

REPORT

Stoffdata som ligger til grunn for nye normverdier og tilstandsklasser

COMPOUND SPECIFIC DATA USED FOR THE
DERIVATION OF NEW QUALITY STANDARDS FOR
CONTAMINATED SOIL

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Summary

The Norwegian Geotechnical Institute (NGI) has reviewed the existing compound specific data that are used in risk assessment of contaminated soil. This is the first such revision since 2007 for most substances. Since 2007, there have been several substantial advances regarding data availability within Europe. This includes the revision of the European Union's and Norway's Water Framework Directive, the implementation of REACH (The Registration, Evaluation, Authorisation and Restriction of Chemicals), new chemicals of concern being prioritized, improved analytical techniques and the publication of several new risk assessment reports and studies on soil contamination. This report considers these new advances in reviewing the compound specific data that are used to predict fate and transport of the contaminants as well as their potential risk. The data reported here were originally collected in 2016 and were reviewed and revised during 2021 as part of the revision of "normverdier og tilstandsklasser" presented in M-2169/2021, dated 2021-12-10. All human health criteria have been revised during 2021 by the Norwegian Institute of Public Health (FHI) and are in detail presented in Appendix A.

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Appendix A Vurdering av grenseverdier for human helse. Dr Helle Katrine Knutsen, Dr Tim Hofer, Dr Hubert Dirven. Folkehelseinstituttet (FHI), Avdeling for miljø og helse

Appendix B Revisjon av distribusjonskoeffisienten for utvalgte stoffer. NGI notat 20200490-01-TN rev 1, datert 2021-05-31

Review and reference page

1 Introduction

The Norwegian Environment Agency (Miljødirektorat) first introduced a system for assessing normative values for soil concentrations in the 1999 guideline "Veiledning om risikovurdering av forurenset grunn" (TA-1629/1999). These normative values, referred to in Norwegian as *normverdier*, are essentially screening or guideline soil quality criteria that can be used as a preliminary assessment of pollution in Norwegian soils. If the normative values are not exceeded, the soil is considered to be acceptable (or without risk) for all applications.

In 2007, a suggestion for revision of the 1999 normative values was introduced based on the latest available data at that time, and included a new list of substances, such as brominated flame retardants, PFOS, chlorinated paraffins, alkyl-phenols and phthalates (Aquateam 2007), which were later put into effect. In 2013, a suggestion for normative values for organotin substances were also added (Aquateam 2011).

This report presents an update of background data by reviewing the background parameters and data that form the basis for the environmental quality standards for soil.

The data reported here were originally collected in 2016 and were reviewed and revised during 2021 as part of the revision of "normverdier og tilstandsklasser" presented in M-2169, dated 2021-12-10. All human health criteria have been revised during 2021 by the Norwegian Institute of Public Health (FHI) and are in detail presented in Appendix A.

2 Methodology of deriving compound specific data

2.1 Relevant parameters

The key chemical background parameters needed to be able to calculate human health risk following the Norwegian guideline for risk assessment of human health are listed in (Table 1). All these parameters were included in the literature review for updating and revision.

Table 1 Overview of properties needed to derive QS_{soil} (human health).

1. Parameter	Definition	Comments
log Pow (l/l)	Octanol-water partition coefficient	Not relevant for metals
K_{oc}(l/kg TS)	Organic carbon-water partition coefficient	Not relevant for metals; in many cases it is estimated from log Pow
K_d(l/kg TS)	Soil-water distribution coefficient	Directly measured for metals. Estimated here for organic compounds as 0.01 K _{oc} , based on the assumption that typical Norwegian soil is 1% organic carbon (OC)
Henry (-)	Henry's law coefficient	Describes air-water transfer
BCF fish (l/kg w.w.)	Bioconcentration factor in fish	If not available from the literature it is estimated according to equation 1
BCF stem (l/kg w.w.)	Bioconcentration factor in plant stems	If not available from the literature it is estimated from equation 2
BCF root (l/kg w.w.)	Bioconcentration in plant roots	If it is not available from the literature it is estimated from equation 3
MTDI (mg/kg/d)	Maximum tolerable daily intake	For human toxicity
RfC (mg/m³)	Toxic reference concentration (air)	For human toxicity
Skin contact: f_{du}	Dermal absorption factor	For human exposure
Diffusivity in air (m²/h)	Gas phase transport	For human exposure

2.2 Estimating parameters

In the absence of applicable literature data on specific parameters, values have been estimated using the equations derived from the Norwegian risk assessment guideline (SFT, 1999) and given below

Equation 1:

$$\begin{aligned} \log \text{BCF}_{\text{fish}} &= 0.85 \log \text{Pow} - 0.7 && (\log \text{Pow} \text{ from } 2 \text{ to } 6) \\ \log \text{BCF}_{\text{fish}} &= -0.2(\log \text{Pow})^2 + 2.74 \log \text{Pow} - 4.72 && (\text{for } \log \text{Pow} > 6) \end{aligned}$$

Equation 2 (from TA-1629/1999):

$$\text{BCF}_{\text{stem}} = 0.784(0.82 + 10^{0.951\log\text{Pow}-2.05}) \left(10^{-0.434 \frac{(\log\text{Pow}-1.78)^2}{2.44}} \right)$$

Equation 3 (from TA-1629/1999):

$$\text{BCF}_{\text{root}} = 10^{(0.77\log\text{Pow}-1.52)} + 0.82$$

Soil-water partition coefficient, K_D in this report are presented for a "typical Norwegian" soil with 1% OC (dry weight) following the description in the Norwegian risk assessment guideline (SFT, 1999).

2.3 $Q_{\text{soil}}(\text{ecotox})$

The derivation of $Q_{\text{soil}}(\text{ecotox})$ follows ECHA (European Chemicals Agency) procedures presented in their various risk assessment guidelines, in particular EC (2003), ECHA (2011) and ECHA (2016). Only toxicity tests to soil dwelling organisms (e.g. plants, soil invertebrates, soil microorganisms) in contaminated soils that are conducted according to these ECHA guidelines are considered here in deriving $Q_{\text{soil}}(\text{ecotox})$ values.

In summary, compound and species specific No Observable Effect Concentration (NOEC) are considered from these soil toxicity tests. Then, for a given compound, NOEC of the most sensitive species is divided by an assessment factor (AF) to generate a $Q_{\text{soil}}(\text{ecotox})$ (this is also commonly referred to as the $\text{PNEC}_{\text{soil}}$ for chronic toxicity). A guideline for what assessment factor to assign is based on the type and availability of soil toxicity tests, as presented in Table 2.

Table 2 Recommended assessment factors for determining $QS_{soil}(ecotox)$ (i.e. $PNEC_{soil}$) depending on the availability of experimental soil toxicity data. Reproduced from EC (2003), Table 20 on page 114.

Information available	Assessment factor
L(E)C50 short-term toxicity tests(s) (e.g. plants, earthworms, or microorganisms)	1000
NOEC for on long-term toxicity test (e.g. plants)	100
NOEC for additional long-term toxicity tests of two trophic levels	50
NOEC for additional long-term toxicity tests for three species of three trophic levels	10
Species sensitivity distribution (SSD method)	5-1, to be fully justified on a case-by-case basis
Field data/data of model ecosystems	Case-by-case

Notice from this table that the greater the abundance of chronic toxicity studies for diverse species, the lower the assessment factor. The confidence in soil toxicity data increases to support that the most sensitive NOEC is protective of soil dwelling organisms. The assessment factor can be quite small (close to 1) if there are tests for many species and a species sensitivity distribution plot (SSD) can be conducted, or alternatively if a NOEC is derived from field data/model data.

We note that as part of this literature review we did not derive any original $QS_{soil}(ecotox)$. Instead, the NOEC values and assessment factors were obtained directly from the source literature. A key adjustment that was done here is that ECHA based-reports present $QS_{soil}(ecotox)$ values normalized to a "typical European" soil with 2% organic carbon (OC), dry weight. In this report, the values are corrected to a "typical Norwegian" soil with 1% OC (dry weight) following the description of a typical Norwegian soil in TA-1629/1999, (see Table 3).

Table 3 Typical Norwegian soil properties used to adjust $QS_{soil}(ecotox)$ values. Reproduction of Table 6 from TA-1629.

Parameter	Value	Unit
Water content of soil	0.2	L water/ L soil
Air content of soil	0.2	L air/ L soil
Soil bulk dry density	1.7	kg soil/ L soil
Fraction of organic carbon in soil	0.01	kg organic carbon / kg soil

Therefore, if a $QS_{soil}(ecotox)$ was reported in an ECHA based assessment normalized to 2% organic carbon dry weight, it would be divided by two for this assessment:

Equation 4:

$$QS_{soil}(ecotox) = QS_{soil}(ecotox)_{EU} \times (f_{OC,Norway}/f_{OC,EU})$$

$$QS_{soil}(ecotox) = QS_{soil}(ecotox)_{EU} \times (0.01/0.02)$$

Some of the European country specific studies in the literature review presented $QS_{soil}(ecotox)$ or equivalent values at different f_{OC} . For instance, Dutch reports typically present data at an f_{OC} of 0.0581 (corresponding to an organic matter content of 10%, see e.g. RIVM (2012)), in this case too the $QS_{soil}(ecotox)$ has been corrected to an f_{OC} of 0.01.

2.4 $QS_{soil}(EQP)$

As presented in the description of Figure 1, an alternative approach to estimate $QS_{soil}(ecotox)$ is through the equilibrium partitioning (EQP) method. This method assumes that toxicity to soil dwelling organisms is the same as water dwelling organisms, and that the two toxicity values can be related through the soil-water distribution coefficient, K_D . Thereby, if a water quality environmental quality standard (EQS) is available, this can be converted into a QS_{soil} by equation 5.

Equation 5:

$$QS_{soil}(EQP) = AA-EQS_{freshwater} \times K_D$$

Where $AA-EQS_{freshwater}$ is the Annual Average-EQS value for freshwater (e.g. from the Water Framework Directive - Directive 2013/39 EU).

This method works best for compounds where the main mode of toxic action in both soil and water dwelling organisms is baseline narcosis, through bioaccumulation in lipids to the point of lipid disruption (as accumulation in lipids is also a partitioning processes). If any freshwater organism has a specific mode of toxicity that is not relevant to soil

dwelling organisms, or vice versa, the derived values may not be appropriate. In this case the derived $QS_{soil}(EQP)$ can be too conservative, or not conservative enough, to protect soil dwelling organisms. The $QS_{soil}(EQP)$ value is also prone to addition uncertainty because KD values themselves are highly uncertain and can exhibit huge variation between pristine areas and contaminated soils (Arp et al. 2014, Enell et al. 2016). For these reasons, the $QS_{soil}(ecotox)$ is given higher priority in the selection of Normverdier than $QS_{soil}(EQP)$.

However, an instance to consider when a $QS_{soil}(EQP)$ may be more appropriate than a $QS_{soil}(ecotox)$ is when the contaminated soil poses a direct emission risk to a nearby water recipient. This is particularly important when the $QS_{soil}(EQP)$ is much lower than $QS_{soil}(ecotox)$, which often occurs for polar substances. It is even more relevant for environmentally persistent substances, as they will not degrade substantially during transport from the contaminated soil to the water recipient. Therefore, in this report $QS_{soil}(ecotox)$ and $QS_{soil}(EQP)$ are always presented beside each other to indicate when this should be considered.

ECHA guidelines recommend that in cases where $\log Pow > 5$ that the $QS_{soil}(EQP)$ value should be divided by 10 (EC (2003), ECHA (2011) and ECHA (2016)). The justification of this is that it accounts for the slow release of ingested soil particles. ECHA's recommendation was not included here for two reasons: 1) users of the suggested normative values can decide whether or not this is appropriate on a case-by-case basis; 2) recent literature suggests that the freely-dissolved concentration is a driver of risk in contaminated soils (Arp et al. 2014), although there remains controversy as to whether a bioavailability approach or bioaccessibility approach is more appropriate for risk assessment.

2.5 QS_{soil} (secondary poisoning)

Secondary poisoning was not considered in previous derivations of Norwegian normative values, therefore it will be elaborated here in detail.

2.5.1 Biota dietary QS values

For consumers in a terrestrial food chain, quality standard values for secondary poisoning concentrations in their diet ($QS_{biota,sp}$) can be determined from toxicology studies using birds, mammals or proxies thereof, via the following equation:

Equation 6:

$$QS_{biota,sp} = \frac{\text{lowest NOEC or EC10 for bird or mammal } \left(\frac{\text{mg}}{\text{kg}_{\text{diet,w.w.}}} \right)}{AF}$$

Table 4 Definition of parameters needed for calculating $QS_{biota,sp}$

Toxicity Parameter	Definition
NOEC	No Observed Effect Concentration: highest tested concentration that did not result in a significant effect on organisms in an ecotoxicology test.
EC10/LC50	Concentration or amount (%) that effected 10% of tested organisms.
AF	Assessment Factor

Note that as with soil ecotox tests, AF for dietary studies also depend on the type of test, according to the EU Technical Guidance Document (EU-TGD, 2011). This is shown in Table 5.

Table 5 Assessment factors recommend by the European Union Technical Guidance Document (2011) for deriving $QS_{biota,sp}$ for selected ecotoxicological studies (EU-TGD, 2011).

Oral toxicity data	Test length	Assessment Factor (AF _{oral})
NOEC/EC10 oral, bird	Chronic	30
NOEC/EC10 oral, mammal	28 d	300
	90 d (reproductive studies)	90
	Chronic	30

In this manner, $QS_{biota,sp}$ have been derived for a large number of regulated chemicals within the EU and Norway. For example, standards are included as part of the EU Water Framework Directive (Directive 2013/39 EU) and the Norwegian Environmental Agency's guideline M-608 ("Grenseverdier for klassifisering av vann, sediment og biota"), as well as presented in the Agency's report M-241 ("Kvalitetssikring av milj kvalitetsstandarder").

2.5.2 Uptake in predators based on earthworm concentrations

Earthworms and other soil invertebrates are key species for soil ecosystems and terrestrial ecosystems, as worms condition soil for plant growth and are a food source to predators like birds. Thus, quantifying concentrations in earthworms, $C_{earthworms}$, is key to assessing the impact of soil contamination.

Several models exist to estimate $C_{earthworms}$, some of them requiring more soil parameters than others; for example, particle grains size, cation exchange capacity, soil porewater dissolved organic carbon (DOC), soil calcium and iron content (Luo et al., 2014). A simple model to estimate $C_{earthworms}$ is included in the Norwegian Environmental Agency's report on the use of sewage sludge on agriculture soils (TA-3005,

Miljødirektoratet 2012). This model is based on ECHA's "Guidance on information requirements and Chemical Safety Assessment Chapter R.16: Environmental exposure assessment." Specifically, the most recent version 3.0 was published in 2016 (equation R.16-65 of ECHA (2016)), which describes the equilibrium situation, and accounts for worms containing contaminants in their body as well as in the undigested soil within their guts:

Equation 7:

$$C_{earthworms} = \frac{BCF_{earthworms}C_{pw} + C_{soil}F_{gut}CONV_{soil}}{1 + F_{gut}CONV_{soil}}$$

Table 6 Parameters needed for calculating the uptake in earthworms.

Parameter	Definition	Units	Value
$C_{earthworms}$	Concentration in earthworms on a wet weight basis	[mg / kg w.w. earthworms]	
$BCF_{earthworm}$	Bioconcentration factor for earthworms on a wet weight basis, based on equilibrium of lipids and porewater	[L pore water / kg w.w. earthworms]	
C_{pw}	Porewater concentration	[mg/L]	
C_{soil}	Soil concentration on a dry weight basis	[mg/kg d.w.]	
F_{gut}	Fraction of worm weight that is stomach contents	[-]	0.1 (typical)
$CONV_{soil}$	conversion factor for soil concentration dry weight soil to wet weight soil	[kg _{d.w.} /kg _{w.w.}]	0.8 (typical)

It is very rare that C_{pw} is available. In this case it can be estimated if a C_{soil} and a soil-water partition coefficient, K_D , is available:

Equation 8:

$$C_{pw} = \frac{C_{soil}}{K_D}$$

After substituting this in equation. 7:

Equation 9:

$$C_{earthworms} = \frac{C_{soil}(BCF_{earthworms}/K_D + F_{gut}CONV_{soil})}{1 + F_{gut}CONV_{soil}}$$

It is then possible to arrange this equation for C_{soil} to be a function of $C_{earthworms}$ (at equilibrium):

Equation 10:

$$C_{soil} = \frac{C_{earthworms}(1 + F_{gut}CONV_{soil})}{(BCF_{earthworms}/K_D + F_{gut}CONV_{soil})}$$

2.5.3 Derivation of $QS_{soil,sp}$

For consideration of the consumers of earthworms, we can directly equate $QS_{biota,sp}$ with $C_{earthworms}$, if we assume that earthworms are the only food source for biota (or that components of a diet have the same concentrations of chemicals as earthworms).

Equation 11:

$$QS_{biota,sp} \text{ (mg/kg}_{w.w.}) = C_{earthworms} \text{ (mg/kg}_{w.w.})$$

To derive a quality standard for soil based on secondary poisoning, $QS_{soil,sp}$ (mg/kg_{d.w.}), that would correspond to $QS_{biota,sp}$ based on earthworms and the subsequent substitutions in equation 10.

Equation 12:

$$QS_{soil,sp} = \frac{QS_{biota,sp}(1 + F_{gut}CONV_{soil})}{BCF_{earthworms}/K_D + F_{gut}CONV_{soil}}$$

Further, if no direct measurements of $BCF_{earthworms}$ for a given contaminant is available, it can be estimated, for instance by using the equation recommended in ECHA (2016) and also used in TA-3005 (Miljødirektorat, 2012).

Equation 13:

$$BCF_{earthworms} = (0.84 + f_{lipid}K_{ow})/RHO_{earthworm}$$

Table 7 Parameters needed for estimating the BCF in earthworms.

Parameter	Definition	Units	Value
f_{lipid}	Mass fraction of earthworms that are lipids	[kg w.w. lipid / kg w.w. earthworms]	0.12 (typical)
K_{ow}	Octanol-water partition coefficient	[L water/ L octanol]	
$RHO_{earthworm}$	Bulk density of an earthworm	[kg w.w. earthworms /L wet earthworms]	1 (typical)

Therefore a simplified version to derive $QS_{soil,sp}$ based only on the partitioning parameters K_{ow} and K_D as well as $QS_{biota,sp}$ using typical values for the soil and worm parameters would be as follows.

Equation 14:

$$QS_{soil,sp} = \frac{QS_{biota,sp}(1.08)}{\frac{(0.84 + 0.12K_{ow})}{K_D} + 0.08}$$

If one were to account for biomagnification to top predators, it would possible to include a biomagnification factor (BMF_{terr}) with the units ($kg_{top\ predator}/kg_{bottom\ predator}$) and the equation would be as below.

Equation 15 a and b:

$$QS_{soil,sp} = \frac{QS_{biota,sp}(1 + F_{gut}CONV_{soil})}{BMF_{terr}(\frac{BCF_{earthworms}}{K_D} + F_{gut}CONV_{soil})}$$

(a)

$$QS_{soil,sp} = \frac{QS_{biota,sp}(1.08)}{BMF_{terr}(\frac{0.84 + 0.12K_{ow}}{K_D} + 0.08)}$$

(b)

A practical issue with using BMF in terrestrial ecosystem models is that relationships between BMF and chemical properties, like K_{ow} , are not as well established between for soil dwelling organism-land animal transfer, as the are for as in fish-to-fish or fish-to-land animal transfer (Gobas et al. 2016). Therefore we recommend use of equation 14 above to estimate $QS_{soil,sp}$.

2.6 Additional compound specific considerations

Information on the analytical limits of quantification (LOQ), typical Norwegian background concentrations, and expert knowledge of the contaminant in the local (Norwegian) context is needed to determine the final normative value, as presented in M-2169/2021.

2.6.1 LOQ considerations

In situations where the lowest $Q_{S_{soil}}$ value is below what most commercial labs can quantify (i.e. $Q_{S_{soil}} < LOQ$), it becomes difficult to practically implement the $Q_{S_{soil}}$ value in a risk assessment. In these cases it is here recommended that the current LOQ is considered for the normative value, though it should be considered that the actual normative value is much lower.

Equation 16:

$$\text{normative value} = LOQ \text{ (if } LOQ > \text{ lowest } Q_{S_{soil}})$$

For these substances, one should keep in mind that some specialist labs may have lower LOQ for these substances, and that in future, the normative value may decrease as analytical power increases.

To obtain LOQ values in this report we contacted two of the most commonly used analytical companies in Norway, Eurofins Environment Testing Norway AS and ALS Laboratory Group Norway AS, in November 2016 to give us their LOQ for the substances considered in this report. The lowest value of these two companies are presented in Chapter 4.

Normative values for groups of substances require a special consideration in deriving a LOQ, or interpreting a Normative Value, particularly when some individual chemicals within the group are reported both below and above the LOQ. In this case analytical labs typically report the LOQ value with a "<" prefix (e.g. if the concentration of substance A is 1 mg/kg and the concentration of substance B is less than the LOQ of 10 mg/kg, then the concentration of substance A and B combined is <11 mg/kg). Here the LOQ for a group of substances is reported as the sum of the LOQ for the individual compounds. This implies in cases where measured soil concentrations of individual species are reported below the LOQ and some above, the sum of LOQ and concentrations measured above the LOQ, respectively, should be added, when comparing the concentration to the suggested normative value reported here.

