

Final report

S-Risk for the Walloon region - substance data sheets part 6: Total Petroleum Hydrocarbons

C. Cornelis, J. Bierkens, A. Standaert

Adapted for the Walloon Region by S. Crèvecoeur (ISSEP)

Study accomplished under the authority of OVAM
2016/MRG/R/0794

Adaptations for Walloon Region accomplished under the authority of DGO3

February 2017



VITO NV

Boeretang 200 - 2400 MOL - BELGIE
Tel. + 32 14 33 55 11 - Fax + 32 14 33 55 99
vito@vito.be - www.vito.be

BTW BE-0244.195.916 RPR (Turnhout)
Bank 375-1117354-90 ING
BE34 3751 1173 5490 - BBRUBEBB

All rights, amongst which the copyright, on the materials described in this document rest with the Flemish Institute for Technological Research NV ("VITO"), Boeretang 200, BE-2400 Mol, Register of Legal Entities VAT BE 0244.195.916.

The information provided in this document is confidential information of VITO. This document may not be reproduced or brought into circulation without the prior written consent of VITO. Without prior permission in writing from VITO this document may not be used, in whole or in part, for the lodging of claims, for conducting proceedings, for publicity and/or for the benefit or acquisition in a more general sense.

TABLE OF CONTENTS

Table of Contents	I
List of acronyms	II
List of modifications	I
Introduction	2
CHAPTER 10. Substance Data Sheet Total Petroleum Hydrocarbons	5
10.1. Aliphatic fraction EC 5 – 6	5
10.2. Aliphatic fraction EC >6 – 8	7
10.3. Aliphatic fraction EC >8 – 10	9
10.4. Aliphatic fraction EC >10 – 12	11
10.5. Aliphatic fraction EC >12 – 16	13
10.6. Aliphatic fraction EC >16 – 21	15
10.7. Aliphatic fraction EC > 21-35 W	17
10.8. Aromatic fraction EC > 6 – 7 (benzene) W	19
10.9. Aromatic fraction EC > 7 – 8 (toluene) W	21
10.10. Aromatic fraction EC > 8 – 10	23
10.11. Aromatic fraction EC >10 – 12	25
10.12. Aromatic fraction EC >12 – 16	27
10.13. Aromatic fraction EC >16 - 21	29
10.14. Aromatic fraction EC > 21 – 35	31
List of Literature	33

LIST OF ACRONYMS

ABS	Absorption factor
Al	Aluminum content
BCF	Bioconcentration factor
BTEXS	benzene, toluene, ethylbenzene, styrene
BTF	Biotransfer factor
Da	Diffusion coefficient in air
Dpe	Diffusion coefficient in polyethylene
Dpvc	Diffusion coefficient in PVC
Dw	Diffusion coefficient in water
FA	Factor used when calculating dermal absorption from water
Fe	Iron content
ISSeP	Institut Scientifique de Service Public
K _d	Sorption coefficient soil-water
Koa	Distribution coefficient octanol-air
Koc	Distribution coefficient organic carbon-water
Kow	Distribution coefficient octanol-water
Kp	Dermale permeability coefficient
MTBE	methyl-t-butylether
OVAM	Openbare Vlaamse Afvalstoffenmaatschappij (Public Waste Agency of Flanders)
PAH	polycyclic aromatic hydrocarbons
Ptot	Total phosphorus content
TCA	Tolerable Concentration in Air
TDI	Tolerable Daily Intake
TGD	Technical Guidance Document

LIST OF MODIFICATIONS

Date	Modification

INTRODUCTION

The **substance data sheets** summarise the data as available in S-Risk 1.0 for the **Walloon region**. The substance data sheets are a copy of those used for the S-Risk Flanders version. They are not based on the Annexe B4 (“propriétés physico-chimiques de référence pour les polluants normés”) of the GRER part B version 2.0. The differences between the Flemish and Walloon Region are highlighted using **W** (representing data used only in the Walloon version). Physiological parameters and BCF/BTF are the same for the two regions. The three main differences are:

- Toxicological values (values recently revised and harmonized in Wallonia);
- Carcinogenicity revision;
- Limit values used in Wallonia are regulatory values only (“code de l’eau” for drinking water and AGW, 2010 and EC, 2004 for outdoor air). No limit values in indoor air nor in plants and meats are proposed.
- All background values are set to “0” (background values are not taken into account in Wallonia).

Substance data sheets modified for the Walloon version summarize the data as available in S-Risk 1.0 for the Walloon region.

