

Annex 3: Overview determinants, data sources and iteration levels in the EET_{plastic} and in the EET_{photo-chemicals} regarding emission estimation to water
Results of part B2 of the OECD Matrix Project

Contact persons for this annex:

Andreas Ahrens, Ökopool GmbH, Hamburg, Germany, Tel. 040 - 3910020, E-Mail: ahrens@oekopol.de

Antonia Reihlen, Ökopool GmbH, Hamburg, Germany, Tel. 040 - 3910020, E-Mail: reihlen@oekopol.de

Dirk Bunke, Öko-Institut e.V., Freiburg, Germany, Tel. 0761 – 45 295 46, E-Mail: d.bunke@oeko.de

Contact Person at UBA:

Silke Müller, German Federal Environment Agency (UBA), Section IV 2.2, Dessau, Germany, Tel. 0340 – 2103 - 3223, Email: silke.mueller@uba.de

Annex 3a

Overview Determinants, data sources and iteration levels in the EET_{plastic additives} regarding emission estimation to water for industrial processing

Explanation of symbols

Choices on pick-list

Free text

Defaults

Not implemented in
current version of

Abbreviations

M/I = Manufacturer or importer of the substance

F = Formulator of plastic compounds containing the substance

IU = Industrial user converting the plastic compounds into an article

STP = Sewage treatment plant

	Starting point (level 1)	Iteration level 2	Iteration level 3
	Substance properties		
Region Back- ground	Total market volume		
	0.002 regional background emission ¹ at 365 days; 80% to STP		
	Dilution 25,000 million m ³ /a		
M/I	Own market volume (local)	Own market volume (local)	
	 Release days/a	
		0.3% emission from process [A 1.1] ²% emission from process
		Fraction through STP + dilution volume	
			Fraction to onsite abatement
			Efficiency onsite abatement
F	100% (local)	Fraction main source and release days [B 2.3, B 2.8, B 2.9]	F specific volume³
	20 days [B 2.8 (5 t/a)] ⁴		F specific release days
	0.675 % [highest emission factor from ESD] ⁵	Emission factors by additive type and process pick-list [ESD]	F specific emission factor (e.g. integrated measures)
	0% through STP treatment, dilution 20,000 m ³ /d	Fraction through STP + dilution volume	
			Fraction to onsite abatement
			Efficiency of onsite abatement

¹ 10% of market amount multiplied with medium conservative emission factor averaged across all life-cycle stages (0.3% from M/I; 0.225% from F, processing of > 40 µm particles only; 0.25 from IU due to good process control practice in plastic conversion; 0.84% from service life under the assumption of 25% outdoor use; 0.6% from local waste treatment based on the assumption that only 15% would end up in non-standard landfills; 80% STP connection assumed for all life-cycle stages. The EET_{plastic} does not yet support iteration of these assumptions.

² Not clear whether this includes i) integrated measures and/or ii) onsite abatement;

³ The F, IU and article specific volumes have always to be inserted as a share of M/I's total volume.

⁴ Remark: It is recognized that the assumption on the fraction of main source (100% as default = producer sells his total production to one customer) and the worst case assumption on release days from the TGD B-tables is overly conservative;

⁵ Raw material handling and compounding for particles < 40 µm and high volatility group (e.g. flame retardant, pigments, antioxidants)

	Starting point (level 1)	Iteration level 2	Iteration level 3
IU	100% (local)	Fraction main source	IU specific volume
	10 days [B 3.9 (10 t/a)] ⁶	and release days [B 3.9]	IU specific release days
	2.5% [highest emission factor from ESD] ⁷	Emission factors by additive type pick-list [ESD]	IU specific emission factors (e.g. integrated measures)
		Process temperature driving the emission factor [ESD]	
	0% through STP treatment, dilution 20,000 m ³ /d	Fraction through STP + dilution volume	
		Defaults	Fraction to onsite abatement
			Efficiency of onsite abatement
Service Life	100% x [1.0][0.1] ⁸		F/IU or product-type specific volume
Region	365 days	365 days	365 days
	3.2% [organic, outdoor use, 20a service life] ⁹	Emission factors by additive type + indoor/outdoor use pick-list	Product-type specific annual emission factors + product specific service life
	0% through STP treatment; dilution 25,000 million m ³ /a	0% through STP treatment; dilution 25,000 million m ³ /a ¹⁰	0% through STP treatment; dilution 25,000 million m ³ /a
		Remark: The emission from indoor use to water (80% STP connection as default) can be manually reduced to 30 [50] [70] %, depending on log P and degradability of the additive	Remark: The emission from indoor use to water (80% STP connection as default) can be manually reduced to 30 [50] [70] %, depending on log P and degradability of the additive
Service life	100% x [1.0] [0.002] ¹¹		I/F specific or product-type specific volume
Local	365 days	365 days	365 days
	3.2% [organic, outdoor use, 20a service life] ¹²	Pick-list additive types + indoor/outdoor use	Product-type specific annual emission factors + product specific service life
	0% through STP treatment; dilution 20,000 m ³ /d	Fraction through STP treatment + dilution volume	
Waste	100% x [1.0] [0.1] ¹³	100% x 0.1	F/IU specific or product-type specific volume

6

⁷ Grinding/machining of solid additives;

⁸ A common EU market is assumed from M/I's perspective since usually there is no regional market for plastic additives where M/I would sell his total production volume. Hence the 10% rule applies. However, if the calculation is performed from F's or IU's perspective 100% of volume are assumed since the compounder or converter may have a regional market and hence no "dilution" across the whole market would occur.