2.6.2 Natural background concentrations

Some of the chemical pollutants considered in this report, particularly the heavy metals and PAHs, occur naturally in soils. Usually the local ecosystem has evolved to tolerate the presence of these naturally occurring concentrations of heavy metals and PAHs, but

may be sensitive to additional inputs. This is especially the case when a metal is present, under natural conditions, in a non-bioavailable form (such as a non-bioavailable redox state), and the metal that is introduced through a contamination event is in a bioavailable form. Therefore in this case, the typical background concentration can be added to the suggested normative value

Equation 17:

$$\text{normative value} = \text{lowest } Q_{S_{\text{soil}}} + \text{natural background concentration}$$

The background soil concentrations in this report for metals came mainly from TA-2683/2011 and for PAHs from Nam et al. (2008), unless otherwise indicated. Background concentrations for saltwater, freshwater and sediments are also presented in Chapter 4.

3 Approach for Reviewing of Available Literature

Within Europe there has been several new advances in how environmental risk is regulated, in addition to several new data sets to consider, since the last time the soil normative values were evaluated in 2007.

Some of the key developments are:

- The revised European Water Framework Directive introduced several new evaluations of background data and AA-EQS values (Directive 2013/39 EU) updated in August 2013.
- New Norwegian EQS values for freshwater, saltwater and sediment (M-608/2016).
- The Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) legislation of EU, which requires producers and importers of chemicals, under certain conditions, to provide toxicity, ecotoxicity and physical chemical data to register their chemicals in Europe. The data base of REACH registered chemicals has compiled thousands of physical-chemical properties and toxicity studies (<https://echa.europa.eu/information-on-chemicals/registered-substances>).
- Several new ecotoxicity studies and risk assessment reports at the national, European and international level have been published.

A feature of these developments is that there is a European-wide centralized assembly of key physical-chemical property data, and evaluation of toxicity studies. This makes it possible to coordinate the use of background data used to derive normative values across different European countries. This is in contrast to earlier times, in the absence of such centralized data base, when individual studies put together their own compilations of data. To make good use of this, as part of this evaluation of the normative values, it

was key that the PNEC and background parameters used here were as synchronized as possible to the recently published water and sediment quality guideline values in Norway (M-241, M-608), as well as the water framework directive (2013/39 EU). Therefore the sources for new information were obtained using the priority presented in Table 8.

Table 8 Overview of parameters and threshold values presented.

Priority	Types of Sources
1.	Background reports to the EU water framework directive (Directive 2013/39 EU) and new Norwegian EQS values (M-608/2016) for water and sediments
2.	Newest EU risk assessment reports (EQS dossier, EU RAR, SVHC dossiers, etc., national reports), recent Norwegian reports (after 2007), or the peer-reviewed literature
3.	Data obtained from the REACH registration dossiers https://echa.europa.eu/information-on-chemicals/registered-substances
4.	Previous data from Aquateam 2007 and 2011.

Data from all four types of sources were compiled in the preparation of this report, but only data corresponding to the highest priority in the table above is presented.

Regarding the REACH data, only ecotoxicology data obtained from the "ecotoxicology summary" section within the "ecotoxicological information" data base, and human toxicology data from the "toxicological summary" section of the "toxicological summary" was considered, with the exception of f_{du} which was acquired from the dermal absorption datasheet (within the toxicokinetics, metabolism and distribution data sheet within the toxicological information). Other data was obtained from the "Physical & chemical property" and "Environmental fate & pathways" data bases.

REACH data is also registered with a reliability score, with a score of 1 meaning "reliable without restriction", 2 "reliable with restrictions", 3 "not reliable" and 4 "not assignable". As there is no real rules to guide what reliability score to assign, and it is often up to the opinion of the REACH registrant, it is difficult to ascertain the relationship of this reliability score with data quality. Nevertheless, the reliability scores were provided for data obtained from the REACH registration dossiers.

4 Revised Data and Normative Values

For each of the compounds that are reviewed in this assessment results are presented in a table where previous used data are compared with the "new review" results.

4.1 Arsenic

Substance	Arsenic		
CAS #		7440-38-2	
M.W. (g/mol)		75	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	
K _{oc} (l/kg TS)	-	-	
K _b (l/kg TS)	100	6607	UK Environment Agency (As)
Henry (-)	-	-	
BCF fish (l/kg w.w.)	50	4	UK Environment Agency (As): 4 (fish), 12 (snegl), 140 - 3688 (algæ og planter)
BCF stem	0.03	0.03	
BCF root	0.015	0.015	
MTDI (mg/kg/d)	0.001	0.0003	FHI, 2021
RfC (mg/m ³)	-	0.0025	REACH (AS(III) chronic = 0.0025)
Skin contact: f _{du}	0.03	0.03	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.15	TA-2361 (slightly above average of 0.134 µg/L)
Coastal water (µg/L)	-	0.15	TA-2361 (slightly above average of 0.134 µg/L)
Sediment (mg/kg)	-	15	OSPAR (2006)
Soil (mg/kg)	0.07-58	4.9	TA-2863 median natural background Oslo & Trondheim

Arsenic	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	1.31	(Arsenic (III): 1.31 mg/kg REACH-AF AF:30)
AA-EQS fw (µg/L)	4	0.5	M-241 / M-608
AA-EQS sw (µg/L)	-	0.6	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	52	18	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	0.0024	
AF (-)	-	2	SSD method
Experimental Q _S _{soil} (f _{OC} = 1%)	0.2	0.0012	RIVM (2015) - Arsenic (not OM normalized)
EQP Q _S _{soil} (f _{OC} = 1%)	-	3.30	Literature data; 0.095 from REACH-EQP (Arsen (III): 0.7 mg/kg REACH-AF AF:10)
Q _S _{soil} (EQP)	-	3.3	
Q _S _{soil} (ecotox.)	0.2	0.0012	
Q _S _{soil} (sec. poisoning)	-	-	not determinable for inorganic compounds
Quantification limits			
Soil (mg/kg dw)	0.03	0.5	

4.2 Lead

Substance	Lead		
CAS #		7439-92-1	
M.W. (g/mol)		207	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	
K _{oc} (l/kg TS)	-	-	
K _b (l/kg TS)	1000	35481	NGI notat 20200490-01-TN
Henry (-)	-	-	
BCF fish (l/kg w.w.)	300	424	median in EU dossier (Pb)
BCF stem	0.03	0.03	
BCF root	0.001	0.001	
MTDI (mg/kg/d)	0.00105	0.0005	FHI, 2021
RfC (mg/m ³)	0.00015	0.00015	
Skin contact: f _{du}	0.006	0.0009	REACH Reliability 2, exp, median used (0,0005; 0,0013)
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.02	EU dossier (Pb)
Coastal water (µg/L)	-	0.02	EU dossier (Pb)
Sediment (mg/kg)	-	25	Ospar (2006), similar to EU dossier (Pb)
Soil (mg/kg)	5-157	10.25	TA-2863 median natural background Oslo & Trondheim

Lead	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	3.6	M-241 / M-608
AA-EQS fw (µg/L)	0.4	1.2	M-241 / M-608
AA-EQS sw (µg/L)	-	1.3	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	83	150 (fv:66)	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	333	
AF (-)	-	2	
Experimental QS _{soil} (f _{OC} = 1%)	100 (10)	166	EU VRAR (Pb); REACH = 212 mg/kg (AF=1)
EQP QS _{soil} (f _{OC} = 1%)	-	43	Literature data
QS _{soil} (EQP)	-	43	
QS _{soil} (ecotox.)	100 (10)	212	
QS _{soil} (sec. poisoning)	-	-	not determinable for inorganic compounds
Quantification limits			
Soil (mg/kg dw)	0.03	0.5	

4.3 Cadmium

Substance	Cadmium		
CAS #		7440-43-9	
M.W. (g/mol)		112	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	NGI notat 20200490-01-TN EU dossier (Cd) worst case: BCF from 0.51 to 623 (whole fish) FHI, 2021
K _{oc} (l/kg TS)	-	-	
K _d (l/kg TS)	100	17000	
Henry (-)	-	-	
BCF fish (l/kg w.w.)	200	623	
BCF stem	0.7	0.7	
BCF root	0.15	0.15	
MTDI (mg/kg/d)	0.000125	0.000357	
RfC (mg/m ³)	0.000005	0.000005	
Skin contact: f _{du}	0.14	0.14	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.003	EU dossier (Cd) (dissolved)
Coastal water (µg/L)	-	0.025	EU dossier (Cd) for marine vann
Sediment (mg/kg)	-	0.2	Ospar (2006)
Soil (mg/kg)	<0.01-1.8	0.065	TA-2863 median natural background Oslo & Trondheim

Cadmium Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	0.2	REACH-AF AF:10
AA-EQS fw (µg/L)	0.02	≤ 0.08 (< 40 mg CaCO₃/L); 0.08 (40 - <50 mg CaCO₃/L); 0.09 (50 - <100 mg CaCO₃/L); 0.15 (100 - <200 mg CaCO₃/L); 0.25 (≥200 mg CaCO₃/L)	M-241 / M-608
AA-EQS sw (µg/L)	-	0.2	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	3	fw 1.5. sw 2.5	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	0.9	REACH-ecotox AF:1
AF (-)	-	1	
Experimental QS _{soil} (f _{OC} = 1%)	4 (0.4)	0.9	
EQP QS _{soil} (f _{OC} = 1%)	-	1.36 (< 40 mg CaCO₃/L); 1.36 (40 - <50 mg CaCO₃/L); 1.53 (50 - <100 mg CaCO₃/L); 2.55 (100 - <200 mg CaCO₃/L); 4.25 (≥200 mg CaCO₃/L)	Literature data
QS _{soil} (EQP)	-	10.4 (< 40 mg CaCO₃/L); 10.4 (40 - <50 mg CaCO₃/L); 11.7 (50 - <100 mg CaCO₃/L); 19.5 (100 - <200 mg CaCO₃/L); 32.5 (≥200 mg CaCO₃/L)	
QS _{soil} (ecotox.)	4 (0.4)	0.9	
QS _{soil} (sec. poisoning)	-	-	not determinable for inorganic compounds
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.4 Mercury

Substance	Mercury		
CAS #		7439-97-6	
M.W. (g/mol)		201	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	
K _{oc} (l/kg TS)	-	-	
K _b (l/kg TS)	500	5000	NGI notat 20200490-01-TN
Henry (-)	0.3	0.3	
BCF fish (l/kg w.w.)	200	200	EU dossier (Hg)
BCF stem	0.03	0.03	
BCF root	0.015	0.015	
MTDI (mg/kg/d)	0.0001	0.000571	FHI, 2021
RfC (mg/m ³)	0.001	0.004	REACH
Skin contact: f _{du}	0.05	0.05	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.001	EU dossier (Hg)
Coastal water (µg/L)	-	0.001	EU dossier (Hg)
Sediment (mg/kg)	-	0.05	Ospar (2006)
Soil (mg/kg)	0.005-0.2	0.210	TA-2863 median of maximum natural background values in different areas of Norway (ranging from 0.1 to 0.45)

Mercury	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	20.0	WFD 2013
AA-EQS fw (µg/L)	0.013	0.048	M-241 / M-608
AA-EQS sw (µg/L)	-	0.048	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.6	1	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	1.1	REACH-AF AF:50
AF (-)	-	50	
Experimental QS _{soil} (f _{OC} = 1%)	1 (0.1)	0.022	
EQP QS _{soil} (f _{OC} = 1%)	-	0.24	
QS _{soil} (EQP)	-	0.24	
QS _{soil} (ecotox.)	1 (0.1)	0.022	
QS _{soil} (sec. poisoning)	-	-	not determinable for inorganic compounds
Quantification limits			
Soil (mg/kg dw)	0.01	0.001	

4.5 Copper

Substance	Copper		
CAS #		7440-50-8	
M.W. (g/mol)		64	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	NGI notat 20200490-01-TN very uncertain (varies with soil properties) EU RAR (Cu) FHI, 2021 REACH Reliability 1 exp, median used (0,098; 0,157; 0,193; 0,128; 0,126; 0,147; 0,086; 0,046; 0,097; 0,136; 0,038)
K _{oc} (l/kg TS)	-	-	
K _b (l/kg TS)	500	8934	
Henry (-)	-	-	
BCF fish (l/kg w.w.)	200	200	
BCF stem	0.1	0.1	
BCF root	0.1	0.1	
MTDI (mg/kg/d)	0.5	0.0714	
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.02	0.112	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.3	TA-2361
Coastal water (µg/L)	-	0.3	TA-2361
Sediment (mg/kg)	-	20	
Soil (mg/kg)	1-246	29	TA-2863 median natural background Oslo & Trondheim

Copper	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	7.8	M-241 / M-608
AA-EQS sw (µg/L)	-	2.6	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	51	84 (fv: 210)	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	65	REACH-0 AF:1
AF (-)	-	1	
Experimental QS _{soil} (f _{OC} = 1%)	100 (10)	65	
EQP QS _{soil} (f _{OC} = 1%)	-	70	
QS _{soil} (EQP)	-	70	
QS _{soil} (ecotox.)	100 (10)	65	
QS _{soil} (sec. poisoning)	-	-	not determinable for inorganic compounds
Quantification limits			
Soil (mg/kg dw)	0.02	0.1	

4.6 Zink

Substance	Zink		
CAS #		7440-66-6	
M.W. (g/mol)		65	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	NGI notat 20200490-01-TN no value suggested in EU RAR (Zn) FHI, 2021 REACH = 2.5
K _{oc} (l/kg TS)	-	-	
K _b (l/kg TS)	200	64000	
Henry (-)	-	-	
BCF fish (l/kg w.w.)	1000	1000	
BCF stem	0.4	0.4	
BCF root	0.1	0.1	
MTDI (mg/kg/d)	0.3	0.35	
RfC (mg/m ³)	-	2.5	
Skin contact: f _{du}	0.02	0.02	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	1.5	TA-2803
Coastal water (µg/L)	-	1.5	TA-2803
Sediment (mg/kg)	-	90	OSPAR (2006)
Soil (mg/kg)	1.7-1000	80	TA-2863 median natural background Oslo & Trondheim

Zink	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.04	11	M-241 / M-608
AA-EQS sw (µg/L)	-	3.38	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	360	139	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	35.6	REACH-ecotox AF:1
AF (-)	-	1	
Experimental QS _{soil} (f _{OC} = 1%)	100 (10)	35.6	
EQP QS _{soil} (f _{OC} = 1%)	-	704	
QS _{soil} (EQP)	-	704	not determinable for inorganic compounds
QS _{soil} (ecotox.)	100 (10)	35.6	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.2	

4.7 Chromium (VI)

Substance	Chromium (VI)		
CAS #	1333-82-0 (CrO3); 7775-11-3 (Na2CrO4);		
M.W. (g/mol)	52		
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	FHI, 2021
K _{oc} (l/kg TS)	-	-	
K _D (l/kg TS)	30	30	
Henry (-)	-	-	
BCF fish (l/kg w.w.)	200	200	
BCF stem	0.02	0.02	
BCF root	0.002	0.002	
MTDI (mg/kg/d)	0.003	0.0001	
RfC (mg/m ³)	0.000008	0.000008	
Skin contact: f _{du}	0.09	0.09	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	<0.01-0.09	<0.01-0.09	

Chromium (VI)	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	3.4	3	REACH-AF AF:10
AA-EQS sw (µg/L)	-	3	REACH-AF AF:10
AA-EQS sed (mg/kg) (f _{OC} = 1%)	500 (tot)	500 (tot)	
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	0.31	REACH-AF AF:10
AF (-)	-	10	
Experimental Q _S _{soil} (f _{OC} = 1%)	2	0.031	
EQP Q _S _{soil} (f _{OC} = 1%)	-	0.09	Derived with updated data
Q _S _{soil} (EQP)	-	0.09	
Q _S _{soil} (ecotox.)	2	0.031	
Q _S _{soil} (sec. poisoning)	-	-	not determinable for inorganic compounds
Quantification limits			
Soil (mg/kg dw)	0.02-0.2	0.06	

4.8 Chromium total (III + VI)

Substance	Chromium total (III + VI)		
CAS #	7440-47-3 (Cr metall)		
M.W. (g/mol)	52		
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	NGI notat 20200490-01-TN fish: 1 (Cr III), 100 (Cr IV) variable (pH and species dependent, shellfish 2800 - 9100, alga 500 - 130000) FHI, 2021 FHI, 2021
K _{oc} (l/kg TS)	-	-	
K _b (l/kg TS)	30	800	
Henry (-)	-	-	
BCF fish (l/kg w.w.)	200	200	
BCF stem	0.002	0.02	
BCF root	0.02	0.002	
MTDI (mg/kg/d)	1	0.3	
RfC (mg/m ³)	0.00005	0.5	
Skin contact: f _{du}	0.09	0.04	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.1	TA-2361 (slightly above average of 0.09 µg/L)
Coastal water (µg/L)	-	0.1	TA-2361 (slightly above average of 0.09 µg/L)
Sediment (mg/kg)	-	60	OSPAR (2006)
Soil (mg/kg)	2.6-246	46.5	TA-2863 median natural background Oslo & Trondheim

Chromium total (III + VI)	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	4.7	3.4	M-241 / M-608
AA-EQS sw (µg/L)	-	3.4	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	500	620 (fv: 112)	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	21.1	REACH-AF AF:1
AF (-)	-	1	
Experimental QS _{soil} (f _{OC} = 1%)	32	21.1	
EQP QS _{soil} (f _{OC} = 1%)	-	2.72	Literature data
QS _{soil} (EQP)	-	2.72	
QS _{soil} (ecotox.)	32	21.1	
QS _{soil} (sec. poisoning)	-	-	not determinable for inorganic compounds
Quantification limits			
Soil (mg/kg dw)	0.02	0.25	

4.9 Nickel

Substance	Nickel		
CAS #		7440-02-0	
M.W. (g/mol)		59	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-	
K _{oc} (l/kg TS)	-	-	
K _b (l/kg TS)	200	2138	NGI notat 20200490-01-TN
Henry (-)	-	-	
BCF fish (l/kg w.w.)	100	270	for bivalves EQS Dossier (Ni)
BCF stem	0.1	0.1	
BCF root	0.07	0.07	
MTDI (mg/kg/d)	0.005	0.013	FHI, 2021
RfC (mg/m ³)	0.000025	0.000025	
Skin contact: f _{du}	0.35	0.35	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.5	EU dossier (Ni)
Coastal water (µg/L)	-	0.5	EU dossier (Ni)
Sediment (mg/kg)	-	30	Ospar (2006) = 30, EU dossier (2011) median = 33
Soil (mg/kg)	2-1100	42.5	TA-2863 median natural background Oslo & Trondheim

Nickel	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	1.2 (sjø)	4.0	M-241 / M-608
AA-EQS sw (µg/L)	-	8.6	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	43	42	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	63 (6.3)	20.4	EU RAR (Ni) worst case (lowest value)
EQP QS _{soil} (f _{OC} = 1%)	-	8.55	Literature data
QS _{soil} (EQP)	-	8.55	
QS _{soil} (ecotox.)	63 (6.3)	20.4	
QS _{soil} (sec. poisoning)	-	-	not determinable for inorganic compounds
Quantification limits			
Soil (mg/kg dw)	0.02	0.5	

4.10 Cyanide free

Substance	Free Cyanide		
CAS #		57-12-5	
M.W. (g/mol)		26.02	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	-	-0.25	REACH Reliability 2 (20 °C)
K _{oc} (l/kg TS)	-	2.8	REACH Reliability 2 (estimated)
K _b (l/kg TS)	1	0.028	0.01 K _{oc}
Henry (-)	0.0013	0.005	REACH Reliability 2
BCF fish (l/kg w.w.)	10	0.12	calculated EU-TGD (2011)
BCF stem	0.883	0.12	based on new P _{ow}
BCF root	0.798	0.84	based on new P _{ow}
MTDI (mg/kg/d)	0.012	0.0225	FHI, 2021
RfC (mg/m ³)	0.025	0.025	
Skin contact: f _{du}	0.3	0.3	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	m.d	m.d	

Cyanide	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.1	1.0	REACH-AF AF:2
AA-EQS sw (µg/L)	-	0.2	REACH-AF AF:10
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.00016	REACH-EQP
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	0.35	REACH-AF AF:100
AF (-)	-	100	
Experimental QS _{soil} (f _{OC} = 1%)	-	0.0035	
EQP QS _{soil} (f _{OC} = 1%)	0.0001	0.000028	Derived with updated data
QS _{soil} (EQP)	0.0001	0.000028	
QS _{soil} (ecotox.)	-	0.0035	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.1	0.1	

4.11 PCB 7

Substance	PCB 7		
CAS #		1336-36-3	
M.W. (g/mol)		375.7 (average)	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	6	5.72	ATSDR (1997, from 4.7 to 6.8: 0.01 Koc average saltwater fish estimated value = 3 estimated value = 763 FHI, 2021
K _{oc} (l/kg TS)	500000	321119	
K _b (l/kg TS)	-	3211	
Henry (-)	0.00034	0.00034	
BCF fish (l/kg w.w.)	47000	24950	
BCF stem	200	200	
BCF root	200	200	
MTDI (mg/kg/d)	0.000003	0.00001	
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.067	0.067	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		OSPAR (2006)
Coastal water (µg/L)	-		
Sediment (mg/kg)	-	0.0003	
Soil (mg/kg)	0.00002- 0.00014	0.00002- 0.00014	