The current **substance data sheets** used for the **Flanders version** of S-Risk are a copy of those used for the calculation of the proposed soil clean-up values in Flanders, with some modifications. Following changes in model equations in S-Risk compared to the formerly used Vlier-Humaan model, some new parameter values had to be introduced. Also some supplementary options available in S-Risk required changes to the input data for which new values had to be collected. The most important changes are:

- **Dermal absorption:** Two new parameters are used that replace the formerly used parameters to calculate dermal absorption, namely the fraction adsorbed for dermal uptake via soil and dust, and the dermal permeability coefficient for dermal uptake from water. The latter parameter is combined with a parameter FA.
- **Bioconcentration factors plants (BCF):** For metals and arsenic very often either the BCF for maize or the BCF for grass was missing. In these cases the same BCF was used for maize and grass. Because this is incorrect, there is a need to search for additional BCFs.
- **Bioconcentration factors plants (BCF):** for organic compounds plant uptake in S-Risk can either be calculated starting from substance- and plant-specific characteristics or directly from BCF values expressed in mg/kg dm in the plant per mg/m³ soil solution. For most organic substances plant uptake is calculated. For some organic substances however, BCF values reported in the original (Vlier-Humaan) data sheets had units of mg/kg dm in the plant per mg/kg dm in the soil, which are incompatible with the current S-Risk version. For these substances plant- and substance specific characteristics were used to calculate plant uptake. If so, this is mentioned in the data sheets.
- **Biotransfer factors animal products (BTF):** S-Risk allows to specify BTF animal products by meat, milk, kidney and liver. For inorganic substances BTF values need to be filled in. The original data sheets only provided values for meat and milk. Lacking values were collected from De Raeymaecker et al. (2005). For organic substances model calculations are always used to obtain BTF values.
- **Biotransfer factors eggs (BTF):** S-Risk allows the user to calculate transfer to chicken eggs. This is a new feature as compared to Vlier-Humaan. However, using default settings in S-Risk this exposure route is not activated. For metals biotransfer factors to eggs have been collected and are included in the substance data sheets. For organic substances no BTF

have been collected and their value has been equaled to zero. When the exposure route to eggs is activated in S-Risk the user should enter appropriate BTF values.

- **Toxicity data:** The toxicity data in S-Risk are copied from the original substance data sheets. In contrast to Vlier-Humaan, where calculations were only possible for systemic effects and either carcinogenic or non-carcinogenic effects, S-Risk allows to make calculations for several endpoints simultaneously. As a consequence, the toxicity data in the current substance data sheets are sometimes more extensive than in the former ones.
- **Background exposure and background concentrations:** Vlier-Humaan did only allow to enter one value for background exposure (be it depending on the type of land use) via food. In S-Risk it is possible to enter age-dependent background exposure via food. Default ratios are most often used for age-dependency (according to the ratios specified in the TGD). Differences between land-uses are taken into account based on the background concentrations for food that have been entered. S-Risk also separately calculates background exposure via drinking water.
- **Limit values for food:** For some substances calculated concentrations in food stuffs have to comply with existing standards. With this in mind recent legislation has been scrutinised and obsolete values were replaced by more recent ones when appropriate.

The existing information, which was copied in S-Risk is based on the following original substance data sheets:

- Heavy metals: OVAM (2009c) and (OVAM, 2009d) with accompanying spreadsheet;
- BTEXS: OVAM (2009a);
- Chlorinated aliphatic substances: OVAM (2004) for 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, dichloromethane, tetrachloroethene, tetrachloromethane, trichloroethene; OVAM (2009b) for 1,2-dichloroethane, vinyl chloride, trichloromethane (chloroform);
- Chloro-aromatics: OVAM (2004); OVAM (2009b) for hexachloro-benzene;
- PAHs: OVAM (2003a) for PAHs; OVAM (2005a) for changes in the evaluation criteria for benzo(a)pyrene and dibenzo(a,h)anthracene;
- Cyanides: OVAM (2004);
- Trimethylbenzenes: OVAM (2003b);
- Chlorophenols: OVAM (2005b)
- Hexane, heptane, octane: OVAM (2004);
- MTBE: OVAM (2003a)

Details on the new information are always available in the report discussing the calculation of clean-up values with S-Risk (Cornelis, Standaert, and Willems, 2013). Newly added or modified information compared to the original data sheets is clearly indicated in the S-Risk substance data sheets.


Changes entered after publication of the first version of the substance datasheets are listed in the section "List of modifications".

The substance data sheets consist of 6 documents:













- Part 1: Substance data sheets metals and arsenic
- Part 2: Substance data sheets benzene, toluene, ethylbenzene, xylenes, styrene, phenol and trimethylbenzenes
- Part 3: Substance data sheets chlorinated aliphatic substances, chlorobenzenes and chlorophenols

- Part 4: Substance data sheets polycyclic aromatic hydrocarbons
- Part 5: Substance data sheets alkanes, MTBE and cyanides
- **Part 6: Substance data sheets total petroleum hydrocarbons**

CHAPTER 10. SUBSTANCE DATA SHEET TOTAL PETROLEUM HYDROCARBONS

Data on substances that do not derive from the former substance data sheets are indicated with , accompanied with some explanation if appropriate. Detailed information on all new entries is given in Cornelis et al. (2013).

