2.D.3.h - Printing

Short description

Category Code	Method					AD					EF				
2.D.3.h	T2					NS					CS				
	NO_x	NMVOC	SO_2	NH_3	$PM_{2.5}$	PM_{10}	TSP	BC	CO	Pb	Cd	Hg	Diox	PAH	HCB
Key Category:	-	L/T	-	-	-	-	-	-	-	-	-	-	-	-	-

T = key source by Trend **L** = key source by Level

Methods	
D	Default
T1	Tier 1 / Simple Methodology *
T2	Tier 2*
T3	Tier 3 / Detailed Methodology *
C	CORINAIR
CS	Country Specific
M	Model

* as described in the EMEP/EEA Emission Inventory Guidebook - 2019, in the group specific chapters.

AD - Data Source for Activity Data	
NS	National Statistics
RS	Regional Statistics
IS	International Statistics
PS	Plant Specific data
As	Associations, business organisations
Q	specific Questionnaires (or surveys)
M	Model / Modelled
C	Confidential

EF - Emission Factors	
D	Default (EMEP Guidebook)
C	Confidential
CS	Country Specific
PS	Plant Specific data
M	Model / Modelled

This source category comprises NMVOC emissions from the use of solvent-based products during printing and in arts. The following technologies / applications / products are taken into consideration:

- **Offset printing** (coldset web presses)
- **Sheetfed offset** (conventional; UV colours)
- **Offset printing** (heatset)
- **Endless offset printing**
- **Printing of books**
- **Flexography** (solvent-based inks; water-based inks)
- **Rotogravure package printing** (solvent-based inks; water-based inks)
- **Publication gravure printing**
- **Screen printing**
- **Other printing applications**
- **Inks / paints for artists**
- **Ink for writing and drawing**

'NMVOC' is defined in accordance with the VOC definition found in the EC solvents directive. For purposes of the definition of solvents, the term 'solvent use' is also defined in accordance with the EC solvents directive.

Method

General procedure

NMVOC emissions are calculated in accordance with a product-consumption-oriented approach. In this approach, solvent-based products or solvents are allocated to the source category, and then the relevant NMVOC emissions are calculated from those solvent quantities via specific emission factors. Thus, the use of this method is possible with the following valid input figures for each product group:

- Quantities of VOC-containing (pre-) products and agents used in the report year,
- The VOC concentrations in these products (substances and preparations),
- The relevant application and emission conditions (or the resulting specific emission factor).

The quantity of the solvent-based (pre-)product corresponds to the domestic consumption which is the sum of domestic production plus import minus export.

NMVOC Emission = domestic consumption of a certain product * solvent content * specific emission factor

The calculated NMVOC emissions of different product groups for a source category are then aggregated. The product / substance quantities used are determined at the product-group level with the help of production and foreign-trade statistics. Where possible, the so-determined domestic-consumption quantities are then further verified via cross-checking with industry statistics.

Specific information

Solvent contents and emission factors for the different printing technologies are based on a study carried out in 1999 [1)].

Discussion of emission trends

General information

Since 1990, so the data, NMVOC emissions from use of solvents and solvent-containing products in general have decreased by nearly 55%.

The main emissions reductions have been achieved in the years since 1999. This successful reduction has occurred especially as a result of regulatory provisions such as the 31st Ordinance on the execution of the Federal Immissions Control Act (Ordinance on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain facilities – 31. BImSchV), the 2nd such ordinance (Ordinance on the limitation of emissions of highly volatile halogenated organic compounds – 2. BImSchV) and the TA Luft.

Specific information

Until 1999, data of the present source categories 2.D.3.a, 2.D.3.h and 2.D.3.i were treated as one source group. Since 2000, a more detailed data collection enables to follow the development of source group 2.D.3.h, which accounts for about 12-16% of total NMVOC emissions from solvent-based products. Emissions of this source group decreased among others due to minor application of isopropanol and more environmentally friendly technologies. Furthermore, the importance of single technologies changed (e.g. printing of books got less important, digital printing raises gained in importance), which influences total emissions of 2.D.3.h.

Uncertainties

Emission factors: A relative error at ±15% was applied, but not exceeding 100% or falling below 0%.

Recalculations

There are no recalculations.

For pollutant-specific information on recalculated emission estimates for Base Year and 2018, please see the pollutant specific recalculation tables following chapter 8.1 - Recalculations.

Planned improvements

At the moment, no category-specific improvements are planned.

[1)] Jepsen, D., Grauer, A., Tebert, C.: Ermittlung des Standes der Technik und der Emissionsminderungspotenziale zur Senkung der VOC-Emissionen aus Druckereien, Ökopol GmbH im Auftrag des Umweltbundesamtes, FKZ 297 44 906/01, Berlin, 1999.