PCB 7	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	0.0006	M-241
AA-EQS fw (µg/L)	0.002	-	M-241 / M-608
AA-EQS sw (µg/L)	-	-	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.0041	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	-	
EQP Q _S _{soil} (f _{OC} = 1%)	0.01	0.01	
Q _S _{soil} (EQP)	0.01	0.01	
Q _S _{soil} (ecotox.)	-	-	
Q _S _{soil} (sec. poisoning)	-	0.00003	
Quantification limits			
Soil (mg/kg dw)	0.002	0.0005	individual PCBs

4.12 Lindane

Substance	Lindane		
CAS #		608-73-1	
M.W. (g/mol)		291	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	3.61	3.5	EU dossier (HCH)
K _{oc} (l/kg TS)	1080	3715	variable (650 - 7000)
K _b (l/kg TS)	33	37	0.01 Koc
Henry (-)	0.00000292	0.00000292	
BCF fish (l/kg w.w.)	730	1300	whole fish
BCF stem	0.15	0.15	estimated value = 5
BCF root	0.86	0.86	estimated value = 16
MTDI (mg/kg/d)	0.00033	0.001	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	-	-	
Diffusivity in air (m ² /h)		0,00511	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	0.002-0.03	0.002-0.03	

Lindane	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.02	0.02	M-241 / M-608
AA-EQS sw (µg/L)	-	0.002	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.00011	0.000074 (fv: 0.00074)	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	
EQP QS _{soil} (f _{OC} = 1%)	0.001	0.00074	Literature data
QS _{soil} (EQP)	0.001	0.00074	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits	-		
Soil (mg/kg dw)	0.001	0.001	

4.13 DDT

Substance	DDT		
CAS #		50-29-3 for p,p-DDT	
M.W. (g/mol)		354	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	6.2	6.91	p,p-DDT (EPI Suite)
K _{oc} (l/kg TS)	408600	6215857	eq
K _b (l/kg TS)	4086	62159	0.01 K _{oc}
Henry (-)	0.0023	0.0023	
BCF fish (l/kg w.w.)	30000	30000	USDHHS (2002),
BCF stem	0.05	0.05	estimated value = 1
BCF root	0.002	0.002	estimated value = 6321
MTDI (mg/kg/d)	0.0005	0.01	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	-	-	
Diffusivity in air (m ² /h)		0,00493	
Background			
Freshwater (µg/L)	-	0	0
Coastal water (µg/L)	-	0	0
Sediment (mg/kg)	-	0	0
Soil (mg/kg)	0.0003-0.02	0.0003-0.02	

DDT	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.01	0.025 (0.01)	M-241 / M-608
AA-EQS sw (µg/L)	-	0.025 (0.01)	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.002	0.016 (0.006)	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	1.72-	RIVM, 2015
EQP QS _{soil} (f _{OC} = 1%)	0.04	1.55	total DDT
QS _{soil} (EQP)	0.04	1.72	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	0.34	RIVM, 2015
Quantification limits			
Soil (mg/kg dw)	0.001	0.01	

4.14 Monochlorobenzene

Substance	Monochlorobenzene		
CAS #		108-90-7	
M.W. (g/mol)		113	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	2.9	2.89	REACH Reliability 2
K _{oc} (l/kg TS)	219	398	REACH Reliability 4 (median 2.68;2.52)
K _b (l/kg TS)	2.2	4	0.01 K _{oc}
Henry (-)	0.13	0.15	REACH (reliability not given)
BCF fish (l/kg w.w.)	40	57	calculated EU-TGD (2011)
BCF stem	2.48	2.47	
BCF root	5.07	5.89	
MTDI (mg/kg/d)	0.02	0.0857	FHI, 2021
RfC (mg/m ³)	-	1	REACH
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0263	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Monochlorobenzene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	10	REACH-AF AF:90
AA-EQS fw (µg/L)	30	32	REACH-AF AF:10
AA-EQS sw (µg/L)	-	3	REACH-AF AF:100
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.018	REACH-EQP
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	0.03	not found	not found
EQP QS _{soil} (f _{OC} = 1%)	-	0.13	REACH-EQP
QS _{soil} (EQP)	-	0.13	
QS _{soil} (ecotox.)	0.03	not found	
QS _{soil} (sec. poisoning)	-	0.4	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.15 1,2-dichlorobenzene

Substance	1,2-dichlorobenzene		
CAS #		95-50-1	
M.W. (g/mol)		147	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	3.5	3.43	REACH Reliability 2
K _{oc} (l/kg TS)	398	398	
K _b (l/kg TS)	4	4	0.01 Koc
Henry (-)	0.058	0.079	REACH (reliability not given)
BCF fish (l/kg w.w.)	230	164	calculated EU-TGD (2011)
BCF stem	4.41	4.37	
BCF root	14.4	14.0	
MTDI (mg/kg/d)	0.43	0.43	FHI, 2021
RfC (mg/m ³)	-	1	REACH chronic = 1; (acute = 5)
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0248	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

1,2-dichlorobenzene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	5.6	REACH-AF AF:90
AA-EQS fw (µg/L)	40	4	REACH-AF AF:100
AA-EQS sw (µg/L)	-	<0.01	REACH-AF AF:1000
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.004	REACH-EQP
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	5	
AF (-)	-	100	
Experimental QS _{soil} (f _{OC} = 1%)	-	0.05	Song et al. (2012), based on Rattus norvegicus, assumed TOC = 2%
EQP QS _{soil} (f _{OC} = 1%)	0.1	0.02	REACH-EQP
QS _{soil} (EQP)	0.1	0.02	
QS _{soil} (ecotox.)	-	0.05	
QS _{soil} (sec. poisoning)	-	0.07	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.16 1,4-dichlorobenzene

Substance	1,4-dichlorobenzene		
CAS #		106-46-7	
M.W. (g/mol)		147	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	3.5	3.37	REACH Reliability 2
K _{oc} (l/kg TS)	661	372	REACH Reliability 2 (median 2.56 - 2.58)
K _d (l/kg TS)	6.6	3.7	0.01 K _{oc}
Henry (-)	0.093	0.10	REACH Reliability 2
BCF fish (l/kg w.w.)	1800	146	calculated EU-TGD (2011)
BCF stem	4.31	4.17	
BCF root	13.6	12.7	
MTDI (mg/kg/d)	0.11	0.1	FHI, 2021
RfC (mg/m ³)	0.13	8.2	REACH chronic = 8.2 (acute = 300)
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0248	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

1,4-dichlorobenzene	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	10.0	REACH-AF AF:1
AA-EQS fw (µg/L)	10	20	REACH-AF AF:10
AA-EQS sw (µg/L)	-	2	REACH-AF AF:100
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.02	REACH-EQP
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	54	REACH-AF AF:1000
AF (-)	-	1000	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	0.05	
EQP Q _S _{soil} (f _{OC} = 1%)	0.07	0.07	Derived with updated data
Q _S _{soil} (EQP)	0.07	0.07	
Q _S _{soil} (ecotox.)	-	0.05	
Q _S _{soil} (sec. poisoning)	-	0.13	
Quantification limits			
Soil (mg/kg dw)	0.02	0.01	

4.17 Trichlorobenzenes

Substance	Trichlorobenzenes		
CAS #		12002-48-1	
M.W. (g/mol)		181	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	4.1	4.05	EU dossier (TCB)
K _{oc} (l/kg TS)	2089	1400	EU dossier (TCB)
K _b (l/kg TS)	21	14	0.01 Koc
Henry (-)	0.0039	0.0039	
BCF fish (l/kg w.w.)	1200	1140	(Naturvårdsverket, 2005); EU dossier (TCB) used 2000
BCF stem	5.92	6.04	
BCF root	36.4	40.5	
MTDI (mg/kg/d)	0.0077	0.0077	FHI, 2021
RfC (mg/m ³)	0.008	0.008	
Skin contact: f _{du}	0.08	0.08	
Diffusivity in air (m ² /h)		0,0108	
Background			
Freshwater (µg/L)	-	0	
Coastal water (µg/L)	-	0	
Sediment (mg/kg)	-	0	
Soil (mg/kg)	0.017 (1,2,4-trichloro)	0.017 (1,2,4-trichloro)	

Trichlorobenzenes Threshold values	Previous values	New Review	References for new values and notes
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.5 - 20 (ind. cong.)	0.4	M-241 / M-608
AA-EQS sw (µg/L)	-	0.4	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0,041 (1,2,4-trichloro)	0.01	EQP with WFD 2013 value fersk og coastal water
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	0.5	
AF (-)	-	100	
Experimental Q _S _{soil} (f _{OC} = 1%)	0.01 - 0.05 (ind. cong.)	0.005	Song et al. (2012), based on Lactuca sativa Lettuce, considering most sensitive congeners assumed TOC = 2%; 1,2,4-trichlorobenzene EU-RAR has an adjusted PNEC of 0.025 mg/kg with AF 1000 (bacteria value)
EQP Q _S _{soil} (f _{OC} = 1%)	-	0.0056	Literature data
Q _S _{soil} (EQP)	-	0.006	
Q _S _{soil} (ecotox.)	0.01 - 0.05 (ind. cong.)	0.005	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits	-		
Soil (mg/kg dw)	0.001 - 0.01 (ind. cong.)	0.01	

4.18 1,2,4,5 tetrachlorobenzene

Substance	1,2,4,5 tetrachlorobenzene		
CAS #		12002-48-1	
M.W. (g/mol)		181	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	4.1	4.6	EU dossier (TCB)
K _{oc} (l/kg TS)	2089	5888	EU dossier (TCB)
K _b (l/kg TS)	21	59	0.01 K _{oc}
Henry (-)	0.0039	0.54	
BCF fish (l/kg w.w.)	1200	4830	(Naturvårdsverket, 2005); EU dossier (TCB) used 2000
BCF stem	5.92	6.22	
BCF root	36.4	126.4	
MTDI (mg/kg/d)	0.0077	0.0017	FHI, 2021
RfC (mg/m ³)	0.008		
Skin contact: f _{du}	0.08	0.1	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0	
Coastal water (µg/L)	-	0	
Sediment (mg/kg)	-	0	
Soil (mg/kg)	0.017 (1,2,4-trichloro)	0.017 (1,2,4-trichloro)	

1,2,4,5 tetrachlorobenzene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-		
AA-EQS fw (µg/L)	0.5 - 20 (ind. cong.)		
AA-EQS sw (µg/L)	-		
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0,041 (1,2,4-trichloro)		
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-		
AF (-)	-		
Experimental QS _{soil} (f _{OC} = 1%)	0.01 - 0.05 (ind. cong.)		
EQP QS _{soil} (f _{OC} = 1%)	-		
QS_{soil} (EQP)			
QS _{soil} (ecotox.)	0.01 - 0.05 (ind. cong.)		
QS _{soil} (sec. poisoning)	-		
Quantification limits			
Soil (mg/kg dw)	0.001 - 0.01 (ind. cong.)	0.01	

4.19 Pentachlorobenzene

Substance	Pentachlorobenzene		
CAS #		608-93-5	
M.W. (g/mol)		250	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	5.2	5.2	5.03 - 5.2 EU dossier (pentachlorobenzene) variable (25120 - 129000), EU dossier (pentachlorobenzene) 0.01 Koc variable (3000 - 20000), "intermediate" value used in EU dossier (pentachlorobenzene) FHI, 2021
K _{oc} (l/kg TS)	8318	40000	
K _d (l/kg TS)	83	400	
Henry (-)	0.15	0.15	
BCF fish (l/kg w.w.)	260000	5300	
BCF stem	5.15	5.06	
BCF root	289.8	306	
MTDI (mg/kg/d)	0.0008	0.0138	
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0	
Coastal water (µg/L)	-	0	
Sediment (mg/kg)	-	0	
Soil (mg/kg)	-	-	

Pentachlorobenzene Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	-	M-241 / M-608 M-241 / M-608 EQP with lowest PNEC biota (1 µg/L fra dossier)
AA-EQS fw (µg/L)	1	0.007	
AA-EQS sw (µg/L)	-	0.0007	
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.04	0.40	
Soil ecotox (mg/kg)	-	-	UK Environment Agency (2008)
NOEC/EC10 (f _{OC} = 1%)	-	0.435	
AF (-)	-	30	
Experimental QS _{soil} (f _{OC} = 1%)	0.1	0.0145	
EQP QS _{soil} (f _{OC} = 1%)	-	0.0028	
QS _{soil} (EQP)	-	0.003	
QS _{soil} (ecotox.)	0.1	0.015	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits	-	-	
Soil (mg/kg dw)	0.002	0.01	

4.20 Hexachlorobenzene

Substance	Hexachlorobenzene		
CAS #		118-74-1	
M.W. (g/mol)		285	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	5.7	5.7	EPIsuite
K _{oc} (l/kg TS)	11482	130000	EU dossier (HCB)
K _b (l/kg TS)	115	1300	0.01 Koc
Henry (-)	0.0064	0.0064	
BCF fish (l/kg w.w.)	30000	42000	EU dossier (HCB) as BAF
BCF stem	4.05	3.36	
BCF root	522.1	740	
MTDI (mg/kg/d)	0.00003	0.00016	FHI, 2021
RfC (mg/m ³)	0.003	0.003	
Skin contact: f _{du}	0.13	0.13	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0	
Coastal water (µg/L)	-	0	
Sediment (mg/kg)	-	0	
Soil (mg/kg)	0.0004-0.006	0.0004-0.006	

Hexachlorobenzene Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	16.7	M-241 / M-608
AA-EQS fw (µg/L)	0.03	0.013	M-241 / M-608
AA-EQS sw (µg/L)	-	0.013	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.0017	0.02	EQP med akvatisk biota basert AA-EQS
Soil ecotox (mg/kg)	-	-	
NOEC/EC10 (f _{OC} = 1%)	-	5	
AF (-)	-	100	
Experimental QS _{soil} (f _{OC} = 1%)	0.1	0.05	Song et al. (2012), based on Lactuca sativa Lettuce, assumed TOC = 2%
EQP QS _{soil} (f _{OC} = 1%)	-	0.017	Literature data
QS _{soil} (EQP)	-	0.02	
QS _{soil} (ecotox.)	0.1	0.05	
QS _{soil} (sec. poisoning)	-	0.36	
Quantification limits	-	-	
Soil (mg/kg dw)	0.002	0.005	

4.21 Dichloromethane

Substance	Dichloromethane		
CAS #		75-09-2	
M.W. (g/mol)		85	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	1.25	1.3	EU dossier (dichloromethane)
K _{oc} (l/kg TS)	16.6	8.8	EU dossier (dichloromethane)
K _b (l/kg TS)	0.17	0.088	0.01 K _{oc}
Henry (-)	0.0861	0.11	EU dossier (dichloromethane)
BCF fish (l/kg w.w.)	5	2.5	calculated EU-TGD (2011)
BCF stem	1.06	0.69	
BCF root	1.65	1.12	
MTDI (mg/kg/d)	0.006	0.002	FHI, 2021
RfC (mg/m ³)	0.45	88.3	REACH chronic =88.3 (acute = 353)
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Dichloromethane Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	600	20	EU dossier (dichloromethane)
AA-EQS sw (µg/L)	-	20	EU dossier (dichloromethane)
AA-EQS sed (mg/kg) (f _{oc} = 1%)	-	0.05	REACH-EQP
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{oc} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{oc} = 1%)	-	0.05 (IUCLID, 1996) as cited in ECOTOC (2004); method not specified	0.05 (IUCLID, 1996) as cited in ECETOC (2004); method not specified
EQP QS _{soil} (f _{oc} = 1%)	0.1	0.0018	REACH-EQP
QS _{soil} (EQP)	0.1	0.0018	
QS _{soil} (ecotox.)	-	0.05 (IUCLID, 1996) as cited in ECOTOC (2004); method not specified	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.05	0.0025	

4.22 Trichloromethane

Substance	Trichloromethane		
CAS #		67-66-3	
M.W. (g/mol)		119	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	1.97	1.97	EU dossier (trichloromethane)
K _{oc} (l/kg TS)	46	185	EU dossier (trichloromethane)
K _b (l/kg TS)	0.46	1.9	0.01 Koc
Henry (-)	0.11	0.11	EU dossier (trichloromethane)
BCF fish (l/kg w.w.)	13	13	EU dossier (trichloromethane)
BCF stem	1.13	1.15	
BCF root	1.78	1.81	
MTDI (mg/kg/d)	0.013	0.015	FHI, 2021
RfC (mg/m ³)	0.045	0.18	REACH = 0.18
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Trichloromethane	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	56	2.5	EU dossier (trichloromethane)
AA-EQS sw (µg/L)	-	2.5	EU dossier (trichloromethane)
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.0041	EU dossier (trichloromethane), corrected for OC and water content; 0.018 from REACH-AF AF:50
Soil ecotox (mg/kg)	-	-	
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	0.092 (EQP method in the EU RAR (chloroform))
EQP QS _{soil} (f _{OC} = 1%)	0.028	0.0048	REACH-EQP
QS _{soil} (EQP)	0.028	0.0048	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits	-	-	
Soil (mg/kg dw)	0.005	0.0025	

4.23 Trichloroethene

Substance	Trichloroethene		
CAS #		79-01-6	
M.W. (g/mol)		131	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	2.6	2.53	REACH Reliability 2 (20 °C)
K _{oc} (l/kg TS)	115	141	REACH Reliability 2
K _b (l/kg TS)	1.15	1.4	0.01 Koc
Henry (-)	0.28	0.42	REACH Reliability 2 (estimated)
BCF fish (l/kg w.w.)	17	28	calculated EU-TGD (2011)
BCF stem	1.74	1.92	
BCF root	3.08	3.50	
MTDI (mg/kg/d)	0.0015	0.0005	FHI, 2021
RfC (mg/m ³)	0.023	0.023	
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0284	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Trichloroethene Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	13.8	REACH-AF AF:30
AA-EQS fw (µg/L)	115	115	REACH-AF AF:50
AA-EQS sw (µg/L)	-	11	REACH-AF AF:500
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.04	REACH-EQP
Soil ecotox (mg/kg)	-	-	
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	0,101 (EQP method in the EU RAR (trichloroethylene))
EQP QS _{soil} (f _{OC} = 1%)	0.13	0.16	REACH-EQP
QS _{soil} (EQP)	0.13	0.16	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	0.5	
Quantification limits	-	-	
Soil (mg/kg dw)	0.01	0.0025	

4.24 Tetrachloromethane

Substance	Tetrachloromethane		
CAS #		56-23-5	
M.W. (g/mol)		154	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	2.7	2.83	REACH Reliability 2 (25 °C) REACH Reliability 2 (median 1.69-2.16) 0.01 Koc REACH Reliability 2 calculated EU-TGD (2011) FHI, 2021 REACH = 0.107 REACH Reliability 4
K _{oc} (l/kg TS)	174	84.1	
K _d (l/kg TS)	1.7	0.8	
Henry (-)	1.25	1.21	
BCF fish (l/kg w.w.)	17	51	
BCF stem	-	2.6	
BCF root	-	5.4	
MTDI (mg/kg/d)	0.007	0.0014	
RfC (mg/m ³)	0.0061	0.107	
Skin contact: f _{du}	0.1	0.00046	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Tetrachloromethane Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	0.2	REACH-AF AF:90
AA-EQS fw (µg/L)	29	220	REACH-AF AF:10
AA-EQS sw (µg/L)	-	22	REACH-AF AF:100
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-		not found
EQP QS _{soil} (f _{OC} = 1%)	0.05	0.18	Derived with updated data
QS _{soil} (EQP)	0.05	0.18	
QS _{soil} (ecotox.)	-		
QS _{soil} (sec. poisoning)	-	0.0023	
Quantification limits	-		
Soil (mg/kg dw)	0.01	0.0025	

4.25 Tetrachloroethene

Substance	Tetrachloroethene		
CAS #		127-18-4	
M.W. (g/mol)		166	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	3.4	2.53	REACH Reliability 2 (23 °C)
K _{oc} (l/kg TS)	263	141	REACH Reliability 3
K _d (l/kg TS)	2.6	1.4	0.01 K _{oc}
Henry (-)	0.93	0.87	REACH Reliability 2 (estimated)
BCF fish (l/kg w.w.)	77.1	28	calculated EU-TGD (2011)
BCF stem	1.96	1.92	
BCF root	3.61	3.50	
MTDI (mg/kg/d)	0.014	0.014	FHI, 2021
RfC (mg/m ³)	0.25	34.5	REACH chronic= 34.5 (acute = 138)
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0259	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Tetrachloroethene Threshold values	Previous values	New Review	References for new values and notes
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	50	51	REACH-AF AF:10
AA-EQS sw (µg/L)	-	5	REACH-AF AF:100
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.018	REACH-AF
Soil ecotox (mg/kg)	-	-	
NOEC/EC10 (f _{OC} = 1%)	-	0.05	REACH-AF AF:10
AF (-)	-	10	
Experimental Q _S _{soil} (f _{OC} = 1%)	0.01	0.005	
EQP Q _S _{soil} (f _{OC} = 1%)	-	0.071	Derived with updated data
Q _S _{soil} (EQP)	-	0.07	
Q _S _{soil} (ecotox.)	0.01	0.005	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits	-	-	
Soil (mg/kg dw)	0.01	0.0025	