10.1. ALIPHATIC FRACTION EC 5 – 6

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	81	TPHCWG (1999)
Solubility	mg/l	3.60×10^1	TPHCWG (1999)
Vapour pressure*	Pa	35463 (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	80388 (20°C)	TPHCWG (1999)
log Kow	g/g	3.52	Franken et al. (1999)
log Koc	dm ³ /kg	2.9	TPHCWG (1999)
Log Koa	g/g	calculated	
BCF		calculated	
Dpe	m ² /d	4×10^{-6}	Van den Berg et al. (1994) (hexane)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64×10^{-5}	TPHCWG (1999)
Kp	cm/h	calculated	
FA	-	1	
ABS dermal soil/dust	-	0.00	 US-EPA (2003), volatility comparable with benzene
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	
BTF liver	d/kg	calculated	
BTF kidney	d/kg	calculated	
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.00	 values not searched for
BTF feed - egg	d/kg	0.00	 values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	5.0	 TPHCWG (1999)
TCA inhalation	mg/m ³	18.4	TPHCWG (1999)
TDI dermal	mg/kg.d	5.0	 = oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	

Parameter	Unit	Value	Source
Limit value in drinking water	mg/m ³	-	W
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Dietary background adults	mg/kg day	0.00	
Dietary background children	mg/kg.day	0.00	
Background potatoes	mg/kg fw	0.00	
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	W
Background indoor air	mg/m ³	0.00	W
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.2. ALIPHATIC FRACTION EC >6 – 8

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	100	TPHCWG (1999)
Solubility	mg/l	5.40	TPHCWG (1999)
Vapour pressure*	Pa	6383 (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	121800 (20°C)	TPHCWG (1999)
log Kow	g/g	3.6	Franken et al. (1999)
log Koc	dm ³ /kg	3.6	TPHCWG (1999)
Log Koa	g/g	calculated	N
BCF		calculated	
Dpe	m ² /d	4.00x10 ⁻⁶	Van den Berg et al. (1994) (heptane)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0,864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64x10 ⁻⁵	TPHCWG (1999)
Kp	cm/h	calculated	N
FA	-	1	N
ABS dermal soil/dust	-	3.00x10 ⁻²	N US-EPA (2003), volatility comparable with toluene, ethylbenzene, xylene
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	N
BTF liver	d/kg	calculated	N
BTF kidney	d/kg	calculated	N
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0	N values not searched for
BTF feed - egg	d/kg	0	N values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	5.0	W TPHCWG (1999)
TCA inhalation	mg/m ³	18.4	TPHCWG (1999)
TDI dermal	mg/kg.d	5.0	W = oral value
averaging period		child, adolescent, adult	averaging period
Limit value in outdoor air	mg/m ³	-	W
Limit value in drinking water	mg/m ³	-	W
Limit value in plants	mg/kg fw		
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	

CHAPTER 10 Substance Data Sheet Total Petroleum Hydrocarbons

Parameter	Unit	Value	Source
Dietary background adults	mg/kg day	0.00	
Dietary background children	mg/kg.day	0.00	
Background potatoes	mg/kg fw	0.00	
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	W
Background indoor air	mg/m ³	0.00	W
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.3. ALIPHATIC FRACTION EC >8 – 10

Parameter	Unit	Value	Source
CAS nr.			
Type		Organic	
Dissociating		no	
Molecular weight	g/mol	130	TPHCWG (1999)
Solubility	mg/l	4.30x10 ⁻¹	TPHCWG (1999)
Vapour pressure*	Pa	638.3 (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	194880 (20°C)	TPHCWG (1999)
log Kow	g/g	3.69	Franken et al. (1999)
log Koc	dm ³ /kg	4.50	TPHCWG (1999)
Log Koa	g/g	calculated	
BCF		calculated	N
Dpe	m ² /d	6.00x10 ⁻⁸	Veenendaal et al. (1985) (nonane)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64x10 ⁻⁵	TPHCWG (1999)
Kp	cm/h	calculated	N
FA	-	1	N
ABS dermal soil/dust	-	1.0x10 ⁻¹	N US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	N
BTF liver	d/kg	calculated	N
BTF kidney	d/kg	calculated	N
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	N values not searched for
BTF feed - egg	d/kg	0.0	N values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	0.1	TPHCWG (1999)
TCA inhalation	mg/m ³	1.0	TPHCWG (1999)
TDI dermal	mg/kg.d	0.1	= oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	W
Limit value in drinking water	mg/m ³	-	W
Limit value in plants	mg/kg fw		
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Dietary background adults	mg/kg day	0,00	
Dietary background children	mg/kg.day	0.00	
Background potatoes	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	W
Background indoor air	mg/m ³	0.00	W
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.4. ALIPHATIC FRACTION EC >10 – 12

