

## ABSTRACT

The Centre for Best Available Techniques (BAT) is founded by the Flemish Government, and is hosted by VITO. The BAT centre collects, evaluates and distributes information on environmentally friendly techniques. Moreover, it advises the Flemish authorities on how to translate this information into its environmental policy. Central in this translation is the concept "BAT" (Best Available Techniques). BAT corresponds to the techniques with the best environmental performance that can be introduced at a reasonable cost.

This report comprises the BAT for the manufacturing of coatings, varnishes, inks and adhesives. It is a revision of the BAT report on coatings and inks manufacturing published in 1998 (Van Deynze et al., 1998), supplemented with the manufacturing of adhesives. This updated BAT-analysis is performed in the light of the actual economic situation of the industry in Flanders. The manufacturing process stayed similar, but the product composition evolved. There is a shift from 'classic' solvent based products to alternatives such as high solids, water based products and UV/EB-technology. The most important emissions in the industry are dust and solvent emissions to air, waste solvents and waste water from cleaning activities.

The industry of paint and ink manufacturers significantly reduced VOC-emissions over the last decades, i.e. 60% less in 2010 compared to 1990. Correct estimation of the VOC-containing remains an important issue for identifying further reduction potential. Renewed product compositions also diminished the pollution of waste water. Heavy metals are rarely used in inks nowadays.

Cleaning activities remain the most important source of emissions and waste streams. Therefore, optimal organisation of the cleaning activities is one of the selected BBT to reduce VOC-emissions, material use and waste. In total, 35 of the 38 analysed environmentally-friendly techniques are evaluated as BAT, including 7 as BAT under specific conditions. The BAT include process adjustments (e.g. work in closed systems) as well as end-of-pipe techniques (e.g. treatment of waste gases). The techniques concerning waste water are mostly relevant for water based production.

Based on this BAT-analysis, several recommendations are formulated, related to the environmental regulations, ecological investment support and to further research and development. The recommendations for environmental regulation are:

- Addition of a description of the ventilation system and an accuracy estimate to the VOC-documents. In most cases, the simplistic mass balance approach cannot be applied to coatings or inks manufacture. If an alternative method should be considered, the principles should be established by an expert study;
- Obligation to report the use of organic solvents with certain risk sentences;
- Elimination of the sectoral emission levels for waste water for the parameters cadmium, chrome, copper, mercury, lead, nickel, silver and zinc (proposal based on data from the VMM).

We propose two new technologies to be added to the LTL of the ecological investment support: ultrasonic cleaning and a closed cleaning machine for small equipment with coating or ink residues.