4.26 1,2-dichloroethane

Substance	1,2-dichloroethane		
CAS #		107-06-2	
M.W. (g/mol)		99	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	1.48	1.45	EU dossier (1,2-DCE)
K _{oc} (l/kg TS)	30.9	116	EU dossier (1,2-DCE)
K _d (l/kg TS)	0.3	1.2	0.01 K _{oc}
Henry (-)	0.03	0.045	EU dossier (1,2-DCE)
BCF fish (l/kg w.w.)	3	2	EU dossier (1,2-DCE)
BCF stem	0.79	0.77	EU dossier (1,2-DCE)
BCF root	1.23	1.21	EU dossier (1,2-DCE)
MTDI (mg/kg/d)	-	0.014	FHI, 2021
RfC (mg/m ³)	-	0.0029	REACH = 0.0029
Skin contact: f _{du}	0.1	1	REACH Reliability 2 exp, Values >100%, used 100%
Diffusivity in air (m ² /h)		0,0374	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

1,2-dichloroethane Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	8.3	REACH-AF AF:90
AA-EQS fw (µg/L)	220	10	EU dossier (1,2-DCE)
AA-EQS sw (µg/L)	-	10	EU dossier (1,2-DCE)
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.22	REACH-EQP
Soil ecotox (mg/kg)	-	-	
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	not found	not found
EQP QS _{soil} (f _{OC} = 1%)	0.07	0.012	REACH-EQP
QS _{soil} (EQP)	0.07	0.012	
QS _{soil} (ecotox.)	-	not found	
QS _{soil} (sec. poisoning)	-	2.23	
Quantification limits	-	-	
Soil (mg/kg dw)	0.003	0.0025	

4.27 1,2-dibromoethane

Substance	1,2-dibromoethane		
CAS #		106-93-4	
M.W. (g/mol)		188	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	1.96	1.96	REACH Reliability 2
K _{oc} (l/kg TS)	43.8	40.7	REACH Reliability 2 (median 1.11;1.61;1.65)
K _d (l/kg TS)	0.44	0,41	0.01 Koc
Henry (-)	0.03	0.03	REACH Reliability 2 (estimated median)
BCF fish (l/kg w.w.)	9.1	9.2	calculated EU-TGD (2011)
BCF stem	1.13	1.14	
BCF root	1.79	1.8	
MTDI (mg/kg/d)	-	0,009	FHI, 2021
RfC (mg/m ³)	-	1.15	REACH chronic = 1.15 (acute = 2)
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

1,2-dibromoethane	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	0.1	REACH-AF AF:90
AA-EQS fw (µg/L)	70	58.1	REACH-AF AF:100
AA-EQS sw (µg/L)	-	5.8	REACH-AF AF:1000
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0	REACH-EQP
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	3.1	REACH-AF AF:10
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	-	0.31	
EQP QS _{soil} (f _{OC} = 1%)	0.03	0.024	Derived with updated data
QS _{soil} (EQP)	0.03	0.02	
QS _{soil} (ecotox.)	-	0.3	
QS _{soil} (sec. poisoning)	-	0.003	
Quantification limits			
Soil (mg/kg dw)	0.004	0.003	

4.28 1,1,1-trichloroethane

Substance	1,1,1-trichloroethane		
CAS #		71-55-6	
M.W. (g/mol)		133	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	2.49	2.5	REACH Reliability 2
K _{oc} (l/kg TS)	110	110	0.01 Koc
K _d (l/kg TS)	1.1	1.1	REACH (reliability not given)
Henry (-)	0.71	0.0007	calculated EU-TGD (2011)
BCF fish (l/kg w.w.)	9	27	
BCF stem	1.72	1.86	
BCF root	3.03	3.36	
MTDI (mg/kg/d)	0.58	0.6	FHI, 2021
RfC (mg/m ³)	0.8	0.8	
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0281	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

1,1,1-trichloroethane Threshold values	Previous values	New Review	References for new values and notes
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	130	130	REACH-AF AF:10
AA-EQS sw (µg/L)	-	13	REACH-AF AF:100
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)	-	-	
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	-	0,0095 (IUCLID, 1996 as cited in ECOTOC (2004); method not specified)
EQP Q _S _{soil} (f _{OC} = 1%)	0.13	0.14	Derived with updated data
Q _S _{soil} (EQP)	0.13	0.14	
Q _S _{soil} (ecotox.)	-	-	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits	-	-	
Soil (mg/kg dw)	0.01	0.0025	

4.29 1,1,2-trichloroethane

Substance	1,1,2-trichloroethane		
CAS #		79-00-5	
M.W. (g/mol)		133	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	1.89	2.27	REACH Reliability 2 (20 °C, median used 2.05-2.49)
K _{oc} (l/kg TS)	80	80	0.01 Koc
K _d (l/kg TS)	0.8	0.8	REACH Reliability 2 (estimated, median used)
Henry (-)	0.9	0.04	calculated EU-TGD (2011)
BCF fish (l/kg w.w.)	-	17	
BCF stem	-	1.49	
BCF root	-	2.51	
MTDI (mg/kg/d)	0.004	0.6	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	-	-	
Diffusivity in air (m ² /h)		0,0281	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

1,1,2-trichloroethane	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	18	18	
AA-EQS sw (µg/L)	-	-	
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	not found	not found
EQP QS _{soil} (f _{OC} = 1%)	0.001	0.014	Derived with updated data
QS _{soil} (EQP)	0.001	0.014	
QS _{soil} (ecotox.)	-	not found	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.0025	

4.30 Phenol

Substance	Phenol		
CAS #		108-95-2	
M.W. (g/mol)		94	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	1.47	1.47	REACH Reliability 2 (30 °C)
K _{oc} (l/kg TS)	30	30	
K _b (l/kg TS)	0.3	0.3	0.01 Koc
Henry (-)	0.000000218	0.000013	REACH Reliability 2 (estimated)
BCF fish (l/kg w.w.)	17.5	3.5	calculated EU-TGD (2011)
BCF stem	-	0.79	
BCF root	-	1.23	
MTDI (mg/kg/d)	0.04	0.04	FHI, 2021
RfC (mg/m ³)	-	1.32	REACH value = 1.32
Skin contact: f _{du}	0.26	0.8	REACH Reliability 2 exp
Diffusivity in air (m ² /h)		0,0295	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Phenol	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	7.7	8	REACH-AF AF:10
AA-EQS sw (µg/L)	-	1	REACH-AF AF:100
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	-
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	68	REACH-AF AF:1000
AF (-)	-	1000	
Experimental QS _{soil} (f _{OC} = 1%)	0.136	0.068	
EQP QS _{soil} (f _{OC} = 1%)	-	0.0024	Derived with updated data
QS _{soil} (EQP)	-	0.002	
QS _{soil} (ecotox.)	0.136	0.07	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.1	0.01	

4.31 Sum mono-, di-, tri-,tetrachlorophenols

Substance	Sum mono-, di-, tri-, tetrachlorophenols		
CAS #		n.a.	
M.W. (g/mol)		n.a.	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	3.7	3.7	
K _{oc} (l/kg TS)	30	30	
K _p (l/kg TS)	0.3	0.3	0.01 Koc
Henry (-)	0.00004	0.00004	
BCF fish (l/kg w.w.)	-	279	calculated EU-TGD (2011)
BCF stem	-	5.2	
BCF root	-	22.2	
MTDI (mg/kg/d)	0.0067	0.003	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.26	0.26	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

n.a. = not applicable

Sum mon-tetrachlorophenols Threshold values	Previous values	New Review	References for new values and notes
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.1	0.100	
AA-EQS sw (µg/L)	-	-	
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	not found	not found
EQP Q _S _{soil} (f _{OC} = 1%)	-	0.00003	Derived with updated data
Q _S _{soil} (EQP)	-	0.00003	very uncertain (mix of congeners)
Q _S _{soil} (ecotox.)	-	not found	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.02	0.04	

4.32 Pentachlorophenol

Substance	Pentachlorophenol		
CAS #		87-86-5	
M.W. (g/mol)		266	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	5.1	3	at pH 7 (log Pow can range from 5 – 1 in soil, depending on the pH) 706 - 53000 variable with pH - EU dossier (pentachlorophenol) 0.01 Koc 770 used as worst case (EU dossier pentachlorophenol), values range from 91 - 1000 (variable) estimated value = 7.0 FHI, 2021
K _{oc} (l/kg TS)	1585	3400	
K _D (l/kg TS)	16	34	
Henry (-)	0.000226	0.000226	
BCF fish (l/kg w.w.)	1250	770	
BCF stem	5.42	3.04	
BCF root	247.3	247	
MTDI (mg/kg/d)	0.003	0.003	
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.11	0.11	
Diffusivity in air (m ² /h)		0,0202	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	<0.005	<0.005	

Pentachlorophenol	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.2	0.4	M-241 / M-608
AA-EQS sw (µg/L)	-	0.4	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.012	0.014	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	0.3	
AF (-)	-	1	
Experimental QS _{soil} (f _{OC} = 1%)	0.006	0.3	UK Environment Agency (2008)
EQP QS _{soil} (f _{OC} = 1%)	-	0.014	Literature data
QS _{soil} (EQP)	-	0.014	
QS _{soil} (ecotox.)	0.006	0.3	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.001	0.001	

4.33 PAH16

A Normverdi for total PAHs cannot be derived in the typical way, because each of the PAHs can have unique modes of toxicity (M-436/2015).

Therefore, the soil normative value of PAH total is derived through a correlation with pyrene concentration. Pyrene was chosen for this because earlier correlational studies found that generally the concentration of 3 and 4 ring PAHs correlated the best with concentrations of all other PAHs, across diverse types of sediments (Arp et al. 2011). This correlation was found to apply not only to the pyrene concentration, but was also found to correlate best with toxicity in the same data set (in particular when the porewater concentration of pyrene was considered).

To demonstrate that this also applies to soils, a data base of PAHs in diverse contaminated soils from Europe, originating from Arp et al. (2014) was obtained, as presented in Table 10. This data set showed the following correlation:

Equation 18:

$$C_{\text{soil,PAH-16}} = 5.71 \pm 0.23 (C_{\text{soil,pyrene}}) \quad (r^2 = 0.95)$$

Since the normative value of pyrene is 0.31 mg/kg. By use of equation 18, the normative value for $C_{\text{soil,PAH-16}}$ is **1.8 mg/kg**.

Table 10. Compilation of PAH data from contaminated European soils (from Arp et al. 2014)

C _{soil}	($\mu\text{g g}_{\text{dw}}^{-1}$)	NAP	ACEY	ACE	FLU	PHE	ANT	FLUA	PYR	BAA	CHR	BBF	BKF	BAP	IND	DAH	BGP	Sum PAH-16
Karlstad 1a-1	KS 1a-1	0.66	1.70	0.03	0.23	2.90	1.37	8.74	6.93	6.04	4.50	7.37	3.20	5.06	3.07	1.18	3.27	56.25
Karlstad 2	KS 2	0.46	1.42	0.07	0.32	3.21	1.53	9.47	7.19	5.96	4.85	7.01	2.74	4.81	3.03	1.17	3.09	56.30
Karlstad 3a	KS 3a	0.95	0.41	0.03	0.12	1.96	0.95	3.25	2.35	1.89	2.59	3.04	1.06	1.55	1.20	0.47	1.23	23.05
Karlstad 5	KS 5	1.08	0.51	0.03	0.15	2.43	0.46	3.38	2.37	1.81	1.91	2.76	1.04	1.31	0.94	0.37	0.95	21.51
Karlstad 6	KS 6	7.61	2.72	0.28	1.38	11.86	3.39	22.95	18.08	12.86	9.15	13.13	5.67	8.87	5.08	2.05	5.23	130.32
Riksten 1a	RS 1a	0.51	9.43	2.10	0.44	3.47	7.56	39.33	61.11	31.61	26.84	32.67	9.75	21.93	11.88	2.80	16.25	277.69
Riksten 2	RS 2	0.76	1.26	0.15	0.22	2.25	0.92	5.83	7.77	2.71	2.81	5.57	1.55	3.48	2.39	0.47	2.68	40.81
Riksten 3	RS 3	0.40	0.12		0.04	0.76	0.10	0.60	0.66	0.24	0.35	0.67	0.19	0.37	0.25	0.06	0.31	5.11
Riksten 6a-1	RS 6a-1	0.51	1.06	0.05	0.12	1.08	0.70	3.30	5.59	3.04	2.84	10.08	3.16	5.49	4.41	0.84	6.28	48.55
Riksten 6a-2	RS 6a-2	0.74	1.34	0.06	0.15	1.55	1.15	5.37	7.95	4.15	4.07	12.14	3.85	6.89	5.90	0.93	6.95	63.21
Riksten 6a-3	RS 6a-3	0.45	1.03	0.04	0.11	1.24	0.66	3.58	5.73	2.96	3.12	11.22	3.11	5.69	5.03	0.80	6.33	51.09
Riksten 6b	RS 6b	0.07	0.09			0.05	0.04	0.20	0.27	0.16	0.19	0.93	0.27	0.28	0.41	0.07	0.43	3.46
Riksten 7	RS 7	0.93	0.15	0.02	0.07	2.14	0.21	1.47	1.62	0.65	0.80	1.31	0.33	0.75	0.46	0.09	0.61	11.62
Riksten 8	RS 8	0.43	0.02		0.02	0.95	0.05	0.55	0.48	0.17	0.25	0.32	0.10	0.17	0.08	0.02	0.09	3.70
Riksten 9	RS 9	0.07				0.04		0.04	0.02		0.03	0.04	0.01		0.01		0.01	0.27
Riksten 10	RS 10	0.06	0.03			0.11	0.02	0.24	0.20	0.10	0.15	0.29	0.10	0.13	0.10	0.02	0.09	1.65
Riksten 11-1	RS 11-1	0.34	1.59	0.21	0.07	0.51	0.87	2.41	3.94	5.41	4.96	10.93	2.82	5.80	4.62	0.92	4.73	50.13
Riksten 11-2	RS 11-2	0.37	1.40	0.05	0.08	0.61	0.84	2.30	4.02	5.26	4.81	10.11	2.64	5.46	4.34	0.98	5.24	48.50
Riksten 11-3	RS 11-3	0.45	1.43	0.05	0.08	0.73	0.82	2.26	3.74	4.49	4.26	10.16	3.12	5.86	4.13	0.85	4.89	47.30
Riksten 11-4	RS 11-4	0.41	1.73	0.05	0.10	0.53	0.92	2.60	4.04	5.57	4.87	10.64	2.86	6.00	4.36	0.96	5.20	50.81
Riksten 11-5	RS 11-5	0.37	1.52	0.06	0.09	0.51	0.87	2.21	4.09	5.27	4.52	11.33	3.18	6.25	4.91	1.03	5.38	51.60
Riksten 11-6	RS 11-6	0.33	1.41	0.07	0.08	0.61	0.86	1.89	3.39	5.05	4.21	10.41	2.81	5.65	4.53	0.91	5.20	47.41
Belgium 1	B 1	5.25	7.27	4.57	7.83	42.49	7.64	49.74	44.43	18.41	18.93	27.97	10.45	18.63	13.64	2.65	17.00	296.88
France 1	FR 1	31.14	68.34	15.10	27.92	150.14	111.66	474.51	351.84	267.82	189.36	326.80	120.64	208.04	143.04	41.36	123.51	2651.21
France 2	FR 2	8.66	72.82	153.22	89.72	165.97	63.12	146.84	100.60	61.65	42.46	79.54	28.24	53.38	37.68	11.41	33.17	1148.47
France 3	FR 3	3.05	1.25	0.43	0.54	5.32	2.88	11.37	8.56	6.82	5.46	10.44	3.66	7.00	5.23	1.50	4.98	78.50
France 4-1	FR 4-1	22.99	26.24	28.57	22.60	80.09	32.79	163.70	127.34	82.67	64.36	140.05	50.55	89.39	72.80	16.28	63.39	1083.81
France 4-2	FR 4-2	23.37	29.91	31.25	23.16	86.80	34.30	192.41	146.37	102.48	82.33	167.92	55.59	106.26	79.23	20.27	78.84	1260.49
France 4-3	FR 4-3	21.67	27.59	30.16	24.42	80.67	33.56	168.84	128.38	82.97	64.65	147.74	55.52	94.43	75.98	17.80	74.68	1129.06
France 5	FR 5	5.86	9.48	5.16	5.41	20.96	7.15	34.46	25.82	18.41	13.99	28.72	10.90	19.47	14.16	3.59	13.21	236.75
Holmsund 1-1	H 1-1	1.67	10.15	110.94	132.84	164.81	126.73	1138.82	492.56	106.64	93.87	60.25	20.42	21.02	7.49	2.52	6.24	2496.99
Holmsund 1-2	H 1-2	1.71	10.62	111.53	132.05	161.85	100.60	1027.41	461.67	105.23	89.36	60.22	20.21	20.71	7.81	2.35	6.51	2319.86
Holmsund 1-3	H 1-3	1.80	11.25	124.23	152.32	181.62	137.32	1159.85	505.73	116.21	88.97	60.34	23.86	21.61	7.73	2.49	6.13	2601.46

Substance	PAH16		
CAS #			
M.W. (g/mol)			
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	5.11	4.96	RIVM (2012)
K _{oc} (l/kg TS)	67608	58884	EU RAR (2008c)
K _o (l/kg TS)	676	589	0.01 Koc
Henry (-)	0.0000749	0.0000749	
BCF fish (l/kg w.w.)	-	88157	RIVM (2009) - 1474 fish, 44500 mollusks, 88157 crustaceans (benthic fauna recommended for large PAHs, see Directive 2013/39/EU)
BCF stem	-	5.73	
BCF root	-	200	
MTDI (mg/kg/d)	0.03	0.000098	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000053	(OSPAR 2006)
Coastal water (µg/L)	-	0.000053	(OSPAR 2006)
Sediment (mg/kg)	-	0.0052	(OSPAR 2006)
Soil (mg/kg)	-	0.013	Nam et al. (2008)

PAH16	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05		
AA-EQS sw (µg/L)	-		
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.14		
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-		
AF (-)	-		
Experimental QS _{soil} (f _{OC} = 1%)	1	1.8	
EQP QS _{soil} (f _{OC} = 1%)	-		
QS _{soil} (EQP)	-		
QS _{soil} (ecotox.)	1	1.8	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.34 Naphthalene

Substance	Naphthalene		
CAS #		91-20-3	
M.W. (g/mol)		128	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	3.3	3.3	EU dossier (naphthalene)
K _{oc} (l/kg TS)	995	1349	Karickhoff et al., (1979)
K _b (l/kg TS)	10	13	0.01 Koc
Henry (-)	0.0117	0.0117	
BCF fish (l/kg w.w.)	229	515	EU dossier (naphthalene)
BCF stem	4.14	3.95	
BCF root	12.5	11.3	
MTDI (mg/kg/d)	0.04	-	FHI, 2021
RfC (mg/m ³)	0.003		
Skin contact: f _{du}	0.1	0.83	REACH Reliability 2 exp, median used (0,876; 0,78)
Diffusivity in air (m ² /h)		0,0212	
Background			
Freshwater (µg/L)	-	0.000661	assumed same as coastal water
Coastal water (µg/L)	-	0.000661	OSPAR (2006) Max North, North Sea
Sediment (mg/kg)	-	0.002	OSPAR (2006)
Soil (mg/kg)	m.d	0.011	Nam et al. (2008)

Naphthalene	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	2.4 (2.1)	2	M-241 / M-608
AA-EQS sw (µg/L)	-	2	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.029	0.027	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	1.2	
AF (-)	-	10	
Experimental Q _S _{soil} (f _{OC} = 1%)	0.8	0.12	RIVM (2012), <i>Folsomia candida</i> .
EQP Q _S _{soil} (f _{OC} = 1%)	-	0.026	Literature data; 0.02665 from REACH-EQP
Q _S _{soil} (EQP)	-	0.03	
Q _S _{soil} (ecotox.)	0.8	0.12	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.35 Acenaphthylene

Substance	Acenaphthylene		
CAS #		208-96-8	
M.W. (g/mol)		152	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	3.9	3.55	RIVM (2012)
K _{oc} (l/kg TS)	2951	2570	EU RAR (coal tar pitch) – after Karickhoff et al., (1979)
K _D (l/kg TS)	30	26	0.01 Koc
Henry (-)	0.029	0.029	
BCF fish (l/kg w.w.)	-	509	RIVM (2009) - Cyprinus carpio (fish), 5% norm
BCF stem	-	4.74	
BCF root	-	17.2	
MTDI (mg/kg/d)	0.04	-	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.18	0.18	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.00001	(OSPAR 2006 N North Sea)
Coastal water (µg/L)	-	0.00001	(OSPAR 2006)
Sediment (mg/kg)	-	0.0016	(OSPAR 2006 N North Sea)
Soil (mg/kg)	-	-	