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		neen	
Molecular weight	g/mol	160	TPHCWG (1999)
Solubility	mg/l	3.40×10^{-2}	TPHCWG (1999)
Vapour pressure*	Pa	63.83 (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	292320 (20°C)	TPHCWG (1999)
log Kow	g/g	3.76	Franken et al. (1999)
log Koc	dm ³ /kg	5.40	TPHCWG (1999)
Log Koa	g/g	calculated	
BCF		calculated	
Dpe	m ² /d	6.00×10^{-8}	Veenendaal et al. (1985) (nonane)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64×10^{-5}	TPHCWG (1999)
Kp	cm/h	calculated	
FA	-	1	
ABS dermal soil/dust	-	1.00×10^{-1}	US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	
BTF liver	d/kg	calculated	
BTF kidney	d/kg	calculated	
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	values not searched for
BTF feed - egg	d/kg	0.0	values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	0.1	TPHCWG (1999)
TCA inhalation	mg/m ³	1.0	TPHCWG (1999)
TDI dermal	mg/kg.d	0.1	= oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	
Limit value in drinking water	mg/m ³	-	
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Dietary background adults	mg/kg day	0.00	
Dietary background children	mg/kg.day	0.00	
Background potatoes	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.5. ALIPHATIC FRACTION EC >12 – 16

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		neen	
Molecular weight	g/mol	200	TPHCWG (1999)
Solubility	mg/l	7.60x10 ⁻⁴	TPHCWG (1999)
Vapour pressure*	Pa	4.86 (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	1 266 721 (20°C)	TPHCWG (1999)
log Kow	g/g	3.85	Franken et al. (1999)
log Koc	dm ³ /kg	6.70	TPHCWG (1999)
Log Koa	g/g	calculated	N
BCF		calculated	
Dpe	m ² /d	6.00x10 ⁻⁸	Veenendaal et al. (1985) (nonane)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64x10 ⁻⁵	TPHCWG (1999)
Kp	cm/h	calculated	N
FA	-	1	N
ABS dermal soil/dust	-	1.00x10 ⁻¹	N US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	N
BTF liver	d/kg	calculated	N
BTF kidney	d/kg	calculated	N
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	N values not searched for
BTF feed - egg	d/kg	0.0	N values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	0.1	TPHCWG (1999)
TCA inhalation	mg/m ³	1.0	TPHCWG (1999)
TDI dermal	mg/kg.d	0.1	= oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	W
Limit value in drinking water	mg/m ³	-	W
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Dietary background adults	mg/kg day	0.00	
Dietary background children	mg/kg.day	0.00	
Background potatoes	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.6. ALIPHATIC FRACTION EC >16 – 21

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	270	TPHCWG (1999)
Solubility	mg/l	2.50x10 ⁻⁶	TPHCWG (1999)
Vapour pressure*	Pa	0.111 (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	11 936 409 (20°C)	TPHCWG (1999)
log Kow	g/g	3.97	Franken et al. (1999)
log Koc	dm ³ /kg	8.80	TPHCWG (1999)
Log Koa	g/g	calculated	N
BCF		calculated	
Dpe	m ² /d	6.00x10 ⁻⁸	Veenendaal et al. (1985) (nonane)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64x10 ⁻⁵	TPHCWG (1999)
Kp	cm/h	calculated	N
FA	-	1	N
ABS dermal soil/dust	-	1.00x10 ⁻¹	N US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	N
BTF liver	d/kg	calculated	N
BTF kidney	d/kg	calculated	N
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	N values not searched for
BTF feed - egg	d/kg	0.0	N values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	2.0	TPHCWG (1999)
TCA inhalation ^{a)}	mg/m ³	7.0	calculated based on the TDI
TDI dermal	mg/kg.d	2.0	= oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	W
Limit value in drinking water	mg/m ³	-	W
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Background food adults	mg/kg day	0.00	
Background food children	mg/kg.day	0.00	
Background potato	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

a) Conversion can be done by multiplying the value in mg/kg.d with a body weight of 70 kg and an inhalation rate of 20 m³/d.

10.7. ALIPHATIC FRACTION EC > 21-35 

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	406.3543	TPHCWG (1999)
Solubility	mg/l	1.51×10^{-11}	TPHCWG (1999)
Vapour pressure	Pa	3.48×10^{-5} (10°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	-	TPHCWG (1999)
log Kow	g/g	12.4	TPHCWG (1999)
log Koc	dm ³ /kg	13.03	TPHCWG (1999)
Log Koa	g/g	calculated	
BCF		calculated	
Dpe	m ² /d	6.00×10^{-8}	Veenendaal et al. (1985)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64×10^{-5}	TPHCWG (1999)
Kp	cm/h	calculated	
FA	-	-	
ABS dermal soil/dust	-	1.00×10^{-1}	US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	
BTF liver	d/kg	calculated	
BTF kidney	d/kg	calculated	
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	values not searched for
BTF feed - egg	d/kg	0.0	values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	2.0	TPHCWG (1999)
TCA inhalation ^{a)}	mg/m ³	7.0	calculated based on the TDI
TDI dermal	mg/kg.d	2.0	= oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	
Limit value in drinking water	mg/m ³	-	
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Background food adults	mg/kg day	0.00	
Background food children	mg/kg.day	0.00	
Background potato	mg/kg fw	0.00	
Background root crops	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

- a) Conversion can be done by multiplying the value in mg/kg.d with a body weight of 70 kg and an inhalation rate of 20 m³/d.

