

## DRY CLEANING

### Date Initiated:

February 17, 1994

### Dates Modified / Updated:

April 1, 1998

### PROCESS DESCRIPTION:

Dry cleaning operations release cleaning solvent vapors to the atmosphere. While perchloroethylene (tetrachloroethylene) is the primary solvent used in dry cleaning operations, some stoddard solvent facilities may still exist. Emission rates are dependent upon the type of equipment used by the facility, emission controls, and the volume of cleaning performed. Equipment types are typically described as closed-loop, dry to dry, or transfer machines. Control devices may include refrigerated condensers, carbon adsorbers, separators, stills, filters, and/or diatomaceous earth. Annual and maximum hourly emissions are most accurately estimated with mass balance techniques based on solvent usage and waste generation. The standard District emission estimation techniques are;

$$Ea = [Ua - (SB \times EFSB) - (FI \times EFFI) - (W \times EFW)] \times D \times Ci$$

$$Eh = Ea / H$$

Where:

**Ea** = Annual emissions of each listed substances per device, (lbs/year)

**Eh** = Maximum hourly emissions of each listed substances per device, (lbs/hour)

**Ua** = Total cleaning solvent usage, (gal/year)

$$= \text{Inventory (initial)} + \text{Purchases} - \text{Inventory (final)}$$

**SB** = Amount of still bottoms shipped offsite as waste, (gallons/yr)

**EFSB** = Emission Factor for still bottom waste, (gallons of solvent / gallon of still bottoms)

$$= 0.50 \text{ gallons Perchloroethylene / gallon still bottoms}$$

**FI** = Number of filters shipped offsite as waste

**EFFI** = Emission Factor for filter waste, (gallons of solvent / filter disposed)

= 0.25 gallons Perchloroethylene / filter disposed

**W** = Other waste shipped offsite, (gallons/yr)

**EFW** = Emission Factor for other waste, (gallons of solvent / gallon of waste disposed)

= Value depends on waste type

**D** = Density of cleaning solvent used, (lb/gal)

= 13.46 lbs. Perchloroethylene / gallon

**Ci** = Concentration of each listed substance in the cleaning solvent used, (lbs/lb)

**H** = Hours of equipment operation, (hours/yr)

#### **EMISSIONS INFORMATION:**

Emission factors and other process information are from the ARB Technical Support Document (8/27/93) titled "Proposed Airborne Toxic Control Measure and Proposed Environmental Training Program for Perchloroethylene Dry Cleaning Operations". Emission factors based on pounds of clothes cleaned are expected to provide less accurate emission estimates for site specific operations than mass balance calculations. However, these factors may be used to evaluate questionable data.

#### **ASSUMPTIONS / LIMITATIONS:**

- Material usage and waste generation estimates must be for the reporting period only. Reported values may require adjustment if waste has accumulated over long periods or on-site inventories have substantially changed.
- Solvent disposal to the sewer is assumed to be negligible based on industrial discharge requirements for dry cleaners.
- Solvent control efficiencies are specifically NOT included in the emission calculations because material recovered from the control devices is reused. The collection and recovery efficiency is accounted for in the reduced annual solvent usage.
- Equipment using cleaning solvents other than perchloroethylene and stoddard solvent must be evaluated individually for correct emission estimates.

- Emissions from miscellaneous spot cleaning solvents (e.g., carbon tetrachloride) are assumed negligible at this time.

**FORMS:**

The generic reporting form for dry cleaning operations may be used to determine emissions for most inventory purposes. Solvent usage and waste disposal data must accurately reflect the time period being evaluated. Waste material solvent content must also be reflective of site specific operating procedures.