Acenaphthylene Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.15	1.28	M-241 / M-608
AA-EQS sw (µg/L)	-	1.28	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.0033	0.033	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	8.8	
AF (-)	-	100	
Experimental QS _{soil} (f _{OC} = 1%)	0.8	0.088	RIVM (2012) Only one tox study (<i>Folsomia fimetaria</i>); EQP = 0.029 mg/kg dw
EQP QS _{soil} (f _{OC} = 1%)	-	0.033	
QS _{soil} (EQP)	-	0.03	
QS _{soil} (ecotox.)	0.8	0.1	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits	-		
Soil (mg/kg dw)	0.01	0.01	

4.36 Acenaphthene

Substance	Acenaphthene		
CAS #		83-32-9	
M.W. (g/mol)		154	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	3.9	3.92	RIVM (2012)
K _{oc} (l/kg TS)	3388	5129	EU RAR (coal tar pitch)
K _o (l/kg TS)	34	51	0.01 K _{oc}
Henry (-)	0.011	0.011	
BCF fish (l/kg w.w.)	-	1000	RIVM (2009) - Cyprinus carpio (fish), 5% norm
BCF stem	-	5.77	
BCF root	-	32.3	
MTDI (mg/kg/d)	0.04	-	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000034	(OSPAR 2006)
Coastal water (µg/L)	-	0.000034	(OSPAR 2006)
Sediment (mg/kg)	-	0.0024	(OSPAR 2006), TA-2803 = 4.8
Soil (mg/kg)	-	0.0032	Nam et al. (2008)

Acenaphthene Threshold values	Previous values	New Review	References for new values and notes
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.15	3.8	M-241 / M-608
AA-EQS sw (µg/L)	-	3.8	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.016	0.10	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	12	
AF (-)	-	100	
Experimental Q _S _{soil} (f _{OC} = 1%)	0.8	0.12	RIVM (2012) <i>Folsomia fimetaria</i>
EQP Q _S _{soil} (f _{OC} = 1%)	-	0.19	
Q _S _{soil} (EQP)	-	0.2	
Q _S _{soil} (ecotox.)	0.8	0.12	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits	-		
Soil (mg/kg dw)	0.01	0.01	

4.37 Phenanthrene

Substance	Phenanthrene		
CAS #		85-01-8	
M.W. (g/mol)		178	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	4.47	4.50	RIVM (2012)
K _{oc} (l/kg TS)	16982	37154	EU RAR (coal tar pitch)
K _D (l/kg TS)	170	372	0.01 K _{oc}
Henry (-)	0.00135	0.00135	
BCF fish (l/kg w.w.)	1476	4751	RIVM (2009) - 4751 fish, 14893 crustaceans
BCF stem	-	6.39	
BCF root	-	89.2	
MTDI (mg/kg/d)	0.04	-	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.18	0.18	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000254	(OSPAR 2006)
Coastal water (µg/L)	-	0.000254	(OSPAR 2006)
Sediment (mg/kg)	-	0.0068	(OSPAR 2006)
Soil (mg/kg)	-	0.04	Nam et al. (2008)

Phenanthrene Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.15	0.51	M-241 / M-608
AA-EQS sw (µg/L)	-	0.51	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.5	0.78	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	6.2	
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	0.8	0.62	RIVM (2012) <i>Eisenia fetida</i>
EQP QS _{soil} (f _{OC} = 1%)	-	0.19	
QS _{soil} (EQP)	-	0.2	
QS _{soil} (ecotox.)	0.8	0.62	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.38 Anthracene

Substance	Anthracene		
CAS #		120-12-7	
M.W. (g/mol)		178	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	4.45	4.68	EU dossier (anthracene)
K _{oc} (l/kg TS)	19953	29512	EU dossier (anthracene) (uses Karickhoff et al., 1979 log K _{oc} = log K _{ow} - 0.21)
K _d (l/kg TS)	200	295	0.01 K _{oc}
Henry (-)	0.0009	0.0021	REACH Reliability 4
BCF fish (l/kg w.w.)	1409	3042	EU dossier (anthracene)
BCF stem	-	6.25	
BCF root	-	122	
MTDI (mg/kg/d)	0.04	-	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0117	
Background			
Freshwater (µg/L)	-	0.004	assumed same as coastal water
Coastal water (µg/L)	-	0.004	OSPAR (2006) Max
Sediment (mg/kg)	-	0.0012	OSPAR (2006)
Soil (mg/kg)	-	0.0034	Nam et al. (2008)

Anthracene	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.15	0.1	M-241 / M-608
AA-EQS sw (µg/L)	-	0.1	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.03	0.0046	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	2.9	
AF (-)	-	50	
Experimental Q _S _{soil} (f _{OC} = 1%)	0.8	0.06	RIVM (2012) <i>Folsomia fimetaria</i>
EQP Q _S _{soil} (f _{OC} = 1%)	-	0.03	
Q _S _{soil} (EQP)	-	0.03	
Q _S _{soil} (ecotox.)	0.8	0.06	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.39 Fluorene

Substance	Fluorene		
CAS #		86-73-7	
M.W. (g/mol)		166	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	4.21005085	4.18	RIVM (2012)
K _{oc} (l/kg TS)	5886	10233	EU RAR (2008c)
K _b (l/kg TS)	59	102	0.01 Koc
Henry (-)	0.00619	0.00619	
BCF fish (l/kg w.w.)	-	1658	RIVM (2009) - <i>Pimephales promelas</i> (fish), 5% norm
BCF stem	-	6.24	
BCF root	-	50.8	
MTDI (mg/kg/d)	0.04	-	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.00019	(OSPAR 2006)
Coastal water (µg/L)	-	0.00019	(OSPAR 2006)
Sediment (mg/kg)	-	0.0068	(OSPAR 2006 N North Sea)
Soil (mg/kg)	-	0.0068	Nam et al. (2008)

Fluorene	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.15	1.5	M-241 / M-608
AA-EQS sw (µg/L)	-	1.5	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.026	0.15	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	2.8	
AF (-)	-	10	
Experimental Q _S _{soil} (f _{OC} = 1%)	0.8	0.3	RIVM (2012) <i>Folsomia fimetaria</i>
EQP Q _S _{soil} (f _{OC} = 1%)	-	0.15	
Q _S _{soil} (EQP)	-	0.15	
Q _S _{soil} (ecotox.)	0.8	0.3	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.40 Fluoranthene

Substance	Fluoranthene		
CAS #		206-44-0	
M.W. (g/mol)		202	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	5.120573931	5.2	EU dossier (fluoranthene)
K _{oc} (l/kg TS)	141336	97724	EU dossier (fluoranthene) (uses Karickhoff et al., 1979 log K _{oc} = log K _{ow} - 0.21)
K _D (l/kg TS)	1514	977	0.01 K _{oc}
Henry (-)	0.00163	0.00163	
BCF fish (l/kg w.w.)	13200	4800	EU dossier (fluoranthene)
BCF stem	5.3	5.06	
BCF root	266	306	
MTDI (mg/kg/d)	0.0125	-	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.00029	assumed same as coastal water
Coastal water (µg/L)	-	0.00029	OSPAR (2006) Max
Sediment (mg/kg)	-	0.008	OSPAR (2006)
Soil (mg/kg)	-	0.014	Nam et al. (2008)

Fluoranthene Threshold values	Previous values	New Review	References for new values and notes
AA-EQS fw (µg/L)	0.05	0.006	M-241 / M-608
AA-EQS sw (µg/L)	-	0.006	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.013	0.400	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	8.3	
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	1	0.83	RIVM (2012) <i>Microbial nitrification</i>
EQP QS _{soil} (f _{OC} = 1%)	-	0.0061	Literature data
QS_{soil} (EQP)	-	0.006	
QS_{soil} (ecotox.)	1	0.83	
QS_{soil} (sec. poisoning)	-	1.54	
Quantification limits	-		
Soil (mg/kg dw)	0.01	0.01	

4.41 Pyrene

Substance	Pyrene		
CAS #		129-00-0	
M.W. (g/mol)		202	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	5.11058971	4.96	RIVM (2012)
K _{oc} (l/kg TS)	67608	58884	EU RAR (2008c)
K _o (l/kg TS)	676	589	0.01 Koc
Henry (-)	0.0000749	0.0000749	
BCF fish (l/kg w.w.)	-	88157	RIVM (2009) - 1474 fish, 44500 mollusks, 88157 crustaceans (benthic fauna recommended for large PAHs, see Directive 2013/39/EU)
BCF stem	-	5.73	
BCF root	-	200	
MTDI (mg/kg/d)	0.03	-	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0098	
Background			
Freshwater (µg/L)	-	0.000053	(OSPAR 2006)
Coastal water (µg/L)	-	0.000053	(OSPAR 2006)
Sediment (mg/kg)	-	0.0052	(OSPAR 2006)
Soil (mg/kg)	-	0.013	Nam et al. (2008)

Pyrene Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.023	M-241 / M-608
AA-EQS sw (µg/L)	-	0.023	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.14	0.08	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	3.10	
AF (-)	-	10.00	
Experimental QS _{soil} (f _{OC} = 1%)	1	0.31	RIVM (2012) <i>Protaphorura armata</i>
EQP QS _{soil} (f _{OC} = 1%)	-	0.014	
QS _{soil} (EQP)	-	0.01	
QS _{soil} (ecotox.)	1	0.31	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits	-		
Soil (mg/kg dw)	0.01	0.01	

4.42 Benzo(a)anthracene

Substance	Benzo(a)anthracene		
CAS #		56-55-3	
M.W. (g/mol)		228	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	5.54	5.91	RIVM (2012)
K _{oc} (l/kg TS)	616595	501187	RIVM (2012)
K _o (l/kg TS)	6172	5012	0.01 K _{oc}
Henry (-)	0.0000017	0.0000017	
BCF fish (l/kg w.w.)	17337	33457	RIVM (2009) - 260 fish, 33457 crustaceans (benthic fauna recommended for large PAHs, see Directive 2013/39/EU)
BCF stem	-	2.66	
BCF root	-	1074	
MTDI (mg/kg/d)	0.005	6.13 x 10⁻⁶	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000006	(OSPAR 2006)
Coastal water (µg/L)	-	0.000006	(OSPAR 2006)
Sediment (mg/kg)	-	0.0036	(OSPAR 2006)
Soil (mg/kg)	-	0.0045	Nam et al. (2008)

Benzo(a)anthracene Threshold values	Previous values	New Review	References for new values and notes
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.012	M-241 / M-608
AA-EQS sw (µg/L)	-	0.012	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.0006	0.060	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	0.33	
AF (-)	-	10	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	0.03	RIVM (2012) <i>Oniscus asellus</i>
EQP Q _S _{soil} (f _{OC} = 1%)	0.03	0.06	
Q _S _{soil} (EQP)	0.03	0.06	
Q _S _{soil} (ecotox.)	-	0.03	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.43 Chrysene

Substance	Chrysene		
CAS #		218-01-9	
M.W. (g/mol)		228	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	5.81	5.81	RIVM (2012)
K _{oc} (l/kg TS)	524807	398107	RIVM (2012)
K _b (l/kg TS)	5253	3981	0.01 Koc
Henry (-)	0.0000047	0.0000047	
BCF fish (l/kg w.w.)	32283	6088	RIVM (2009) - crustaceans
BCF stem	-	2.99	
BCF root	-	900	
MTDI (mg/kg/d)	-	6.13 x 10⁻⁶	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000056	(OSPAR 2006)
Coastal water (µg/L)	-	0.000056	(OSPAR 2006)
Sediment (mg/kg)	-	0.0044	(OSPAR 2006)
Soil (mg/kg)	-	0.014	Nam et al. (2008)

Chrysene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.07	M-241 / M-608
AA-EQS sw (µg/L)	-	0.07	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.0028	0.28	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	
EQP QS _{soil} (f _{OC} = 1%)	0.03	0.28	
QS _{soil} (EQP)	0.03	0.28	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.44 Benzo(b)fluoranthene

Substance	Benzo(b)fluoranthene		
CAS #		205-99-2	
M.W. (g/mol)		252	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	5.78	5.78	EU dossier (5,6-ring PAHs)
K _{oc} (l/kg TS)	218776	831864	EU dossier (5,6-ring PAHs) (uses Karickhoff et al., 1979 log K _{oc} = log K _{ow} - 0.21, but the estimated K _{ow} of 2.12)
K _D (l/kg TS)	2188	8319	0.01 K _{oc}
Henry (-)	0.0000028	0.0000028	
BCF fish (l/kg w.w.)	50000	11138	EU dossier (5,6-ring PAHs): 135 (fish) 11138 (crustaceans) 57981 (mollusks), WFD recommends crustaceans and mollusks as basis
BCF stem	-	3.09	
BCF root	-	853	
MTDI (mg/kg/d)	0.005	6.13 x 10⁻⁶	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000017	assumed same as coastal water
Coastal water (µg/L)	-	0.000017	OSPAR (2006) Max
Sediment (mg/kg)	-	0.0916	OSPAR (2006) - N North Sea benzo(b + k)fluoranthene divided by two
Soil (mg/kg)	-	0.016	Nam et al. (2008)

Benzo(b)fluoranthene Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.017	M-241 / M-608
AA-EQS sw (µg/L)	-	0.017	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.024	0.14	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	
EQP QS _{soil} (f _{OC} = 1%)	0.01	0.14	
QS _{soil} (EQP)	0.01	0.14	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.45 Benzo(k)fluoranthene

Substance	Benzo(k)fluoranthene		
	CAS #	207-08-9	
M.W. (g/mol)		252	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	6.11	6.11	EU dossier (5,6-ring PAHs)
K _{oc} (l/kg TS)	1737801	794328	EU dossier (5,6-ring PAHs) (uses Karickhoff et al., 1979 log K _{oc} = log K _{ow} - 0.21)
K _p (l/kg TS)	17395	7943	0.01 K _{oc}
Henry (-)	0.0000028	0.0000028	
BCF fish (l/kg w.w.)	50000	11138	EU dossier (5,6-ring PAHs), 135 (fish) 11138 (crustaceans) 57981 (mollusks), WFD recommends crustaceans and mollusks as basis
BCF stem	-	2.06	
BCF root	-	1531	
MTDI (mg/kg/d)	-	6.13 x 10⁻⁶	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000017	assumed same as coastal water
Coastal water (µg/L)	-	0.000017	OSPAR (2006) assumed same as Benzo(b)fluoranthene
Sediment (mg/kg)	-	0.0916	OSPAR (2006) - N North Sea benzo(b + k)fluoranthene divided by two
Soil (mg/kg)	-	0.0031	Nam et al. (2008)

Benzo(k)fluoranthene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.017	M-241 / M-608
AA-EQS sw (µg/L)	-	0.017	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.081	0.14	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	
EQP QS _{soil} (f _{OC} = 1%)	0.09	0.14	
QS _{soil} (EQP)	0.09	0.14	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.46 Benzo(a)pyrene

Substance	Benzo(a)pyrene		
CAS #		50-32-8	
M.W. (g/mol)		252	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	6.4	6.11	EU dossier (5,6-ring PAHs)
K _{oc} (l/kg TS)	660693	831764	EU dossier (5,6-ring PAHs): (uses Karickhoff et al., 1979 , but used log Koc = log Kow - 0.19 instead of log Koc = log Kow - 0.21)
K _d (l/kg TS)	-	8318	0.01 Koc
Henry (-)	0.000034	0.000034	
BCF fish (l/kg w.w.)	28200	11138	EU dossier (5,6-ring PAHs): 135 (fish) 11138 (crustaceans) 57981 (mollusks), WFD recommends crustaceans and mollusks as basis
BCF stem	2.01	2.06	
BCF root	1584	1531	
MTDI (mg/kg/d)	0.00001	7 x 10⁻⁷	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000005	assumed same as coastal water
Coastal water (µg/L)	-	0.000005	OSPAR (2006) Max
Sediment (mg/kg)	-	0.006	OSPAR (2006)
Soil (mg/kg)	<0.01-0.16	0.0053	Nam et al. (2008)

Benzo(a)pyrene Threshold values	Previous values	New Review	References for new values and notes
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.00017	M-241 / M-608
AA-EQS sw (µg/L)	-	0.00017	M-241 / M-608
AA-EQS sed (mg/kg) (f _{oc} = 1%)	0.0023	0.18	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{oc} = 1%)	-	0.28	
AF (-)	-	10	
Experimental QS _{soil} (f _{oc} = 1%)	1.5	0.028	RIVM (2012) <i>Porcellio scaber</i>
EQP QS _{soil} (f _{oc} = 1%)	-	0.0014	
QS _{soil} (EQP)	-	0.0014	
QS _{soil} (ecotox.)	1.5	0.028	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.47 Indeno(1,2,3-cd)pyrene

Substance	Indeno(1,2,3-cd)pyrene		
CAS #		193-39-5	
M.W. (g/mol)		276	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	6.87	6.7	EU dossier (5,6-ring PAHs)
K _{oc} (l/kg TS)	1047129	2344229	EU dossier (5,6-ring PAHs) (uses Karickhoff et al., 1979 , but used log Koc = log Kow - 0.33 instead of log Koc = log Kow - 0.21)
K _D (l/kg TS)	10482	23442	0.01 Koc
Henry (-)	0.00000117	0.00000117	
BCF fish (l/kg w.w.)	50000	11138	EU dossier (5,6-ring PAHs): 135 (fish) 11138 (crustaceans) 57981 (mollusks), WFD recommends crustaceans and mollusks as basis
BCF stem	-	0.8	
BCF root	-	4356	
MTDI (mg/kg/d)	0.005	6.13 x 10⁻⁶	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.18	0.18	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000017	assumed same as coastal water
Coastal water (µg/L)	-	0.000017	OSPAR (2006) Max
Sediment (mg/kg)	-	0.02	OSPAR (2006)
Soil (mg/kg)	-	-	

Indeno(1,2,3-cd)pyrene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.0027	M-241 / M-608
AA-EQS sw (µg/L)	-	0.0027	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.0047	0.063	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	
EQP QS _{soil} (f _{OC} = 1%)	0.05	0.063	
QS _{soil} (EQP)	0.05	0.06	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.48 Dibenzo(a,h)anthracene

Substance	Dibenzo(a,h)anthracene		
CAS #		53-70-3	
M.W. (g/mol)		278	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	7.11	6.55	RIVM (2012)
K _{oc} (l/kg TS)	1380384	1949845	RIVM (2012)
K _b (l/kg TS)	18804	19498	0.01 K _{oc}
Henry (-)	0.000038	0.000038	
BCF fish (l/kg w.w.)	50000	50119	RIVM (2009) - crustaceans
BCF stem	-	1.05	
BCF root	-	3339	
MTDI (mg/kg/d)	-	6.13 x 10⁻⁶	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.09	0.09	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000001	(OSPAR 2006) max "<0.000001 µg/L)
Coastal water (µg/L)	-	0.000001	(OSPAR 2006) max "<0.000001 µg/L)
Sediment (mg/kg)	-	0.012	(OSPAR 2006 N North Sea)
Soil (mg/kg)	-	0.0012	Nam et al. (2008)

Dibenzo(a,h)anthracene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.00061	M-241 / M-608
AA-EQS sw (µg/L)	-	0.00061	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.058	0.027	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	
EQP QS _{soil} (f _{OC} = 1%)	0.07	0.012	Literature data
QS _{soil} (EQP)	0.07	0.01	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.49 Benzo(g,h,i)perylene

Substance	Benzo(g,h,i)perylene		
	CAS #	191-24-2	
M.W. (g/mol)		276	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	6.22	6.63	EU dossier (5,6-ring PAHs) EU dossier (5,6-ring PAHs) (uses Karickhoff et al., 1979 , but used log K _{oc} = log K _{ow} - 0.62 instead of log K _{oc} = log K _{ow} - 0.21) 0.01 K _{oc} EU dossier (5,6-ring PAHs): 135 (fish) 11138 (crustaceans) 57981 (mollusks), WFD recommends crustaceans and mollusks as basis FHI, 2021
K _{oc} (l/kg TS)	2691535	1023293	
K _d (l/kg TS)	26942	10233	
Henry (-)	0.000004	0.000004	
BCF fish (l/kg w.w.)	50000	11138	
BCF stem	-	0.91	
BCF root	-	3848	
MTDI (mg/kg/d)	0.03	6.13 x 10⁻⁶	
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.18	0.18	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0.000011	assumed same as coastal water
Coastal water (µg/L)	-	0.000011	OSPAR (2006) Max
Sediment (mg/kg)	-	0.018	OSPAR (2006)
Soil (mg/kg)	-	0.0093	Nam et al. (2008)

Benzo(g,h,i)perylene	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	0.05	0.008	M-241 / M-608
AA-EQS sw (µg/L)	-	0.0008	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.0021	0.084	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	-	
EQP Q _S _{soil} (f _{OC} = 1%)	0.1	0.084	
Q _S _{soil} (EQP)	0.1	0.1	
Q _S _{soil} (ecotox.)	-	-	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.01	