10.8. AROMATIC FRACTION EC > 6 – 7 (BENZENE) 

Parameter	Unit	Value	Source
CAS nr.		71-43-2	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	78.11	
Solubility	mg/l	1777 (25°C)	average
Vapour pressure*	Pa	12516 (25°C)	average
Henry coefficient	Pa m ³ /mol	552 (25°C)	average
log Kow	g/g	2.13	Geometric mean
log Koc	dm ³ /kg	1.9	Geometric mean
Log Koa	g/g	calculated	
BCF		calculated	
Dpe	m ² /d	1.4x10 ⁻⁶	van den Berg (1995)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.74	average
Diffusion coefficient water (Dw)	m ² /d	9.07x10 ⁻⁵	average
Kp	[cm/h]	calculated	
FA	-	1	
ABS dermal soil/dust	-	0	considered negligible
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	
BTF liver	d/kg	calculated	
BTF kidney	d/kg	calculated	
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0	values not searched for
BTF feed - egg	d/kg	0	values not searched for
Carcinogenicity		1 A	IARC (2012) US-EPA (2000)
Systemic effects threshold			
TDI oral	mg/kg.d	5.0x10 ⁻⁴	ATSDR (2007)
TCA inhalation	mg/m ³	3.0x10 ⁻³	OEHHA (2014)
TDI dermal	mg/kg.d	5.0x10 ⁻⁴	= oral value
Systemic effects non-threshold			
Oral slope factor	(mg/kg.d) ⁻¹	5.5x10 ⁻²	US-EPA (2000)
Inhalation unit risk	(mg/m ³) ⁻¹	6.0x10 ⁻³	WHO (2000)
Dermal slope factor	(mg/kg.d) ⁻¹	5.5x10 ⁻²	= oral value
Limit in outdoor air	mg/m ³	5.00x10 ⁻³	EC (2008); AGW (2010)
Limit value in drinking water	mg/m ³	1.0	EC (1998) ; Code de l'Eau (2004)
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	

Parameter	Unit	Value	Source
Dietary background adults	mg/kg day	0	
Dietary background children	mg/kg.day	0	
Background potatoes	mg/kg fw	0	
Background root crops	mg/kg fw	0	
Background bulbous plants (onion ...)	mg/kg fw	0	
Background fruit vegetables	mg/kg fw	0	
Background cabbage	mg/kg fw	0	
Background leafy vegetables	mg/kg fw	0	
Background legume	mg/kg fw	0	
Background beef	mg/kg fw	0	
Background offal	mg/kg fw	0	
Background milk	mg/kg fw	0	
Background butter	mg/kg fw	0	
Background eggs	mg/kg fw	0	
Background outdoor air	mg/m ³	0	
Background indoor air	mg/m ³	0	
Background drinking water	mg/m ³	0	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.9. AROMATIC FRACTION EC > 7 – 8 (TOLUENE) 

Parameter	Unit	Value	Source
CAS nr.		108-88-3	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	92.13	
Solubility	mg/l	523 (25°C)	average
Vapour pressure*	Pa	3802 (25°C)	average
Henry coefficient	Pa m ³ /mol	655 (25°C)	average
log Kow	g/g	2.65	Geometric mean
log Koc	dm ³ /kg	2.12	Geometric mean
Log Koa	g/g	calculated	
BCF		calculated	
Dpe	m ² /d	1.2x10 ⁻⁶	van den Berg (1995)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.6936	average
Diffusion coefficient water (Dw)	m ² /d	7.66x10 ⁻⁵	average
Kp	[cm/h]	calculated	
FA	-	1	
ABS dermal soil/dust	-	3.00x10 ⁻²	US-EPA (1995, 2003)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	
BTF liver	d/kg	calculated	
BTF kidney	d/kg	calculated	
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0	values not searched for
BTF feed - egg	d/kg	0	values not searched for
Carcinogenicity		3 D	IARC (1999) US-EPA (2005)
Systemic effects threshold			
TDI oral	mg/kg.d	8.0x10 ⁻²	US-EPA (2005)
TCL inhalation	mg/m ³	2.6x10 ⁻¹	WHO (2000)
TDI dermal	mg/kg.d	8.0x10 ⁻²	= oral TDI
averaging period		Child, adolescent, adult	
Limit in outdoor air	mg/m ³	-	
Limit value in drinking water	mg/m ³	-	
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Dietary background adults	mg/kg day	0	
Dietary background children	mg/kg.day	0	
Background potatoes	mg/kg fw	0	
Background root crops	mg/kg fw	0	

