the layout of the unloading system.

An unloading dock with proper piping connections should be provided at the railroad track where the Aroclor is to be unloaded. This dock should be provided with the connection to the discharge piping, the displacement air piping, and suitable steam connections for use on the steam coils.

APPENDIX

ADDITIONAL INFORMATION CONCERNING THE HANDLING OF AROCLOR 1254

Attached to this copy of this report is Monsanto Chemical Company, Phosphate Division, Drawing No. 9C-8170-5 showing the detail construction of a 15,000 gallon storage tank for Aroclor 1254. This construction has been found to be completely satisfactory and is, to the best of our knowledge, the best construction for this service.

The various nozzles on this tank are used as follows, considering them in order from left to right on the drawing:

3" nozzle	- Inlet for recirculation.
24" nozzle	- For future agitator if required (not used).
3" nozzle	- For calcium chloride breather connection.
36" manhole	- For inspection, etc. Float gauge located in center of this manhole.
3" nozzle	- Not used.
24" nozzle	- For future agitator if required (not used).
3" nozzle	- Not used.
3" nozzle	- Filling inlet connection.
18"x26" Oval nozzle	- For sump pump.
3" nozzle	- For thermometer well (see detail).

The two 24" nozzles were originally installed for installation of agitators if required. However, it has been found unnecessary to use agitators in the storage tank, and these nozzles could be omitted from storage tanks where extreme agitation is not required.

It has been found that circulation of the Aroclor by the sump pump, and into the nozzle on the opposite end of the tank, for several hours gives satisfactory blending of the tank contents.

For pumping Aroclor 1254 from the storage tank, a Taber Pump Company all bronze 2-1/2" x 2" vertical pump (Figure 1940) with monel shaft has been found to be quite satisfactory for the application. Further details and specifications for this pump will be furnished on request.

The liquid level gauge used in the storage must be gas tight. The Monsanto Aroclor 1254 storage tanks are equipped with Vapor Recovery Systems Co. "Varec", Fig. 253 gas tight automatic tank gauge. Further details and specifications for this level indicator will be furnished on request.

It is recommended that the stored Aroclor be filtered through a filter press using paper before using in order to remove any foreign matter such as scale, etc. Details of a suitable filter can be furnished on request.

The storage tank should be provided with an operating platform suitable to the customers conditions of operation.

A dock for unloading should be provided at the tank car unloading location. This dock can be constructed to conform to other loading or unloading docks used by the customer. Detail prints of loading docks used by Monsanto will be furnished on request.

The dehumidifying unit used as a breather on the storage tank can be of any suitable construction. Calcium chloride breathers constructed as shown on Monsanto Chemical Company, Phosphate Division, Drawing No. 9C-8248 (attached) have been found satisfactory. The upper portion of the chamber is charged with anhydrous calcium chloride. Periodic inspection of the calcium chloride will show the formation of a cake of damp material on top about 1 to 1 1/2" deep. This cake should be removed and fresh material recharged. Any suitable construction similar to that shown on Drawing No. 9C-8248 may be used for the breather units.

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