4.50 Benzene

Substance	Benzene		
CAS #		71-43-2	
M.W. (g/mol)		78	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	2.1	2.13	EU dossier (benzene)
K _{oc} (l/kg TS)	74	134.2	EU dossier (benzene)
K _b (l/kg TS)	0.7	1.3	0.01 K _{oc}
Henry (-)	0.159	0.159	
BCF fish (l/kg w.w.)	10.9	13	EU dossier (benzene)
BCF stem	1.32	1.31	
BCF root	2.15	2.14	
MTDI (mg/kg/d)	-	0.0033	FHI, 2021
RfC (mg/m ³)	0.05	0.05	
Skin contact: f _{du}	0.08	0.015	REACH Reliability 2 (QSAR)
Diffusivity in air (m ² /h)		0,0317	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	<0.1	<0.1	

Benzene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	80	10	EU dossier (benzene)
AA-EQS sw (µg/L)	-	8	EU dossier (benzene)
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	7	REACH-EQP AF:1
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	12		0.1 using the EQP method used in EU dossier (benzene)
EQP QS _{soil} (f _{OC} = 1%)	0.2	0.013	REACH-EQP AF:1
QS _{soil} (EQP)	0.2	0.01	
QS _{soil} (ecotox.)	12	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.005	0.01	

4.51 Toluene

Substance	Toluene		
CAS #		108-88-3	
M.W. (g/mol)		92	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	2.8	2.73	REACH Reliability 2 (20 °C)
K _{oc} (l/kg TS)	250	63.8	REACH Reliability 4 (median 1.53-2.08)
K _D (l/kg TS)	2.5	0.64	0.01 K _{oc}
Henry (-)	0.27	0.27	
BCF fish (l/kg w.w.)	39	42	calculated EU-TGD (2011)
BCF stem	2.2	2.34	
BCF root	4.24	4.64	
MTDI (mg/kg/d)	0.22	0.223	FHI, 2021
RfC (mg/m ³)	0.26	56.5	REACH chronic = 56.5 (acute = 226)
Skin contact: f _{du}	0.12	0.036	REACH Reliability 2 (Q)Sar
Diffusivity in air (m ² /h)		0,0313	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	0.32	0.32	

Toluene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	74	680	REACH-ecotox AF:1
AA-EQS sw (µg/L)	-	680	REACH-ecotox AF:1
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	3	REACH-0
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	7.5	
AF (-)	-	50	
Experimental QS _{soil} (f _{OC} = 1%)	0.3	0.15	EU RAR (toluene), earthworm based - normalized to f _{OC}
EQP QS _{soil} (f _{OC} = 1%)	-	0.44	REACH-EQP
QS _{soil} (EQP)	-	0.44	
QS _{soil} (ecotox.)	0.3	0.15	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.005	0.01	

4.52 Ethylbenzene

Substance	Ethylbenzene		
CAS #		100-41-4	
M.W. (g/mol)		106	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	2.8	3.6	REACH Reliability 1 (20 °C)
K _{oc} (l/kg TS)	250	250	
K _b (l/kg TS)	2.5	2.5	0.01 K _{oc}
Henry (-)	0.27	0.33	REACH Reliability 2
BCF fish (l/kg w.w.)	86	229	calculated EU-TGD (2011)
BCF stem	3.4	4.90	
BCF root	8.48	18.7	
MTDI (mg/kg/d)	0.1	0.0971	FHI, 2021
RfC (mg/m ³)	1	15	REACH chronic = 15 (worker = 77)
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,027	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	<0.1	<0.1	

Ethylbenzene	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	20	REACH-AF
AA-EQS fw (µg/L)	0.5	100	REACH-AF AF:10
AA-EQS sw (µg/L)	-	10	REACH-AF AF:10
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.27	REACH-EQP
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	0.2	0.2	0.66 EQP method from EU RAR (ethyl benzene), corrected for OC and wet weight
EQP QS _{soil} (f _{OC} = 1%)	-	0.25	REACH-EQP
QS _{soil} (EQP)	-	0.25	
QS _{soil} (ecotox.)	0.2	0.2	
QS _{soil} (sec. poisoning)	-	0.1	
Quantification limits			
Soil (mg/kg dw)	0.005	0.01	

4.53 Xylene

Substance	Xylene		
CAS #		1330-20-7	
M.W. (g/mol)		106	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	2.8	3.2	REACH Reliability 2 (20 °C)
K _{oc} (l/kg TS)	250	250	
K _b (l/kg TS)	2.5	2.5	0.01 K _{oc}
Henry (-)	0.27	0.26	REACH Reliability 2 (estimated)
BCF fish (l/kg w.w.)	105	105	calculated EU-TGD (2011)
BCF stem	3.37	3.64	
BCF root	8.34	9.61	
MTDI (mg/kg/d)	0.2	0.179	FHI, 2021
RfC (mg/m ³)	0.87	14.8	REACH chronic = 14.8 (acute = 174)
Skin contact: f _{du}	0.12	0.118	REACH Reliability 2 (Q)Sar, median used (0,139; 0,118; 0,109)
Diffusivity in air (m ² /h)		0,0281	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	<0.1	<0.1	

Xylene	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	3.5	327	REACH-ecotox AF:1
AA-EQS sw (µg/L)	-	327	REACH-ecotox AF:1
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	2	REACH-EQP AF:1
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	not found	
EQP Q _S _{soil} (f _{OC} = 1%)	0.03	0.82	REACH-EQP AF:1
Q _S _{soil} (EQP)	0.03	0.8	
Q _S _{soil} (ecotox.)	-	not found	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.005	0.03	if all congeners at LOD

4.54 Aliphatic hydrocarbons C5-C8

Substance	Aliphatic C5-C8		
CAS #		n.a.	
M.W. (g/mol)		n.a.	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	3.27	3.3	
K _{oc} (l/kg TS)	800	800	
K _d (l/kg TS)	8	8	0.01 Koc
Henry (-)	47	50	
BCF fish (l/kg w.w.)	190	488	calculated for C8 by EU-TGD (2011)
BCF stem	3.88	5.92	
BCF root	10.93	36.3	
MTDI (mg/kg/d)	5	5	FHI, 2021
RfC (mg/m ³)	18.4	18.4	
Skin contact: f _{du}	1	1	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Aliphatic C5-C8	Previous values	New Review	References for new values and notes
Threshold values			
Q _S ^{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	40	40	
AA-EQS sw (µg/L)	-	-	
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental Q _S ^{soil} (f _{OC} = 1%)	-	not found	
EQP Q _S ^{soil} (f _{OC} = 1%)	0.3	0.32	Derived with updated data
Q _S ^{soil} (EQP)	0.3	0.3	
Q _S ^{soil} (ecotox.)	-	not found	
Q _S ^{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	-	7	

4.55 Aliphatic hydrocarbons > C8-C10

Substance	Aliphatic > C8-C10		
CAS #		n.a.	
M.W. (g/mol)		n.a.	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	4.89	4.9	
K _{oc} (l/kg TS)	32000	32000	
K _b (l/kg TS)	320	320	0.01 Koc
Henry (-)	55	55	
BCF fish (l/kg w.w.)	7700	2841	calculated EU-TGD (2011)
BCF stem	5.9	5.90	
BCF root	175.64	176	
MTDI (mg/kg/d)	0.1	0.8	FHI, 2021
RfC (mg/m ³)	1	1	
Skin contact: f _{du}	0.5	0.5	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Aliphatic > C8-C10	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	40	40	
AA-EQS sw (µg/L)	-	-	
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	
EQP QS _{soil} (f _{OC} = 1%)	13	12.8	Derived with updated data
QS _{soil} (EQP)	13	13	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	10	3	

4.56 Aliphatic hydrocarbons > C10-C12

Substance	Aliphatics > C10-C12		
CAS #		n.a.	
M.W. (g/mol)		n.a.	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	5.8	5.8	
K _{oc} (l/kg TS)	250000	250000	
K _b (l/kg TS)	2500	2500	0.01 K _{oc}
Henry (-)	60	60	
BCF fish (l/kg w.w.)	60000	16272	calculated EU-TGD (2011)
BCF stem	3.09	3.09	
BCF root	850.35	850	
MTDI (mg/kg/d)	0.1	0.5	FHI, 2021
RfC (mg/m ³)	1	1	
Skin contact: f _{du}	0.5	0.5	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Aliphatics > C10-C12	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	1000	1000	
AA-EQS sw (µg/L)	-	-	
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	100	100	
EQP QS _{soil} (f _{OC} = 1%)	-	2500	Derived with updated data
QS _{soil} (EQP)	-	2500	
QS _{soil} (ecotox.)	100	100	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	10	3	

4.57 Aliphatic hydrocarbons > C12-C35

Substance	Aliphatics > C12-C35		
CAS #		n.a.	
M.W. (g/mol)		n.a.	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	6.3	6.3	
K _{oc} (l/kg TS)	1000000000	1000000000	
K _b (l/kg TS)	10000000	10000000	0.01 Koc
Henry (-)	87	87	
BCF fish (l/kg w.w.)	200000000	40179	calculated EU-TGD (2011)
BCF stem	0.0004	1.57	
BCF root	438322	2144	
MTDI (mg/kg/d)	2	0.5	FHI, 2021
RfC (mg/m ³)	1	1	
Skin contact: f _{du}	0.1	0.1	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Aliphatics > C12-C35	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	1000	1000	
AA-EQS sw (µg/L)	-	-	
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	100	100	
EQP QS _{soil} (f _{OC} = 1%)	-	10000000	Derived with updated data
QS _{soil} (EQP)	-	10000000	
QS _{soil} (ecotox.)	100	100	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	10	6.5	

4.58 MTBE

Substance	MTBE		
CAS #		1634-04-4	
M.W. (g/mol)		88	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	0.9	1.23	REACH Reliability 1
K _{oc} (l/kg TS)	6	6	
K _D (l/kg TS)	0.06	0.06	0.01 Koc
Henry (-)	0.024	0.022	REACH Reliability 2
BCF fish (l/kg w.w.)	2	2	calculated EU-TGD (2011)
BCF stem	0.69	0.66	
BCF root	1.12	1.09	
MTDI (mg/kg/d)	0.1	0.5	FHI, 2021
RfC (mg/m ³)	3	53.6	REACH chronic = 53.6 (acute = 214)
Skin contact: f _{du}	0.1	0.002	REACH Reliability 2 (Q)Sar
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

MTBE	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	-	
AA-EQS fw (µg/L)	2600	5100	REACH-AF AF:10
AA-EQS sw (µg/L)	-	260	REACH-AF AF:100
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	REACH-ecotox
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	78	REACH AF:100
AF (-)	-	100	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	0.78	
EQP Q _S _{soil} (f _{OC} = 1%)	0.16	0.3	Derived with updated data
Q _S _{soil} (EQP)	0.16	0.3	
Q _S _{soil} (ecotox.)	-	0.78	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.1	0.02	

4.59 Tetraethyl-lead

Substance	tetraethyl-lead		
CAS #		78-00-2	
M.W. (g/mol)		323	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	4.1	4.39	REACH Reliability 2 (20 °C, median used 4.15;4.62)
K _{oc} (l/kg TS)	758	1300	REACH Reliability 2
K _D (l/kg TS)	7.6	13	0.01 Koc
Henry (-)	28	0.19	REACH Reliability 2 minimum value!
BCF fish (l/kg w.w.)	100	1065	calculated EU-TGD (2011)
BCF stem	3.04	6.39	
BCF root	6.99	72.7	
MTDI (mg/kg/d)	0.0000001	2 x 10⁻⁶	FHI, 2021
RfC (mg/m ³)	-	0.08	REACH chronic = 0.08 (acute = 0.34)
Skin contact: f _{du}	1	0.065	REACH Reliability 2 exp
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Tetraethyl-lead Threshold values	Previous values	New Review	References for new values and notes
Q _S _{biota,sp} (mg/kg biota)	-	0.0	REACH-AF AF:300
AA-EQS fw (µg/L)	0.004	0.027	REACH-AF AF:1000
AA-EQS sw (µg/L)	-	0.003	REACH-AF AF:10000
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	-	
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	not found	
EQP Q _S _{soil} (f _{OC} = 1%)	0.00003	0.00035	REACH-EQP
Q _S _{soil} (EQP)	0.00003	0.00035	
Q _S _{soil} (ecotox.)	-	not found	
Q _S _{soil} (sec. poisoning)	-	2.7 x 10⁻⁶	
Quantification limits			
Soil (mg/kg dw)	0.00003	0.001	

4.60 PBDE-99

Substance	PBDE-99		
	CAS #	60348-60-9	
M.W. (g/mol)		564.7	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	6.285	6.5	EU dossier (BDE): assumes tetra; 5.87 (tetra, lowest measured); 6.57 (penta); 8.35 (lowest measured)
K _{oc} (l/kg TS)	21080	565860	EU dossier (BDE): assumes tetra; 565860 (tetra); 983340 (penta); 1363040 (and larger for octa)
K _D (l/kg TS)	13921	5659	0.01 K _{oc}
Henry (-)	0.0000012	0.0000012	
BCF fish (l/kg w.w.)	3245	35000	EU dossier (BDE) highest measured (tetra BDE)
BCF stem	-	1.14	
BCF root	-	3056	
MTDI (mg/kg/d)	0.002	1.7 x 10⁻⁶	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.067	0.067	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	0.00004 (BDE-99)	-	BDEs do not occur naturally

PBDE-99	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0,53 (BDE-99)	4.9 x 10⁻⁸	M-241 / M-608
AA-EQS sw (µg/L)	-	2.4 x 10⁻⁹	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.026	0.062 (fv: 0.310)	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	9.5	
AF (-)	-	50	
Experimental QS _{soil} (f _{OC} = 1%)	0.38 (BDE-99)	0.19	EU RAR (BDE), plant study
EQP QS _{soil} (f _{OC} = 1%)	-	2.77 x 10⁻⁷	
QS _{soil} (EQP)	-	2.8 x 10⁻⁷	
QS _{soil} (ecotox.)	0,38 (BDE-99)	0.19	
QS _{soil} (sec. poisoning)	-	0.66	
Quantification limits	-		
Soil (mg/kg dw)	0.001	0.003	if all congeners at LOD

4.61 PBDE-153

Substance	PBDE-153			
CAS #		68631-49-2		
M.W. (g/mol)		643.6		
Property	2007 Values	New Review	References for new values and notes	
log Pow (l/l)	6.285	6.5	EU dossier (BDE): assumes tetra; 5.87 (tetra, lowest measured); 6.57 (penta); 8.35 (lowest measured) EU dossier (BDE): assumes tetra; 565860 (tetra); 983340 (penta); 1363040 (and larger for octa) 0.01 Koc EU dossier (BDE) highest measured (tetra BDE) FHI, 2021	
K _{oc} (l/kg TS)	21080	565860		
K _o (l/kg TS)	13921	5659		
Henry (-)	0.0000012	0.0000012		
BCF fish (l/kg w.w.)	3245	35000		
BCF stem	-	1.1		
BCF root	-	3056		
MTDI (mg/kg/d)	0.002	3.8 x 10⁻⁶		
RfC (mg/m ³)	-	-		
Skin contact: f _{du}	0.067	0.067		
Diffusivity in air (m ² /h)		0,0036		
Background				
Freshwater (µg/L)	-			BDEs do not occur naturally
Coastal water (µg/L)	-			
Sediment (mg/kg)	-			
Soil (mg/kg)	0.00004 (BDE-99)	-		

PBDE-153	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-		
AA-EQS fw (µg/L)	0,53 (BDE-99)		
AA-EQS sw (µg/L)	-		
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.026		
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-		
AF (-)	-		
Experimental Q _S _{soil} (f _{OC} = 1%)	0.38 (BDE-99)		
EQP Q _S _{soil} (f _{OC} = 1%)	-		
Q _S _{soil} (EQP)	-		
Q _S _{soil} (ecotox.)	0,38 (BDE-99)		
Q _S _{soil} (sec. poisoning)	-	0.66	
Quantification limits			
Soil (mg/kg dw)	0.001	0.003	

4.62 PBDE-209

Substance	PBDE-209		
CAS #		1163-19-5	
M.W. (g/mol)		959	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	9.9	9.9	REACH = 6.625, which is inconsistent with other BDE; a value between 9.5 - 11 is more consistent (Palm et al. (2002))
K _{oc} (l/kg TS)	33000	1.36 x 10⁸	REACH Reliability 2 (estimated)
K _o (l/kg TS)	330	1.36 x 10⁶	0.01 Koc
Henry (-)	0.000000045	4.9 x 10⁻⁷	REACH Reliability 2 (estimated)
BCF fish (l/kg w.w.)	-	637	calculated EU-TGD (2011)
BCF stem	-	3.3 x 10⁻⁵	
BCF root	-	1.27 x 10⁶	
MTDI (mg/kg/d)	0.01	0.0017	FHI, 2021
RfC (mg/m ³)	-	70	REACH = 70 (worker = 6)
Skin contact: f _{du}	0.067	0.067	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	0.00051	0.00051	

PBDE-209	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	384000	-	
AA-EQS sw (µg/L)	-	-	
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	2	REACH-AF AF:500
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	2450	REACH-AF AF:50
AF (-)	-	50	REACH-AF is 50
Experimental QS _{soil} (f _{OC} = 1%)	98	49	See also EU RAR (PBDE-209)
EQP QS _{soil} (f _{OC} = 1%)	-	-	
QS_{soil} (EQP)	-	-	
QS_{soil} (ecotox.)	98	49	
QS_{soil} (sec. poisoning)	-	849	
Quantification limits	-		
Soil (mg/kg dw)	0.0005	0.003	

4.63 HBCDD

Substance	HBCDD		
CAS #	This refers to 1,3,5,7,9,11-Hexabromocyclododecane (CAS 25637-99-4), 1,2,5,6,9,10-Hexabromocyclododecane (CAS 3194-55-6), α -Hexabromocyclododecane (CAS 134237-50-6), β -Hexabromocyclododecane (CAS 134237-51-7) and γ -Hexabromocyclododecane (CAS 134237-52-8)		
M.W. (g/mol)	642		
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	5.8	5.62	technical product (EU dossier (HBCDD))
K _{oc} (l/kg TS)	330	45709	technical product (EU dossier (HBCDD))
K _o (l/kg TS)	33	457	0.01 Koc
Henry (-)	0.000117	0.000117	
BCF fish (l/kg w.w.)	-	18100	technical product (EU dossier (HBCDD))
BCF stem	-	3.64	
BCF root	-	643	
MTDI (mg/kg/d)	-	9.8 x 10⁻⁵	FHI, 2021
RfC (mg/m ³)	-	0.719	REACH = 0.719
Skin contact: f _{du}	0.067	0.0001	REACH Reliability 1 exp
Diffusivity in air (m ² /h)	-	0,0036	
Background			
Freshwater (µg/L)	-	0 (LOD 0.001)	lowest measured above LOD in TA-2982
Coastal water (µg/L)	-	0 (LOD 0.001)	lowest measured above LOD in TA-2982
Sediment (mg/kg)	-	0	
Soil (mg/kg)	-	-	

HBCDD	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.31	0.0016	M-241 / M-608
AA-EQS sw (µg/L)	-	0.0008	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.086	0.034 (fv: 0.172)	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	64	REACH-AF AF:10
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	0.04	6.4	
EQP QS _{soil} (f _{OC} = 1%)	-	0.00073	
QS _{soil} (EQP)	-	0.0007	
QS _{soil} (ecotox.)	0.04	6.4	
QS _{soil} (sec. poisoning)	-	1.5	
Quantification limits			
Soil (mg/kg dw)	0.0005	0.0005	

4.64 Tetrabromobisphenol A

Substance	Tetrabromobisphenol A		
	CAS #	79-94-7	
M.W. (g/mol)		544	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	5.9	5.9	EU RAR (TBBPA)
K _{oc} (l/kg TS)	49726	49726	EU RAR (TBBPA)
K _D (l/kg TS)	497	497	0.01 Koc
Henry (-)	-	9.4 x 10⁻¹²	REACH Reliability 2 (estimated)
BCF fish (l/kg w.w.)	1200	1234	EU RAR (TBBPA); 1,200 in Fathead minnows (Pimephalus promelas) from EFSA (2011)
BCF stem	-	2.69	
BCF root	-	1055	
MTDI (mg/kg/d)	-	0.053	FHI, 2021
RfC (mg/m ³)	-	4.3	REACH = 4.3
Skin contact: f _{du}	0.067	0.0073	REACH Reliability 1 exp
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

Tetrabromobisphenol A	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	6.6	0.254	M-241 / M-608
AA-EQS sw (µg/L)	-	0.254	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.063	0.11	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	0.155	REACH-AF AF:10
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	0.00094	0.02	
EQP QS _{soil} (f _{OC} = 1%)	-	0.1	
QS_{soil} (EQP)	-	0.13	
QS_{soil} (ecotox.)	0.00094	0.0155	
QS_{soil} (sec. poisoning)	-	3478	
Quantification limits	-		
Soil (mg/kg dw)	0.001	0.0005	

4.65 Bisphenol A

Substance	Bisphenol A		
CAS #		80-05-7	
M.W. (g/mol)		228	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	3.4	3.4	EU RAR (BPA)
K _{oc} (l/kg TS)	1349	715	EU RAR (BPA)
K _d (l/kg TS)	13	7	0.01 Koc
Henry (-)	1.1E-11	1.3 x 10⁻¹⁰	REACH Reliability 2 (estimated)
BCF fish (l/kg w.w.)	5.1	67	EU RAR (BPA) 155 estimated from Pow
BCF stem	-	4.27	
BCF root	-	13.4	
MTDI (mg/kg/d)	0.05	0.004	FHI, 2021
RfC (mg/m ³)	-	1	REACH = 1
Skin contact: f _{du}	-	0.093	REACH Reliability 1 exp
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

