2.D.3.i - Other Solvent Use

Short description

In source category *2.D.3.i - Other Solvent Use*, emissions from various product groups and processes and also from lubricants use in stationary and mobile applications are reported. Relevant pollutants are NMVOC and some heavy metals.

Table 1: Overview of emission sources covered

Emission sources	Pollutants	Method	AD	EF	Key Category
Other solvent use	NMVOC	T2	NS	CS	**L & T:** NMVOC
Use of lubricants in stationary applications	NMVOC	T2	NS	CS	
Use of lubricants in mobile applications	Cd, Cr, Cu, Ni, Pb, Se and Zn	T1	NS, M	D	

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

Methods	
D	Default
RA	Reference Approach
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/CORINAIR Emission Inventory Guidebook - 2007, 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, surveys

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

Other solvent use

Method

In sub-category *2.D.3.i - Other product use: Other solvent use* the following product groups and processes are taken into consideration:

- Glass and mineral wool enduction
- Fat, edible and non-edible oil extraction
- Application of glues and adhesives (paper and packaging; wood; footwear; transport; Do-it-yourself-applications; others)
- Preservation of wood
- Underseal treatment and conservation of vehicles
- Vehicles dewaxing
- Other:
    - Plant protectives
    - Dichloromethane in strippers
    - Removal of paints from incorrectly coated aluminium parts
    - Removal of paint from steel parts
    - Concrete additives
    - De-icing (Aircraft de-icing; De-icing of operated areas; Other de-icing applications)
    - Applications in scientific laboratories (R&D; analyses; universities)

General procedure

Use of lubricants in stationary applications

Method

Sub-category *2.D.3.i - Other product use: Use of lubricants in stationary applications* comprises the entire use phase including the process stages of input and output. The products or lubricants covered here, are:

- Automotive and industrial gear oils
- Compressor oils
- Turbine oils
- Hydraulic oils
- Electro insulating oils
- Machine oils
- Process oils
- Other industrial oils not for lubricating purposes
- Metal working fluids
- Greases
- Base oils
- Extracts from lubricant refining

2-stroke engine oils are excluded as emissions from use of lubricants in 2-stroke engines are considered in 1.A.4.b ii. All other emissions from the unintended co-incineration of lubricants in mobile machinery and vehicles (other than 2-strokes) are reported in Use of lubricants in mobile applications.
'NMVOC' is defined in keeping 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 keeping with the EC solvents directive.

Activity rate

The emissions calculation method follows a Tier-2 approach. It uses national statistical data [Lit. 1] for the quantities placed on the market specific per lubricant types as activity rate and specific emission factors for each lubricant type. It is assumed that the amount of lubricants placed on the market per year equals the lubricant use (consumption) in the same year.

The consumption of lubricants in Germany has remained at a relatively constant level since 1990, apart from a sharp decrease in 2009 that was related to the overall economic situation.

Emission factors

Along the life cycle of the different lubricant types, different kinds of losses occur. Only some types of losses are of relevance with regard to air emissions and the different lubricants types differ significantly from each other. Relevant emitted pollutants identified for lubricants are NMVOC and CO_2. But only for engine oils used in machinery and in vehicles emission of both could be accounted for due to combustion of a small fraction of lubricating oils directly resulting in CO_2 emissions.

For Electro insulating oils [Lit. 3, 5], Process oils [Lit. 4, 10, 11], Greases [Lit. 10, 11] and Extracts from lubricant production [Lit. 2, 10, 11] no emissions expected.

All emission factors are determined in a research project (UBA, 2018) [Lit. 14].

Table 1: Tier 2 emission factor for source category 2.D.3.i, 2.G Other solvent and product use, Other

		NMVOC		
Lubricant-type group	**Proportion range of total sales since 1990**	**Default**	**Range**	**Reference**
Automotive gear oils	5 - 10 %	1 %	0 - 2 %	[Lit. 2-4]
Industrial gear oils	2 - 3 %	1.5 %	1 - 2 %	
Compressor oils	=< 1 %	1.5 %	1 - 2 %	1) 2) 3) 4) 5) 6)
Turbine oils	< 1 %	0.5 %	0 - 1 %	7) 8) 9)
Hydraulic oils	6 - 15 %	1.5 %	1 - 2 %	
Machine oils	1 - 7 %	2.5 %	0 - 5 %	10) 11) 12)
Other oils not for lubricating purposes	2 - 7 %	25 %	0 - 50 %	13) 14) 15) 16)
Metalworking fluids	5 - 9 %	5 %	0 - 10 %	17) 18) 19)

Base oils	4 - 16 %	10 %	5 - 15 %	[20)]

Uncertainties

For activity data, an uncertainty of 5 percent is assumed considering the well developed national statistics.

The emission factors are based on a broad review of literature and results from relevant research projects and have been discussed with senior lubricant experts. The experts suggested using ranges which are provided in the emission factor table 1.

Recalculations

No recalculation.

Planned improvements

No category-specific improvements are planned.

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Use of lubricants in mobile applications

In sub-category *2.D.3.i - Other product use: Use of lubricants in mobile applications*, the German air pollutant emisisons inventory includes emissions from the unintentional co-incineration of lubricants in mobile sources.

In contrast, emissions from the stationary use of lubricants are reported in 2.D.3.i - Use of lubricants in stationary applications.