⁹ The emission factor for slip-promoters/lubricants and antistatic agents as suggested in the ESD (100% in 200 days) has not been taken into account for the worst case.

¹⁰ The EET_{plastic} does not support yet flexible STP connection depending on the type of article use. However a guided calculation can be carried out manually.

¹¹ It is assumed that the maximum fraction of the registrant's production volume contained in articles in a municipal waste facility can be determined by the fraction of main source for domestic use of chemicals (B-tables). However, if the calculation is carried out from F's or IU's perspective 100% is assumed by default since the compounder or the converter may possibly serve regional market.

¹² The emission factor for slip-promoters/lubricants and antistatic agents as suggested in the ESD (100% in 200 days) has not been taken into account for the worst case.

¹³ A common EU market is assumed from M/Is perspective since usually there is no regional market for plastic additives where M/I would sell his total production volume. Hence the 10% rule applies. However, if the calculation is performed from F's or IU's perspective 100% of volume are assumed since the compounder or converter may have a regional market and hence no "dilution" across the whole market would occur.

	Starting point (level 1)	Iteration level 2	Iteration level 3
Region	365 days	365 days	365 days
	12.2% (12 + 0.2 metals) ¹⁴	Pick-list: disposal operation types (emission rates after onsite abatement)	Product-disposal specific emission factors
	0% through STP treatment; dilution 25,000 million m ³ /a	Fraction through STP treatment + dilution 25,000 million m ³ /a	
Waste	100% x [1.0] [0.002] ¹⁵		F/IU specific or product-type specific volume
Local	365 days	365 days	365 days
	4.8% [organic, 30 years open to environment]	Product-disposal specific emission factors	Product-disposal specific emission factors
	0% through STP, 20,000 m ³ /d	Fraction through STP treatment + dilution volume	

¹⁴ Highest emission factor for waste remaining in the environment from the EU RAR on DEHP assessment (coil coated roofing sheets: 50% of which 25% goes to water).

¹⁵ It is assumed that the maximum fraction of the registrant's production volume contained in articles in a municipal waste facility can be determined by the fraction of main source for domestic use of chemicals (B-tables). However, if the calculation is carried out from F's or IU's perspective 100% is assumed by default since the compounder or the converter may possibly serve regional market.

Annex 3b

Overview Determinants, data sources and iteration levels in the EET_{photochem} regarding emission estimation to water for industrial processing

	Starting point (level 1)	Iteration level 2	Iteration level 3
	Substance properties		
Region	Total market volume		
Back-ground	[2.21%] regional background emission ¹⁶ at 365 days; 80% to STP; Dilution 25,000 million m ³ /a		
MI			
F			
IU	Own handled volume (local)	Area of processed material pick-list and concentration in bath pick-list [ESD] (leading to own handled volume)¹⁷	Area of processed material Bath concentration
	300 emission days [B 3.8] ¹⁸		
		Bath-type, concentration in bath, ingredient-type and CO or RP rate by pick-list (leading to emission factor) [ESD]	CO rate RP rate
	100% emission [ESD] ¹⁹	Substance specific removal due to reaction on use (leading to emission factor) [ESD]	Substance specific removal
			Fraction to onsite abatement
			Efficiency of onsite abatement
	0% through STP treatment, dilution 20,000 m ³ /d	Fraction through STP + dilution volume	Fraction through STP + dilution volume Fraction Onsite abatement
Service Life			
Region			

¹⁶ Calculation as in the case of plastic additives (see footnote 1 of annex 3a). Not valid for photo-chemicals

¹⁷ This is the ESD-route to determine the substance volume (= “fraction of main source”) and ideally it should match with volume inserted in the beginning of the first iteration. Could be brought into the TGD B table format (just by manual conversion) in the follow-up-project

¹⁸ Default value from the TGD table B 3.8.

¹⁹ This is the default value for process baths with direct discharge to wastewater and no removal of the substance during the process (according to the ESD)

	Starting point (level 1)	Iteration level 2	Iteration level 3
Service			
Life			
Local			
Waste			
Region			
Waste			
Local			

Explanation of symbols

Choices on pick-list

Free text

Defaults

Not implemented in current
version of the IT tool

Abbreviations

M/I = Manufacturer or importer of the substance

F = Formulator of plastic compounds containing the substance

IU = Industrial user converting the plastic compounds into an article

STP = Sewage treatment plant