Bisphenol A	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	1.6	1.5	M-241 / M-608
AA-EQS sw (µg/L)	-	0.15	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.0011 (fv: 0.011)	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	18.5	
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	-	1.85	EU RAR (BPA) 155 estimated from Pow
EQP QS _{soil} (f _{OC} = 1%)	0.01	0.011	Literature data
QS _{soil} (EQP)	0.01	0.01	
QS _{soil} (ecotox.)	-	1.9	
QS _{soil} (sec. poisoning)	-	0.063	metabolization not considered
Quantification limits	-		
Soil (mg/kg dw)	0.001	0.05	

4.66 PFOS

Substance	PFOS		
CAS #		1763-23-1	
M.W. (g/mol)		500.13 (som syre)	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	-	-	
K _{oc} (l/kg TS)	2690	1000	EU dossier (PFOS) K _{oc} value of 66 is listed as uncertain. K _{oc} = 1000 from Zareitalabad et al. (2013)
K _o (l/kg TS)	26.9	10	0.01 K _{oc}
Henry (-)	0.000000032	8.7 x 10⁻¹⁰	
BCF fish (l/kg w.w.)	2796	2796	EU dossier (PFOS)
BCF stem	-	0.17	
BCF root	-	0.01	
MTDI (mg/kg/d)	0.0001	3.15 x 10⁻⁷	FHI, 2021
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	-	-	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

PFOS	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	2.5	0.00065	M-241 / M-608
AA-EQS sw (µg/L)	-	0.00013	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.00023 (fv: 0.0023)	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-		
AF (-)	-		
Experimental QS _{soil} (f _{OC} = 1%)	0.02		
EQP QS _{soil} (f _{OC} = 1%)	-	0.0000065	Literature data
QS_{soil} (EQP)		0.0000065	
QS_{soil} (ecotox.)	0.02		
QS_{soil} (sec. poisoning)	-		
Quantification limits			
Soil (mg/kg dw)	-	0.002	

4.67 Nonylphenol

Substance	Nonylphenol		
CAS #		84852-15-3	
M.W. (g/mol)		220	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	4.48	4.48	EU dossier (NP)
K _{oc} (l/kg TS)	6596	5360	EU dossier (NP)
K _d (l/kg TS)	66	53.6	0.01 K _{oc}
Henry (-)	0.00011	0.004	REACH Reliability 2
BCF fish (l/kg w.w.)	-	1280	EU dossier (NP)
BCF stem	-	6.4	
BCF root	-	85.9	
MTDI (mg/kg/d)	-	0.05	FHI, 2021
RfC (mg/m ³)	-	0.4	REACH chronic = 0.4 (acute = 0.8) - (Phenol, 4-nonyl-, branched)
Skin contact: f _{du}	-	0.001	REACH Reliability 2 exp, median used (0,1;0,1;0,12)
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

Nonylphenols	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.04 (horm.f)	0.3	M-241 / M-608
AA-EQS sw (µg/L)	-	0.3	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.018	0.016	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	11.5	
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	0.0026	1.15	REACH AF 10 - (Phenol, 4-nonyl-, branched)
EQP QS _{soil} (f _{OC} = 1%)	-	0.016	Literature data
QS _{soil} (EQP)	-	0.016	
QS _{soil} (ecotox.)	0.0026	1.15	
QS _{soil} (sec. poisoning)	-	0.035	
Quantification limits			
Soil (mg/kg dw)	0.005	0.01-0.03	

4.68 Nonylphenoethoxylate

Substance	Nonylphenoethoxylate		
CAS #		9016-45-9	
M.W. (g/mol)		264	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	4.48	4.48	EU dossier (NP)
K _{oc} (l/kg TS)	6596	5360	EU dossier (NP)
K _D (l/kg TS)	66	53.6	0.01 Koc
Henry (-)	0.00011	0.004	REACH Reliability 2
BCF fish (l/kg w.w.)	-	1280	EU dossier (NP)
BCF stem	-	6.4	
BCF root	-	85.9	
MTDI (mg/kg/d)	-	0.13	FHI, 2021
RfC (mg/m ³)	-	0.4	REACH chronic = 0.4 (acute = 0.8) - (Phenol, 4-nonyl-, branched)
Skin contact: f _{du}	-	0.001	REACH Reliability 2 exp, median used (0,1;0,1;0,12)
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

Nonylphenoethoxylate	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.04 (horm.f)		
AA-EQS sw (µg/L)	-		
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.018		
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-		
AF (-)	-		
Experimental QS _{soil} (f _{OC} = 1%)	0.0026		
EQP QS _{soil} (f _{OC} = 1%)	-		
QS_{soil} (EQP)			
QS _{soil} (ecotox.)	0.0026		
QS _{soil} (sec. poisoning)	-		
Quantification limits			
Soil (mg/kg dw)	0.005	0.01-0.03	

4.69 Octylphenol

Substance	Octylphenol		
CAS #		140-66-9 (1806-26-4)	
M.W. (g/mol)		206	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	4.12	4.12	variable (3 - 5.7), EU dossier (OP)
K _{oc} (l/kg TS)	2740	2740	variable (2740 - 18400 in dossier)
K _b (l/kg TS)	25	27.4	0.01 Koc
Henry (-)	0.0000085	0.079	REACH Reliability 2 4-(1,1,3,3-tetramethylbutyl)phenol
BCF fish (l/kg w.w.)	6.34	634	variable (471 - 6000), worst case used
BCF stem	-	6.15	
BCF root	-	45.7	
MTDI (mg/kg/d)	-	0.1	FHI, 2021
RfC (mg/m ³)	-	0.6	REACH chronic AF 50 = 0.6, (acute = 1.8) - 4-(1,1,3,3-tetramethylbutyl)phenol6
Skin contact: f _{du}	-	0.0008	REACH Reliability 2 read across, median used (0,07;0,08;0,14)
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

Octylphenols	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.12	0.1	M-241 / M-608
AA-EQS sw (µg/L)	-	0.01	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.00034	0.00027 (fv: 0.0027)	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	11.5	
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	-	1.15	REACH AF 10 - (4-(1,1,3,3-tetramethylbutyl)phenol)
EQP QS _{soil} (f _{OC} = 1%)	0.006	0.0027	Literature data
QS _{soil} (EQP)	0.006	0.0027	
QS _{soil} (ecotox.)	-	1.15	
QS _{soil} (sec. poisoning)	-	0.041	
Quantification limits	-		
Soil (mg/kg dw)	0.001	0.01-0.03	

4.70 Octylphenoethoxylate

Substance	Octylphenoethoxylate		
CAS #		9002-93-1	
M.W. (g/mol)		250	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	4.12	4.12	variable (3 - 5.7), EU dossier (OP)
K _{oc} (l/kg TS)	2740	2740	variable (2740 - 18400 in dossier)
K _b (l/kg TS)	25	27.4	0.01 Koc
Henry (-)	0.0000085	0.079	REACH Reliability 2 4-(1,1,3,3-tetramethylbutyl)phenol
BCF fish (l/kg w.w.)	6.34	634	variable (471 - 6000), worst case used
BCF stem	-	6.15	
BCF root	-	45.7	
MTDI (mg/kg/d)	-	0.1	FHI, 2021
RfC (mg/m ³)	-	0.6	REACH chronic AF 50 = 0.6, (acute = 1.8) - 4-(1,1,3,3-tetramethylbutyl)phenol6
Skin contact: f _{du}	-	0.0008	REACH Reliability 2 read across, median used (0,07;0,08;0,14)
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

Octylphenols	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.12		
AA-EQS sw (µg/L)	-		
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.00034		
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-		
AF (-)	-		
Experimental QS _{soil} (f _{OC} = 1%)	-		
EQP QS _{soil} (f _{OC} = 1%)	0.006		
QS _{soil} (EQP)	0.006		
QS _{soil} (ecotox.)	-		
QS _{soil} (sec. poisoning)	-		
Quantification limits	-		
Soil (mg/kg dw)	0.001	0.01-0.03	

4.71 Tributyltin cation

Substance	Tributyltin cation		
CAS #		688-73-3; 366643-28-4	
M.W. (g/mol)		290	
Property	2011 Values	New Review	References for new values and notes
log Pow (l/l)	3.2	4.4	3.1 - 4.4 from EU dossier and Arnold et al. (1997)
K _{oc} (l/kg TS)	2000	1084	conservative log K _{oc} 2.5 - 6.1 dossier, field 5.1 to 5.7 (Berg et al. (2001))
K _D (l/kg TS)	20	10.8	0.01 K _{oc}
Henry (-)	0.0000017	0.0000017	
BCF fish (l/kg w.w.)	2600	6000	EU dossier (TBT)
BCF stem	1.1	6.4	
BCF root	1.1	74.6	
MTDI (mg/kg/d)	0.0003	0.000122	FHI, 2021
RfC (mg/m ³)		-	
Skin contact: f _{du}	0	0.151	REACH Reliability 2 exp, median used
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

Tributyltin compounds	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.00014	0.0002	M-241 / M-608
AA-EQS sw (µg/L)	-	0.0002	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.000002	0.0000020	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	0.3	
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	-	0.03	Silva et al. (2014); soil ca 1% OC
EQP QS _{soil} (f _{OC} = 1%)	0.00003	0.0	Literature data
QS _{soil} (EQP)	0.00003	0.0000022	
QS _{soil} (ecotox.)	-	0.03	
QS _{soil} (sec. poisoning)	-	0.81	
Quantification limits	-		
Soil (mg/kg dw)	0.001	0.001	

4.72 Triphenyltin cation

Substance	Triphenyltin cation		
CAS #	892-20-6, 900-95-8, 76-87-9, 639-58-7		
M.W. (g/mol)	350		
Property	2011 Values	New Review	References for new values and notes
log Pow (l/l)	-	3.43	3.43 WHO (1999), 3.1 USEPA (1999)
K _{oc} (l/kg TS)	2000	1900	1900 – 54000 (USEPA, 1999)
K _d (l/kg TS)	20	19	0.01 K _{oc}
Henry (-)	0.00000063	6.3 x 10 ⁻⁷	
BCF fish (l/kg w.w.)	1100	1100	257 – 4100 (WHO, 1999), 530 – 7500 with 1100 suggested (Aquateam, 2011)
BCF stem	0	4.37	
BCF root	0	14	
MTDI (mg/kg/d)	0	0.000147	FHI, 2021
RfC (mg/m ³)		-	
Skin contact: f _{du}	0	-	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	0	0
Coastal water (µg/L)	-	0	
Sediment (mg/kg)	-	0	
Soil (mg/kg)	m.d	m.d	

Triphenyltin compounds	Previous values	New Review	References for new values and notes
Threshold values			
Q _S _{biota,sp} (mg/kg biota)	-	-	M-241 / M-608
AA-EQS fw (µg/L)	0.0006	0.0019	M-241 / M-608
AA-EQS sw (µg/L)	-	0.0019	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.000036	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental Q _S _{soil} (f _{OC} = 1%)	-	0.03	assumme same as TBT
EQP Q _S _{soil} (f _{OC} = 1%)	0.006	0.000036	Literature data
Q _S _{soil} (EQP)	0.006	0.000036	
Q _S _{soil} (ecotox.)	-	0.03	
Q _S _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.001	0.001	

4.73 Di(2-ethylhexyl)phthalate (DEHP)

Substance	DEHP		
CAS #		117-81-7	
M.W. (g/mol)		391	
Property	2007 Values	New Review	References for new values and notes
log P _{ow} (l/l)	5.1	7.5	EU dossier (DEHP) variable 63100 - 88800 (depends on cation) 0.01 Koc worst case BCF EU RAR (DEHP): 840 (fish), 2500 (mussels), 2700 crustaceans FHI, 2021 REACH Reliability 2 exp, NB! total amount migrated from film to skin and bandaging was 0,064%
K _{oc} (l/kg TS)	-	165000	
K _d (l/kg TS)	5860	1650	
Henry (-)	0.000044	0.000044	
BCF fish (l/kg w.w.)	840	840	
BCF stem	-	0.14	
BCF root	-	17990	
MTDI (mg/kg/d)	0.02	0.05	
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	-	<0,00064	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

DEHP	Previous values	New Review	References for new values and notes
Threshold values			
QS _{biota,sp} (mg/kg biota)	-	-	M-241 / M-608
AA-EQS fw (µg/L)	0.5	1.3	M-241 / M-608
AA-EQS sw (µg/L)	-	1.3	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.215	10	M-241 / M-608
Soil ecotox (mg/kg)			
NOEC/EC10 (f _{OC} = 1%)	-	65	
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	-	6.5	EU RAR (DEHP)
EQP QS _{soil} (f _{OC} = 1%)	2.8	2.15	Literature data
QS _{soil} (EQP)	2.8	2.1	
QS _{soil} (ecotox.)	-	6.5	
QS _{soil} (sec. poisoning)	-	-	
Quantification limits			
Soil (mg/kg dw)	0.01	0.8	

4.74 Medium-chain chlorinated paraffins (MCCP)

Substance	MCCP		
CAS #		85535-85-9	
M.W. (g/mol)		232.5-826.5	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	5.58	7	UK Environment Agency (MCCP) Log Koc = 0,00028 + 0,9831logPow 0.01 Koc
K _{oc} (l/kg TS)	91201	7616755	
K _d (l/kg TS)	912	76168	
Henry (-)	-	-	
BCF fish (l/kg w.w.)	1087	1087	variable EU RAR (MCCP)
BCF stem	-	0.44	
BCF root	-	7414	
MTDI (mg/kg/d)	-	0.036	FHI, 2021
RF _C (mg/m ³)	-	2	REACH = 2
Skin contact: f _{du}	-	0.007	REACH Reliability 1 exp
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

MCCP	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	1	0.052	M-241 / M-608
AA-EQS sw (µg/L)	-	0.052	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.012	5	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	59.5	REACH-AF AF:10
AF (-)	-	10	
Experimental QS _{soil} (f _{OC} = 1%)	-	6	
EQP QS _{soil} (f _{OC} = 1%)	0.6	3.97	
QS _{soil} (EQP)	0.6	4	
QS _{soil} (ecotox.)	-	6	
QS _{soil} (sec. poisoning)	-	11	
Quantification limits	-		
Soil (mg/kg dw)	0.05	0.1	

4.75 Short-chain chlorinated paraffins (SCCP)

Substance	SCCP		
	CAS #	85535-84-8	
M.W. (g/mol)		337	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	4.39	6	function of Chlorine content (6 used by the EU dossier (SCCP)) EU dossier (SCCP) 0.01 Koc 1173 - 7816 (whole fish), 24000 - 40900 (mussels) FHI, 2021 REACH = 8.7 REACH Reliability 2 exp, less than 0,01%
K _{oc} (l/kg TS)	199500	199526	
K _p (l/kg TS)	1995	1995	
Henry (-)	-	-	
BCF fish (l/kg w.w.)	-	1600	
BCF stem	-	2.38	
BCF root	-	1260	
MTDI (mg/kg/d)	-	0.0023	
RfC (mg/m ³)	-	8.7	
Skin contact: f _{du}	-	0.0001	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

SCCP	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.5	0.4	M-241 / M-608
AA-EQS sw (µg/L)	-	0.4	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	0.1	0.8	M-241 / M-608
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	59.5	REACH-AF AF:20
AF (-)	-	20	
Experimental QS _{soil} (f _{OC} = 1%)	-	2.98	
EQP QS _{soil} (f _{OC} = 1%)	1	0.8	
QS _{soil} (EQP)	1	0.8	
QS _{soil} (ecotox.)	-	2.975	
QS _{soil} (sec. poisoning)	-	0.091	
Quantification limits	-		
Soil (mg/kg dw)	0.002	0.1	

4.76 Tricresyl phosphate

Substance	Tricresyl phosphate		
CAS #		1330-78-5	
M.W. (g/mol)		368.37	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	5.11	5.93	REACH Reliability 2
K _{oc} (l/kg TS)	29512	20417	REACH Reliability 1
K _p (l/kg TS)	295	204	0.01 Koc
Henry (-)	0.0000011	0.0000011	
BCF fish (l/kg w.w.)	2768	21903	calculated EU-TGD (2011)
BCF stem	-	2.6	
BCF root	-	1113	
MTDI (mg/kg/d)	-	0.02	FHI, 2021
RfC (mg/m ³)	-	0.08	REACH = 0.08
Skin contact: f _{du}	-	-	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-	-	
Coastal water (µg/L)	-	-	
Sediment (mg/kg)	-	-	
Soil (mg/kg)	-	-	

Tricresyl phosphate	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.03	1	REACH-AF AF:10
AA-EQS sw (µg/L)	-	<0.01	REACH-AF AF:100
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	0.041	REACH-ecotox
Soil ecotox (mg/kg)	-		
NOEC/EC10 (f _{OC} = 1%)	-	505	REACH-AF AF:1000
AF (-)	-	1000	
Experimental QS _{soil} (f _{OC} = 1%)	-	0.51	
EQP QS _{soil} (f _{OC} = 1%)	0.001	0.2	Derived with updated data
QS _{soil} (EQP)	0.001	0.20	
QS _{soil} (ecotox.)	-	0.51	
QS _{soil} (sec. poisoning)	-	0.0013	
Quantification limits	-		
Soil (mg/kg dw)	0.12	-	

4.77 Dioxins (TCDD-equiv.)

Substance	Dioxins		
CAS #		1746-01-6	
M.W. (g/mol)		321.97	
Property	2007 Values	New Review	References for new values and notes
log Pow (l/l)	-	6.8	2,3,7,8-TCDD (EPISuite) eq
K _{oc} (l/kg TS)	1400000	4500000	
K _d (l/kg TS)	14000	45000	0.01 K _{oc}
Henry (-)	0.0003	0.0003	EU dossier (dioxin)
BCF fish (l/kg w.w.)	-	41540	
BCF stem	-	0.66	
BCF root	-	5201	FHI, 2021
MTDI (mg/kg/d)	1.4E-09	2.86 x 10⁻¹⁰	
RfC (mg/m ³)	-	-	
Skin contact: f _{du}	0.2	0.2	
Diffusivity in air (m ² /h)		0,0036	
Background			
Freshwater (µg/L)	-		
Coastal water (µg/L)	-		
Sediment (mg/kg)	-		
Soil (mg/kg)	-	-	

Dioxins (TCDD-equiv.)	Previous values	New Review	References for new values and notes
Threshold values			
AA-EQS fw (µg/L)	0.000004	1.90 x 10⁻⁸	M-241 / M-608
AA-EQS sw (µg/L)	-	1.90 x 10⁻⁹	M-241 / M-608
AA-EQS sed (mg/kg) (f _{OC} = 1%)	-	9 x 10⁻⁷	M-241 / M-608
Soil ecotox (mg/kg)	-	-	
NOEC/EC10 (f _{OC} = 1%)	-	-	
AF (-)	-	-	
Experimental QS _{soil} (f _{OC} = 1%)	-	-	
EQP QS _{soil} (f _{OC} = 1%)	0.0000034	8.55 x 10⁻⁷	
QS _{soil} (EQP)	0.0000034	8.55 x 10⁻⁷	
QS _{soil} (ecotox.)	-	-	
QS _{soil} (sec. poisoning)	-	0.000384	
Quantification limits	-	-	
Soil (mg/kg dw)	0.00001	1 ng/kg TS	

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Vedlegg A

VURDERING AV GRENSEVERDIER FOR HUMAN HELSE

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Tabell 1: Oversikt over MTDI-verdier^a som brukt til å vurdere human risiko i utredning av normverdier og tilstandsklasser i jord og anslått prosentandel av MTDI-verdier som kommer fra mat og drikke uten spesiell kontaminering^b.