Parameter	Unit	Value	Source
Background bulbous plants (onion ...)	mg/kg fw	0	
Background fruit vegetables	mg/kg fw	0	
Background cabbage	mg/kg fw	0	
Background leafy vegetables	mg/kg fw	0	
Background legume	mg/kg fw	0	
Background beef	mg/kg fw	0	
Background offal	mg/kg fw	0	
Background milk	mg/kg fw	0	
Background butter	mg/kg fw	0	
Background eggs	mg/kg fw	0	
Background outdoor air	mg/m ³	0	
Background indoor air	mg/m ³	0	
Background drinking water	mg/m ³	0	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.10.AROMATIC FRACTION EC > 8 – 10

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	120	TPHCWG (1999)
Solubility	mg/l	6.50x10 ¹	TPHCWG (1999)
Vapour pressure*	Pa	638 (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	1169 (20°C)	TPHCWG (1999)
log Kow	g/g	3.55	Franken et al. (1999)
log Koc	dm ³ /kg	3.20	TPHCWG (1999)
Log Koa	g/g	calculated	N
BCF		calculated	
Dpe	m ² /d	2.10x10 ⁻⁶	Van den Berg et al. (1994) (ethylbenzene)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64x10 ⁻⁵	TPHCWG (1999)
Kp	cm/h	calculated	N
FA	-	1	N
ABS dermal soil/dust	-	3.00x10 ⁻²	N US-EPA (2003) volatility comparable with toluene, ethylbenzene, xylene
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	N
BTF liver	d/kg	calculated	N
BTF kidney	d/kg	calculated	N
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	N values not searched for
BTF feed - egg	d/kg	0.0	N values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	0.04	TPHCWG (1999)
TCA inhalation	mg/m ³	0.2	TPHCWG (1999)
TDI dermal	mg/kg.d	0.04	= oral value
averaging period		Child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	W
Limit value in drinking water	mg/m ³	-	W
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Background food adults	mg/kg day	0.00	

Parameter	Unit	Value	Source
Background food children	mg/kg.day	0.00	
Background potato	mg/kg fw	0.00	
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	W
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.11.AROMATIC FRACTION EC >10 – 12

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	130	TPHCWG (1999)
Solubility	mg/l	2.50x10 ¹	TPHCWG (1999)
Vapour pressure*	Pa	63.8 at (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	341 (20°C)	TPHCWG (1999)
log Kow	g/g	3.58	Franken et al. (1999)
log Koc	dm ³ /kg	3.40	TPHCWG (1999)
Log Koa	g/g	calculated	N
BCF		calculated	
Dpe	m ² /d	2.10x10 ⁻⁶	Van den Berg et al. (1994) (ethylbenzene)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64x10 ⁻⁵	TPHCWG (1999)
Kp	cm/h	calculated	N
FA	-	1	N
ABS dermal soil/dust	-	1.00x10 ⁻¹	N US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	N
BTF liver	d/kg	calculated	N
BTF kidney	d/kg	calculated	N
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	N values not searched for
BTF feed - egg	d/kg	0.0	N values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	0.04	TPHCWG (1999)
TCA inhalation	mg/m ³	0.2	TPHCWG (1999)
TDI dermal	mg/kg.d	0.04	= oral value
averaging period		Child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	W
Limit value in drinking water	mg/m ³	-	W
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Background food adults	mg/kg day	0.00	
Background food children	mg/kg.day	0.00	
Background potato	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.12.AROMATIC FRACTION EC >12 – 16

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	150	TPHCWG (1999)
Solubility	mg/l	5.80	TPHCWG (1999)
Vapour pressure*	Pa	4.86 (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	129 (20°C)	TPHCWG (1999)
log Kow	g/g	3.61	Franken et al. (1999)
log Koc	dm ³ /kg	3.70	TPHCWG (1999)
Log Koa	g/g	calculated	
BCF		calculated	
Dpe	m ² /d	2.10x10 ⁻⁶	Van den Berg et al. (1994) (ethylbenzene)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64x10 ⁻⁵	TPHCWG (1999)
Kp	cm/h	calculated	
FA	-	1	
ABS dermal soil/dust	-	1.00x10 ⁻¹	US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	
BTF liver	d/kg	calculated	
BTF kidney	d/kg	calculated	
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	values not searched for
BTF feed - egg	d/kg	0.0	values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	0.04	TPHCWG (1999)
TCA inhalation	mg/m ³	0.2	TPHCWG (1999)
TDI dermal	mg/kg.d	0.04	= oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	
Limit value in drinking water	mg/m ³	-	
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Background food adults	mg/kg day	0.00	
Background food children	mg/kg.day	0.00	
Background potato	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

