7.28 Coating processes 3: Coil coating

7.28.1 Coverage

Coil coating (of metal coil surface) is a linear process by which protective and/or decorative organic coatings are applied to flat metal sheets or strips packaged in rolls or coils.

7.28.2 Emission sources

The metal strip is sent through a coating application station, where rollers coat one or both sides of the metal strip. Roller coaters assure a very high transfer efficiency of the paint on the strip. The strip then passes through an oven where the coatings are dried and cured. As the strip exits the oven, it is cooled by water spray and/or air quenching and again dried. If the line is a tandem line, as most are, there is first the application of a primer, followed by another of topcoat on one or both sides of the strip.

Solvent-based paints containing between 40 and 50% of solvent are commonly used. There is no technical limit for the use of solvent-based paints.

7.28.3 BAT, Associated Emissions Levels (AEL)

The potential of use of the different coatings is different. Water-based paints almost disappeared in the early 80s and have not seen significant usage since due to technical difficulties in manufacture and limitations in use. The use of powder coatings is limited as their application is still technologically and economically difficult. For the time being, powder line speed is about 10 m/min vs. 50 - 100 m/min for most liquid paint lines, while film thicknesses less than 60μm are difficult and expensive to achieve in powder. These factors combined make powder uncompetitive against traditional solvent-based coil coatings in most applications.

BAT AEL are based on the STS BREF [1] and on information from ECCA [4]. They are presented in table 1 bellow.

Table 1: Emission sources and selected VOC control measures with associated emission levels for coil coating

Emission source	Combination of control measures	BAT associated emission levels for VOC [Defined for the following averaging periods: daily for AELc and yearly for AELf and total AEL]
Coil coating – new plants	Combination of extraction of the coating preparation area, paint application, drier/oven and cooling zone and treatment of the waste gases by thermal or catalytic oxidation	0.73 to 0.84 g NMVOC/m², with 3 – 5% fugitive emissions* (concentrations in the treated waste gas of 20 - 50 mg C/m³ can be reached)
Coil coating – existing plants		0.73 to 0.84 g NMVOC/m², with 3 – 10% fugitive emissions* (concentrations in the treated waste gas of 20 - 50 mg C/m³ can be reached)

* New information from ECCA shows that the achievable emission rate depends on a wide variety of factors, but that a figure of <2.5 g/m^2 should be used to cover all foreseeable scenarios, where BAT is adopted. As this value has not been validated in the BREF, it is not reproduced in the table above.

7.28.4 Cost data for emission reduction techniques

Abatement costs corresponding to the implementation of a thermal oxidiser vary between about 200 and 360 €/t VOC abated according to the size of the installation. The detailed methodology used to estimate these costs is defined in the EGTEI synopsis sheet concerning “coil coating“ [2].

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

7.28.5 Emerging techniques

The primary technique is secondary abatement through oxidisers. Technology for water-borne and powder paints are not new, but both systems suffer severe limitations. In the future, the emergence of radiation-curable paints (using UV and/or EB radiation) may provide VOC-free paint systems for this sector, but these technologies are not yet commercially adopted [4].

7.28.6 References used for chapter 7.28

[1] STS BREF – August 2007

[2] EGTEI synopsis sheet: Coil coating – 2006

[3] Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations

[4] Comments from ECCA – 09/03/2009