

## **7.31 Manufacturing of coatings, varnishes, inks and adhesives**

### **7.31.1 Coverage**

This sector covers the manufacturing of all types of paints, varnishes, stains as well as inks and adhesives. A wide number of products, formulated to meet a variety of service requirements, are available. These products are destined among others to aircrafts, automobiles, ships, wooden and metal furniture, packaging, textile fibres, domestic uses etc.

### **7.31.2 Emission sources**

Raw materials used in the products manufacturing process include solids, binders, solvents and all kinds of additives.

- Solids provide the coating with colour, opacity, and a degree of durability.
- Binders are components which form a continuous phase, hold the solids in the dry film, and cause it to adhere to the surface to be coated. The majority of binders are composed of resins and drying oils which are to a great extent responsible for the protective and general mechanical properties of the film.
- For viscosity adjustment, solvents are required. Materials that can be used as solvents include aliphatic and aromatic hydrocarbons, alcohols, esters and ketones.
- Additives are raw materials which are added in small concentrations. They perform a special function or give a certain property to the coating. Additives include driers, thickeners, antifoams, dispersing agents, and catalysts.

Only physical processes such as weighing, mixing, grinding, tinting, thinning, and packaging take place; no chemical reactions are involved. These processes are carried out in large mixing tanks at approximately room temperature.

Emission losses may arise from several steps in the process. Major emission sources are:

- Losses during filling and cleaning activities;
- Losses from product clinging to the vessels and equipment;
- Fugitive losses during mixing of preparations and storage of solvents.

### **7.31.3 Available Techniques, Associated Emissions Levels (AEL)**

In the production of coatings, process modifications are possible by switching to low organic solvent containing paints and glues. Process controls for reducing emissions, such as covering vessels or reducing storage tank breathing losses can be implemented. Further VOC abatement options are condensation, adsorption, thermal and catalytic oxidation. Examples of available emission reduction measures are given in table 1 below.

**Table 1: Emission sources and selected VOC control measures with associated emission levels for manufacturing of paints and adhesives**

Emission source	Combination of control measures	Associated emission levels for VOC  [Defined for the following averaging period: yearly for total AEL]
Large installations with an annual organic solvent consumption > 1000 t		1 wt-% of solvent input [1]
All other plants	Good practices such as: Recovery of solvent vapours during raw material distribution, Unloading of the barrels with fork lifts to avoid leakages, Coverage of mobile vessels, Use of solvents with lower volatility to reduce fugitive emissions, Use of cleaning agents containing less solvents, Use of automatic cleaning devices whenever possible, Recycling of cleaning solutions,	2.5 wt-% of solvent input
	Good practices and upgrading of the condensation or carbon adsorption units and solvent recovery	1.75 wt-% of solvent input

#### 7.31.4 Cost data for emission reduction techniques

Abatement costs corresponding to emission levels below 2% of the solvent input are about 2,200 €/t VOC abated. The detailed methodology is defined in the EGTEI synopsis sheet concerning “manufacture of paints, inks and glues” [2].

**Caution:** this document is susceptible to evolve if new updated data are available.

#### 7.31.5 Emerging techniques

No data available.

#### 7.31.6 References used for chapter 7.31

[1] Comments from UBA – this correspond to the German legislation for large installations

[2] EGTEI synopsis sheet: Manufacture of paints, inks and glues – 2005