10.13.AROMATIC FRACTION EC >16 - 21

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	190	TPHCWG (1999)
Solubility	mg/l	6.5×10^{-1}	TPHCWG (1999)
Vapour pressure*	Pa	1.11×10^{-1} (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	3.16×10^1 (20°C)	TPHCWG (1999)
log Kow	g/g	3.66	Franken et al. (1999)
log Koc	dm ³ /kg	4.2	TPHCWG (1999)
Log Koa	g/g	calculated	
BCF		calculated	
Dpe	m ² /d	2.00×10^{-7}	Van den Berg et al. (1994) (pyreen)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64×10^{-5}	TPHCWG (1999)
Kp	cm/h	calculated	
FA	-	1	
ABS dermal soil/dust	-	1.00×10^{-1}	US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	
BTF liver	d/kg	calculated	
BTF kidney	d/kg	calculated	
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	values not searched for
BTF feed - egg	d/kg	0.0	values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	0.03	TPHCWG (1999)
TCA inhalation ^{a)}	mg/m ³	0.105	calculated based on the TDI
TDI dermal	mg/kg.d	0.03	= oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	
Limit value in drinking water	mg/m ³	-	
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Background food adults	mg/kg day	0	
Background food children	mg/kg.day	0	
Background potato	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

* Volatile pollutant (vapour pressure > 0.1Pa at 20°C)

a) Conversion can be done by multiplying the value in mg/kg.d with a body weight of 70 kg and an inhalation rate of 20 m³/d.

10.14.AROMATIC FRACTION EC > 21 – 35

Parameter	Unit	Value	Source
CAS nr.		-	
Type		organic	
Dissociating		no	
Molecular weight	g/mol	240	TPHCWG (1999)
Solubility	mg/l	6.60x10 ⁻³	TPHCWG (1999)
Vapour pressure	Pa	4.458x10 ⁻⁵ (20°C)	TPHCWG (1999)
Henry coefficient	Pa m ³ /mol	1.6321 (20°C)	TPHCWG (1999)
log Kow	g/g	3.74	Franken et al. (1999)
log Koc	dm ³ /kg	5.1	TPHCWG (1999)
Log Koa	g/g	calculated	
BCF		calculated	
Dpe	m ² /d	2.00x10 ⁻⁷	Van den Berg et al. (1994) (pyrene)
Dpvc	m ² /d	calculated	
Diffusion coefficient air (Da)	m ² /d	0.864	TPHCWG (1999)
Diffusion coefficient water (Dw)	m ² /d	8.64x10 ⁻⁵	TPHCWG (1999)
Kp	cm/h	calculated	
FA	-	1	
ABS dermal soil/dust	-	1.00x10 ⁻¹	US-EPA (2004)
BTF beef	d/kg	calculated	
BTF mutton	d/kg	calculated	
BTF liver	d/kg	calculated	
BTF kidney	d/kg	calculated	
BTF milk	d/kg	calculated	
BTF soil – egg	d/kg	0.0	values not searched for
BTF feed - egg	d/kg	0.0	values not searched for
Carcinogenicity		non-carcinogenic	
Systemic effects threshold			
TDI oral	mg/kg.d	0.03	TPHCWG (1999)
TCA inhalation ^{a)}	mg/m ³	0.105	calculated based on the TDI
TDI dermal	mg/kg.d	0.03	= oral value
averaging period		child, adolescent, adult	
Limit value in outdoor air	mg/m ³	-	
Limit value in drinking water	mg/m ³	-	
Limit value in plants	mg/kg fw	-	
Limit value in meat			
Beef	mg/kg fw	-	
Mutton	mg/kg fw	-	
Liver	mg/kg fw	-	
Kidney	mg/kg fw	-	
Milk	mg/kg fw	-	
Butter	mg/kg fw	-	
Egg	mg/kg fw	-	
Background food adults	mg/kg day	0	
Background food children	mg/kg.day	0	
Background potato	mg/kg fw	0.00	

Parameter	Unit	Value	Source
Background root crops	mg/kg fw	0.00	
Background bulbous plants (onion ...)	mg/kg fw	0.00	
Background fruit vegetables	mg/kg fw	0.00	
Background cabbage	mg/kg fw	0.00	
Background leafy vegetables	mg/kg fw	0.00	
Background legume	mg/kg fw	0.00	
Background beef	mg/kg fw	0.00	
Background offal	mg/kg fw	0.00	
Background milk	mg/kg fw	0.00	
Background butter	mg/kg fw	0.00	
Background eggs	mg/kg fw	0.00	
Background outdoor air	mg/m ³	0.00	
Background indoor air	mg/m ³	0.00	
Background drinking water	mg/m ³	0.00	

- a) Conversion can be done by multiplying the value in mg/kg.d with a body weight of 70 kg and an inhalation rate of 20 m³/d.

