5.D.2 - Industrial Wastewater Handling

Short description

Category Code	Method					AD					EF				
5.D.2	T1					NS					D				
	NO_x	NMVOC	SO_2	NH_3	$PM_{2.5}$	PM_{10}	TSP	BC	CO	Pb	Cd	Hg	Diox	PAH	HCB
Key Category:	-	-/-	-	-	-	-	-	-	-	-	-	-	-	-	-

Method(s) applied	
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 category chapters.	
(source for) Activity Data	
NS	National Statistics
RS	Regional Statistics
IS	International Statistics
PS	Plant Specific
As	Associations, business organisations
Q	specific Questionnaires (or surveys)
M	Model / Modelled
C	Confidential
(source for) Emission Factors	
D	Default (EMEP Guidebook)
CS	Country Specific
PS	Plant Specific
M	Model / Modelled
C	Confidential

In category **5.D.2**, NMVOC emissions from industrial wastewater handling are reported. The industrial section is covered by wastewaters from industrial processes. Main sectors are chemical industries, iron & steel industries, power generation, Food sector, Paper & Cardboard-production and “Other”-Industrial processes.

Method

Emissions reported under this category are calculated using the Tier 1 approach of the EMEP/EEA Guidebook 2019, where the emission factor (EF) is 15 mg/m³ wastewater (Part B, 5.D, chap. 3.2.2, Table 3-1, p. 7 [1)]). This EF is multiplied with the total amount of wastewater (AD) treated in industrial wwt-plants, following the equation:

Emissions $_{NMVOC}$ = AD x EF
(ibid., chap. 3.2.1)

Activity data

Total volumes of treated industrial wastewater are derived by the German statistical agency (Statistisches Bundesamt, Umweltnutzung und Wirtschaft. Tabellen zu den Umweltökonomischen Gesamtrechnungen. Teil 4: Wassereinsatz, Abwasser. Table 7.7 [2)]). The availability of the data starts in 1991 with new data for every following year, until 2001. Until then the data source is published on a three-year basis with new data only for the respective year of the update. Missing data are interpolated. Since the Wastewaterstatistic has not been updated since 2016, the data for Chemical Industry and Paper&Cardboard has been extrapolated until 2017 on the basis of an expert judgment, assuming for the Chemical Industry a yearly reduction of 1% and for Paper&Cardboard of 1,5%. For the remaining industries expert-judgement concluded that constant values since 2016 are deemed to be most probable.

Emisson factors

See method.
It should be noted that the described default emission factor was collected in Turkey for municipal wastewater treatment plants under specific climatic conditions in developing countries. The wastewater characteristics of the considered industries sometimes differ significantly from municipal wastewater.

Uncertainties

The AD from Statistisches Bundesamt have an uncertainty of ±3% (normal distribution) whereas the uncertainty for the EF, due to its range (5/50 mg/m³), is -70 / +210 % and the distribution lognormal.

Recalculations

As given above, the activity data for Chemical Industry and Paper&Cardboard have been recalculated according to the following table: Table: Revised volumes of treated Ww, TOW and NMVOC-Emissions

	Inventory	Unit	2017	2018	2019	2020
Volumes of treated Wastewater						
Chemical-Sector	NIR 2023	[m³]	254.395.036	251.851.086	249.332.575	246.839.249
	NIR 2022	[m³]	256.964.683	256.964.683	256.964.683	256.964.683
Paper&Cardboard - Sector	NIR 2023	[m³]	196.996.966	194.042.012	191.131.382	188.264.411
	NIR 2022	[m³]	199.996.920	199.996.920	199.996.920	199.996.920
TOW						
Total	NIR 2023	[kt]	1.337	1.323	1.310	1.296
	NIR 2022	[kt]	1.350	1.350	1.350	1.350
Emission						
NMVOC	NIR 2023	[kt]	12,9152306	12,8327471	12,7513100	12,6709055
	NIR 2022	[kt]	12,99877466	12,99877466	12,99877466	12,99877466

For **pollutant-specific information on recalculated emission estimates for Base Year and 2019**, please see the recalculation tables following chapter 8.1 - Recalculations.

Planned improvements

Currently no improvements are planned.

[1)] EMEP/EEA, 2019: EMEP/EEA air pollutant emission inventory guidebook 2019, Copenhagen, 2019
[2)] Statistisches Bundesamt, Umweltnutzung und Wirtschaft. Tabellen zu den Umweltökonomischen Gesamtrechnungen. Teil

4: Wassereinsatz, Abwasser. Table 7.7