LIST OF LITERATURE

- AGW. (2010). Arrêté du Gouvernement wallon relatif à l'évaluation et la gestion de la qualité de l'air ambiant (M.B. 01.09.2010).
- ATSDR. (2007). Toxicological Profile for benzene: Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/ToxProfiles/tp3.pdf> (updated August 2007)
- Code de l'Eau. (2004). Décret relatif au Livre II du Code de l'Environnement constituant le Code de l'Eau (M.B. 23.09.2004). Annexe XXXI – valeurs paramétriques applicables aux eaux destinées à la consommation humaine.
- Cornelis, C., Standaert, A., & Willems, H. (2013). S-Risk - Technical guidance document. Mol, België: VITO.
- EC. (1998). Directive 98/83/CE du conseil du 3 novembre 1998 relative à la qualité des eaux destinées à la consommation humaine. (98/83/EC).
- EC. (2008). Directive 2008/50/CE du Parlement Européen et du Conseil du 21 mai 2008 concernant la qualité de l'air ambiant et un air pur pour l'Europe. *PB. L 152(1)*.
- Franken, R. O. G., Baars, A. J., Crommentuijn, G. H., & Otte, P. F. (1999). A proposal for revised Intervention Values for petroleum hydrocarbons ('minerale olie') on base of fractions of petroleum hydrocarbons. Bilthoven, Nederland: RIVM.
- IARC. (1999). Re-evaluation of some organic chemicals, Hydrazine and hydrogen Peroxide. *Volume 71*.
- IARC. (2012). Monographs on the evaluation of the carcinogenic risk of chemicals to humans, Supplement 7. Lyon, France: International Agency for Research on Cancer. <http://monographs.iarc.fr/ENG/Monographs/suppl7/suppl7.pdf>
- OVAM. (2003a). Aanvulling bij basisinformatie voor risico-evaluaties - polyaromatische koolwaterstoffen en MTBE. Mechelen, België: OVAM.
- OVAM. (2003b). Aanvulling bij basisinformatie voor risico-evaluaties - trimethylbenzenen. Mechelen, België: OVAM.
- OVAM. (2004). Basisinformatie voor risico-evaluaties / Deel 4 - SN - Stofdata normering: OVAM.
- OVAM. (2005a). Aanvulling bij basisinformatie voor risico-evaluaties - aangepaste toetsingscriteria voor historische bodemverontreiniging met benzo(a)pyreen en dibenzo(a,h)antracene. Mechelen, België: OVAM.
- OVAM. (2005b). Aanvulling bij basisinformatie voor risico-evaluaties - chloorfenolen: voorstel van normering en stofdata. Mechelen, België: OVAM.
- OVAM. (2009a). Aanvulling bij basisinformatie voor risico-evaluaties - BTEXS stofdata. Mechelen, België: OVAM.
- OVAM. (2009b). Aanvulling bij basisinformatie voor risico-evaluaties - carcinogene gechloreerde koolwaterstoffen (1,2-DCA, VC, CHL en HCB): stofdata. Mechelen, België: OVAM.
- OVAM. (2009c). Aanvulling bij basisinformatie voor risico-evaluaties - zware metalen en arseen: stofdata. Mechelen, België: OVAM.
- OVAM. (2009d). Rekenmodule voor de opname van zware metalen in planten en transfer naar de voedselketen. Mechelen, België: OVAM.
- TPHCWG. (1999). Human health risk-based evaluation of petroleum release sites: implementing the Working Group approach.
- US-EPA. (1995). Technical Guidance Manual - Assessing dermal contact with soil / existing guidance: United States Environmental Protection Agency - Region 3. <http://www.epa.gov/reg3hwmd/risk/human/info/solabsg2.htm>
- US-EPA. (2000). IRIS - Benzene (CAS n° 71-43-2). <http://www.epa.gov/iris/subst/0276.htm>
- US-EPA. (2003). Updated dermal exposure assessment guidance: United States Environmental Protection Agency - Region 3. <http://www.epa.gov/reg3hwmd/risk/human/info/dermalag.htm>

- US-EPA. (2004). Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Washington DC, USA: Office of Superfund Remediation and Technology Innovation - U.S. Environmental Protection Agency. <http://www.epa.gov/oswer/riskassessment/ragse/index.htm>
- US-EPA. (2005). IRIS - Toluene (CAS n° 108-88-3). <http://www.epa.gov/iris/subst/0118.htm>
- van den Berg, R. (1994). Blootstelling van de mens aan bodemverontreiniging. Een kwalitatieve en kwantitatieve analyse, leidend tot voorstellen voor humaan toxicologische C-toetsingswaarden (beperkt herziene versie). Bilthoven, Nederland: RIVM.
- van den Berg, R. (1995). Blootstelling van de mens aan bodemverontreiniging. Een kwalitatieve en kwantitatieve analyse, leidend tot voorstellen voor humaan toxicologische C-toetsingswaarden (Herziene versie). Bilthoven, Nederland: RIVM.
- Veenendaal, G., Verheyen, L. A. H. M., & Vonk, M. W. (1985). Waterleidingen in vervuilde bodem. Nieuwegein, Nederland: Keuringsinstituut voor Waterleidingartikelen (KIWA).
- WHO. (2000). Air quality guidelines for Europe, 2nd Ed., 91.