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
Arsen	0,0003	75 %	<p>Arsen (uorganisk) er karsinogent, men ikke gentoksisk. EFSA beregnet 1 % ekstra kreftrisiko (BMDL₀₁) for ulike kreftformer (lunge, hud og blære). BMDL₀₁ var fra 0,3 til 8 µg/kg kv per dag¹. Den laveste (0,3 µg/kg kv per dag) brukes som MTDI. En inntaksberegning fra EFSA² viser at arseninntak fra mat er overlappende med 1 % økt kreftrisiko.</p> <p>Gjennomsnittlig inntak hos voksne strekker seg fra 0,09 til 0,38 µg/kg kv per dag². Midtpunktet i dette intervallet er 0,23 µg/kg kv per dag. Dette utgjør 78 % av 0,3 µg/kg kv per dag (laveste BMDL₀₁, for lungekreft). Inntaket er derfor anslått til ca. 75 % av MTDI-verdien.</p>
Bly	0,0005	75 %	<p>Bly i relativt lave mengder er forbundet med skader på nervesystemet under utvikling, øket blodtrykk og øker forekomst av kronisk nyreskade hos voksne. EFSA uttalte i 2010 at den tidligere PTWI på 24 µg/kg/uke ikke lenger var gjeldende. Nytt tolerabelt inntak ble ikke fastsatt fordi det ikke var datagrunnlag for å fastsette nedre grense for toksisitet. Blodnivåene av bly som var assosiert med 1 % nedgang i IQ hos barn (BMDL₀₁) var 12 µg/L (tilsvarer inntak på 0,5 µg/kg kv per dag). Denne brukes som MTDI. For økning i blodtrykk var BMDL₀₁ 36 µg/L (tilsvarer inntak på 1,5 µg/kg kv per dag) og BMDL₁₀ for økt forekomst av kronisk nyreskade var 15 µg/L (tilsvarer inntak på 0,63 µg/kg kv per dag)³.</p> <p>I en inntaksberegning i flere europeiske land gjort av EFSA i 2012 var gjennomsnittlig inntak hos voksne 0,5 µg/kg kv per dag⁴. Blant gravide i Den norske mor, far og barn-undersøkelsen (MoBa) i perioden 2003-2008 var median blykonsentrasjon 8,2 µg/L⁵. 13 % av deltakerne hadde et blyinnhold i blodet som gir barnet eksponering tilsvarende</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			BMDL ₀₁ for nedgang i IQ ⁵ . Blant unge kvinner ser derfor gjennomsnittsinntak ut til å være lavere enn 0,5 µg/kg/dag. Det anslås derfor at gjennomsnittsinntak av bly fra mat utgjør ca. 75 % av MTDI.
Kadmium	0,000357	50 %	TWI ⁶ er 2,5 µg/kg kv per uke, som tilsvarer 0,357 µg/kg kv per dag, som brukes som MTDI. Den ble satt av EFSA i 2009 med nyreskade som kritisk effekt og ble stadfestet av EFSA i 2012 ⁷ , og TWI er lavere enn den satt av WHO. I EFSA's inntaksberegning fra 2012 ble gjennomsnittlig inntak hos voksne beregnet til 1,44 (1,21-1,94) µg/kg kv per uke (LB) ⁸ . Gjennomsnittsinntaket er derfor anslått til 50 % av TWI.
Kvikksølv	0,000571	50 %	EFSA (2012) TWI for uorganisk kvikksølv er 4 µg/kg/uke ⁹ basert på nyreeffekter. Dette tilsvarer 0,57 µg/kg kv per dag, som brukes som MTDI. Eksponering fra mat ble beregnet til å være opp mot 1,8 µg/kg per uke hos de med høyt inntak (95-persentil). Gjennomsnittlig inntak er betydelig lavere (laveste LB til høyeste UB inntak var 0,13 til 2,16 µg/kg kv per uke på tvers av undersøkelser og alderskategorier). Høyeste gjennomsnittlige inntak var hos småbarn og var ca. 50 % av TWI.
Kobber	0,0714	50 %	UL for kobber er fastsatt for voksne til 5 mg/dag ¹⁰ , og ekstrapolert til barn ved hjelp av standard kroppsvekt for ulike alderskategorier. 5 mg/dag ved kroppsvekt 70 kg (standardvekt for voksne) tilsvarer 0,0714 mg/kg kv per dag, og brukes som MTDI. Per 2021 er EFSA Scientific Committee i gang med revisjon av UL for kobber med tilhørende eksponeringsberegning. Gjennomsnittlig inntak i Europa er tidligere beregnet til å være 1-2,3 mg per dag, så opptil halvparten av UL. Inntaket fra kosten anslås derfor som 50 %

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
Sink	0,35	50 %	<p>UL for sink er fastsatt til 25 mg/dag for voksne, og ekstrapolert til barn ved hjelp av standard kroppsvekt for ulike alderskategorier¹⁰. 25 mg/dag ved kroppsvekt 70 kg (standardvekt for voksne) tilsvarer 0,35 mg/kg kv per dag, og brukes som MTDI.</p> <p>Gjennomsnittlig inntak i Europa er beregnet til 9 (kvinner) og 13 (menn) mg/dag. Dette utgjør ca. 50 % av UL</p>
Krom (total)	0,3	50 %	<p>TDI for krom (III) ble fastsatt til 0,3 mg/kg kv per dag av EFSA i 2014¹¹. Denne TDI er relevant hvis total mengde krom er målt i jord, fordi mest krom i sedimenter er redusert til krom (III). Eksponering fra mat antas å være krom (III), fordi mat stort sett er reduserende medium, der oksidasjon fra krom (III) til krom (VI) sannsynligvis ikke vil skje. Gjennomsnittsinntak er av EFSA beregnet til å være 0,6 til 1,6 µg/kg kv per dag hos voksne og dette utgjør opptil ca. 50 % av MTDI.</p>
Krom (VI)	0,0001	50 %	<p>Krom (VI) er gentoksisk og karsinogent. BMDL₁₀ for adenomer og karsinomer i tynntarm hos mus er 1 mg/kg kv per dag¹¹. Eksponeringsmarginen (inntak/BMDL₁₀) bør være >10 000 for å beskytte helse, så eksponering bør være under 0,0001 mg/kg kv per dag (brukes som MTDI).</p> <p>Ved beregning av eksponering for krom (VI) regnet EFSA i 2014 med at alt krom i drikkevann er krom (VI) (verste-fall scenario). Gjennomsnittsinntak (fra laveste LB til høyeste UB på tvers av aldersgrupper og undersøkelser) var fra 0,7 til 159 ng/kg/dag fra drikkevann. Det er høy usikkerhet knyttet til UB. MOE var > 10000 i de aller fleste undersøkelser (unntak UB småbarn (1-3 år)). Kontaminering av drikkevann i Norge med krom (VI) er ikke noe kjent problem, og andel fra drikkevann anslås til 50 %.</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
Nikkel	0,013	75 %	EFSA's TDI for nikkel ble oppdatert i 2020 og er 13 µg/kg kv per dag ¹² . Gjennomsnittsinntaket (LB) i Europa var fra 1,8 til 4,3 µg/kg kv per dag hos voksne og fra 6,2 til 12,5 µg/kg kv per dag hos småbarn (1-3 år), som var alderskategorien med høyest inntak. Ut fra dette anslås det at ca. 75 % av MTDI kommer fra mat.
PCB7	0,00001	25 %	Ingen TDI kunne fastsettes av EFSA i 2005 fordi PCB-testsubstanser var kontaminert med dioksiner ¹³ . 10 ng PCB6 (sum av PCB-28, -52, -101, -138, -153 og -180) per kg kroppsvekt per dag har vært brukt som referanseverdi i tidligere risikovurderinger av PCB i mat i Norge ¹⁴ , og er også anvendt som MTDI her. PCB-118 (dioksinliknende) inngår i PCB7, men inngår også i dl-PCB og er derfor dekket av total TEQ fra dioksiner og dl-PCB. PCB6 og PCB7 er høyt korrelert med total TEQ i mat ¹⁵ . Inntak av sum PCB6 var ved median hos gravide deltakere i MoBa 2,6 ng/kg/dag ¹⁶ . Dette utgjør ca. 25 % av MTDI.
DDT	0,01	0 %	TDI for DDT ble fastsatt av WHO ¹⁷ og godkjent av EFSA. EFSA estimerte inntaket til 5-30 ng/kg kv per dag ¹⁸ . Dette inntaket er langt under TDI, og % bidrag fra mat settes lik 0.
Trikloretan	0,0005	0 %	TDI er 0,5 µg/kg kv per dag basert på tre kritiske effekter (lavere tymus vekt hos voksne mus, utviklings immun-toksisitet hos mus, samt utviklingstoksisitet (hjerte feildannelse) hos rotter) ¹⁹ . Bidrag fra mat er ukjent, men er anslått å være lavt, og satt til 0 %.
PAH16	0,000098	50 %	EFSA risikovurderte 15 PAH og benzo[c]fluorene i 2008 ²⁰ . EFSA konkluderte for 8 PAH som det var karsinogenisetsdata for etter oral eksponering: benzo[a]pyrene, benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[ghi]perylene,

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			<p>chrysene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene.</p> <p>EFSA uttalte at det er bare disse 8 PAH (alene eller i kombinasjon) som er mulige indikatorer for karsinogent potensiale av PAH i mat.</p> <p>EFSA beregnet BMDL₁₀ for økning i tumorbærende dyr sammenliknet med kontroll for BaP alene og for blandinger av PAH.</p> <p>BMDL₁₀ var 0,49 mg/kg kv per dag for PAH8. Ved bruk av MOE på 10000 settes MTDI for PAH8 til 0,000049 mg/kg kv per dag.</p> <p>PAH16 er definert som summen av naftalen, acenaftalen, acenaften, fluoren, fenantren, antracen, fluoranten, pyren, benzo[a]antracen, krysen, benzo[b]fluoranten, benzo[k]fluoranten, benzo[a]pyren, indeno[1,2,3-cd]pyren, dibenz[ah]antracen og benzo[ghi]perylene.</p> <p>Det var behov for MTDI-verdi for PAH 16 i forbindelse med vurdering av tilstandsklasser i jord. PAH8 utgjør ca. 50 % av PAH 16 i jord²¹. MTDI-verdien som kan benyttes for PAH16 er derfor satt til det dobbelte av den for PAH8 (2 x 0,000049 mg/kg kv per dag).</p> <p>Inntaksberegninger fra EFSA²⁰ indikerte at gjennomsnittsinntaket av PAH8 var 28,8 ng/kg kv per dag, og MOE var >10000 ved gjennomsnittlig. Ved P95 inntak var MOE noe lavere enn 10000 i deler av befolkningen i EU. Mediant inntak av PAH8 utgjorde 59 % av TDI-verdien for PAH8. Bidraget fra mat anslås til 50 % av TDI-verdien.</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
Benzo(a)pyren	0,0000007	50 %	<p>Se forklaring for PAH over. BMDL₁₀ for BaP alene var 0,07 mg/kg kv per dag²⁰ For å oppnå MOE på 10000 kan inntaket være 0,0000007 mg/kg kv per dag, og brukes som MTDI.</p> <p>Inntaksberegning fra MoBa viste i gjennomsnitt 2,13 ng/kg kv per dag (149 ng/dag og standard kv 70 kg)²² og var i tråd med medianen fra EFSA (3,9 ng/kg kv per dag)²⁰ som gir MOE på 32900. Gjennomsnittsinntak (EFSA) utgjør 56 % av TDI-verdien, og bidrag fra mat settes til 50 %.</p>
Benzen	0,0033	0 %	<p>Foreløpig maksimalt tillatt risikonivå (MPR), er 3,3 µg/kg kv per dag²³. Dette er basert på livstidsrisiko for kreft etter oral eksponering på 1 per 10000 personer og er ekstrapolert fra inhalasjonseksponering, noe som øker usikkerhet. FHI bruker denne verdien som MTDI.</p> <p>Eksponeringen er overveiende ved inhalasjon og andel fra mat er derfor satt til 0 %.</p>
Alifater >C8-C10	0,8	0 %	<p>Kritisk studie identifisert av TPHCWG²⁴ med funn av redusert kroppsvekt samt mikroskopiske nyre- og leverforandringer hos hannrotter i 90-dagers studie (LOAEL 500 mg/kg kv per dag) ved administrering av alifatisk C9-C12 fraksjon. FHI bruker usikkerhetsfaktor 600 (x2 ekstra for ekstrapolasjon subkronisk til kronisk studie, x3 ekstra da LOAEL i henhold til ECHA guidance R.8²⁵); da blir MTDI 0,8 mg/kg kv per dag.</p> <p>Innholdet av petroleumsalifater i mat anslås å være lavt og bidrag fra mat settes til 0 %.</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
Alifater >C10-C12	0,5	0 %	<p>Kritisk studie identifisert av TPHCWG²⁴ med funn av leverforandringer hos rotter i 13-ukers studie (NOAEL 100 mg/kg kv per dag) ved administrering av alifatisk C10-C13 fraksjon. FHI bruker usikkerhetsfaktor 200 (x2 ekstra da subkronisk studie i henhold til ECHA guidance R.8²⁵); da blir MTDI 0,5.</p> <p>Innholdet av petroleumsalifater i mat anslås å være lavt og bidrag fra mat settes til 0 %.</p>
Alifater >C12-C35	0,5	0 %	<p>Kritisk studie identifisert av TPHCWG²⁴. For alifat-kategorien C>12-C16 ga en 90-dagers oral rottestudie med administrering av C11-C17 isoparafinsk løsningsmiddel økt levervekt (NOAEL 100 mg/kg kv per dag). For alifat kategorien C>16-C35 ga en 90-dagers studie med total petroleum hydrokarbon C17-C34 alifater (hvit mineralolje) funn av levergranulomer (NOAEL 200 mg/kg kv per dag). Som en konservativ tilnærming for alifater >C12-C35 velger FHI å bruke laveste NOAEL fra de to studiene (100 mg/kg kv per dag basert på den nevnte rottestudie med C>12-C16) og bruker usikkerhetsfaktor 200 (ekstra usikkerhetsfaktor x2 for subkronisk studie i henhold til ECHA guidance R.8²⁵). Da blir MTDI 0,5 mg/kg kv per dag.</p> <p>Innholdet av petroleumsalifater i mat anslås å være lavt og bidrag fra mat settes til 0 %.</p>
DEHP	0,05	25 %	<p>EFSA²⁶ fastsatte i 2019 en foreløpig TDI på 0,05 mg/kg/dag uttrykt som DEHP ekvivalenter med effekter på reproduksjon i rotter. Dette er en gruppe-TDI for fire phtalater (DBP, BBP, DEHP and DINP) som har ulike relative potensfaktorer (RPF). RPF er 1 for DEHP, 5 for DBP, 0,1 for BBP, og 0,3 for DINP.</p> <p>I EFSA's eksponeringsberegning viste verstefalls-scenario eksponering tilsvarende 25 % av gruppe-TDI, og andel fra mat er derfor satt til 25 %.</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
Dioksiner og dioksinlike PCB (TCDD ekvivalenter basert på TEQ _{WHO-2005})	0,00000000286	100 %	TWI for sum av PCDD/F og dl-PCB ble fastsatt av EFSA til 2 pg TEQ _{WHO-2005} /kg kv per uke ²⁷ . Dette tilsvarer 0,286 pg TEQ/kg kv per dag, og brukes som MTDI. Relativ potensfaktor for de 29 kongenerne som inngår i total TEQ (TCDD ekvivalenter) er fastsatt av WHO ²⁸ og er per 2021 under revisjon. Gjennomsnittlig eksponering fra mat tilsvarer eller overskrider TWI. Bidrag fra mat er derfor satt til 100 %.

BMDL: benchmark dose lower bound; kv: kroppsvekt; LB: lower bound; LOAEL: Laveste dosenivå med observerte alvorlige helseeffekter (Lowest Observed Adverse Effect Level); MOE: eksponeringsmargin (Margin of Exposure); MPR: Foreløpig maksimal tillatt risikonivå (Provisional Maximum Permissible Risk); NOAEL: Høyeste dosenivå uten observerte alvorlige helseeffekter (No Observable Adverse Effect Level); TDI: tolerabelt daglig inntak; TPHCWG: Total Petroleum Hydrocarbon Criteria Working Group; TWI: tolerabelt ukentlig inntak; UB: Upper Bound; UL: øvre tolerabelt inntak (Upper Level).

^a MTDI-verdi er basert på helsebasert referanseverdi og angitt som maksimalt inntak per kg kroppsvekt per dag, uavhengig av om referanseverdien som ligger til grunn er en TDI. Den kan opprinnelig være fastsatt for ukentlig eller daglig inntak, eller det er MOE som ligger til grunn i risikovurderingen som er brukt. Det kan også ha vært gjort andre avveininger, og forklaringer finnes i kolonnen «vurdering».

^b Angir den prosentandelen av MTDI som gjennomsnittlig inntak av mat og drikke fra områder uten spesiell forurensing bidrar til. Det er gjort som trinnvise anslag (0 %, 25 %, 50 %, 75 % og 100 %), begrunnelse for anslaget er gitt i kolonnen «vurdering».

Referanser tabell 1

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²⁴ TPHCWG, 1997. TPH Series Volume 4: Development of fraction specific reference doses (RfD's) and reference concentration (RfC's) for total petroleum hydrocarbons. Edwards DA, Andriot MD, Amoroso MA, Tummey AC, Bevan CJ, Tveit A, Hayes LA, Youngren SH, and Nakles DV. ISBN 1-884-940-13-7.

²⁵ ECHA guidance R.8 (2012).

https://echa.europa.eu/documents/10162/13632/information_requirements_r8_en.pdf/e153243a-03f0-44c5-8808-88af66223258

²⁶ EFSA CEP Panel (EFSA Panel on Food Contact Materials, Enzymes and Processing Aids), Silano, V, Barat Baviera, JM, Bolognesi, C, Chesson, A, Cocconcelli, PS, Crebelli, R, Gott, DM, Grob, K, Lampi, E, Mortensen, A, Rivièrè, G, Steffensen, I-L, Tlustos, C, Van Loveren, H, Vernis, L, Zorn, H, Cravedi, J-P, Fortes, C, Tavares Poças, MF, Waalkens-Berendsen, I, Wölfle, D, Arcella, D, Cascio, C, Castoldi, AF, Volk, K and Castle, L, 2019. Scientific Opinion on the update of the risk assessment of di-butylphthalate (DBP), butyl-benzyl-phthalate (BBP), bis(2-ethylhexyl)phthalate (DEHP), di-isononylphthalate (DINP) and di-isodecylphthalate (DIDP) for use in food contact materials. *EFSA Journal* 2019;17(12):5838, 85 pp.

<https://doi.org/10.2903/j.efsa.2019.5838>

²⁷ EFSA CONTAM Panel (EFSA Panel on Contaminants in the Food Chain), Knutsen, HK, Alexander, J, Barregård, L, Bignami, M, Brüschweiler, B, Ceccatelli, S, Cottrill, B, Dinovi, M, Edler, L, Grasl-Kraupp, B, Hogstrand, C, Nebbia, CS, Oswald, IP, Petersen, A, Rose, M, Roudot, A-C, Schwerdtle, T, Vleminckx, C, Vollmer, G, Wallace, H, Fürst, P, Håkansson, H, Halldorsson, T, Lundebye, A-K, Pohjanvirta, R, Rylander, L, Smith, A, van Loveren, H, Waalkens-Berendsen, I, Zeilmaker, M, Binaglia, M, Gómez Ruiz, JÁ, Horváth, Z, Christoph, E, Ciccolallo, L, Ramos Bordajandi, L, Steinkellner, H and Hoogenboom, LR, 2018. Scientific Opinion on the risk for animal and human health related to the presence of dioxins and dioxin-like PCBs in feed and food. *EFSA Journal* 2018;16(11):5333, 331 pp. <https://doi.org/10.2903/j.efsa.2018.5333>

²⁸ Van den Berg M, Birnbaum L, Bosveld ATC, Brunström B, Cook P, Feeley M, Giesy J, Hanberg A, Hasegawa R, Kennedy SW, Kubiak T, Larsen JC, van Leeuwen FXR, Liem AKD, Nolt C, Peterson RE, Poellinger L, Safe S, Schrenk D, Tillitt D, Tysklind M, Younes M, Wærn F and Zacharewski T, 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. *Environmental Health Perspectives*, 106, 775–792

Tabell 2: Oversikt over MTDI-verdier^a som brukt til å vurdere human risiko i utredning av normverdier i jord og anslått prosentandel av MTDI-verdier som kommer fra mat og drikke uten spesiell kontaminering^b.

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
Cyanid fri	0,0225	0 %	<p>MTDI er basert på subkronisk 13-ukers oral (drikkevann) rottestudie (identifisert av WHO)¹ med mindre endringer i testis som kritisk effekt (NOAEL 4,5 mg/kg kv per dag, usikkerhetsfaktor 200 (FHI har lagt til x2 ekstra for overgang subkronisk – kronisk i henhold til ECHA guidance R.8, tabell R.8-5)²). Det er ikke fri cyanid i mat, men noen spiselige planter (f.eks. cassava) inneholder cyanogene glykosider, og enzymer i tarmen slipper hydrogencyanid (HCN) fri¹.</p> <p>Bidraget fra mat og vann anses som generell lavt i Norge og er skjønnsmessig satt til 0 %.</p>
Lindan	0,001	25 %	<p>For Lindan (gamma-HCH) refererer EFSA³ til en ADI på 0,001 mg/kg per dag. Dette er basert på NOAEL i en 2-års studie i rotte og en usikkerhetsfaktor på 500.</p> <p>Inntaksdata mangler, men lindan påvises regelmessig i mat⁴. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 25 %.</p>
Monoklorbensen	0,0857	0 %	<p>TDI satt av WHO⁵ er basert på 2-årig oral rottestudie med funn av neoplastiske knuter i lever. NOAEL var 60 mg/kg kv per dag, og korrigert for dosering 5 av 7 dager per uke er NOAEL (60*5/7) 42,8 mg/kg kv per dag. En usikkerhetsfaktor på 500 (x5 ekstra knyttet til usikkerhet i kreftutvikling) ble brukt. TDI er derfor 42,8 mg/500 = 0,0875 mg/kg kv per dag.</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>
1,2-diklorbensen	0,43	0 %	<p>TDI satt av WHO⁶ er basert på 2-årig oral studie i mus med funn av nyretoksisitet (tubulære endringer). NOAEL (60 mg/kg kv per dag) korrigert for dosering 5 dager i uke er 60 x 5/7 = 42.9 mg/kg kv per dag. TDI er 0,43 mg/kg kv per dag med bruk av usikkerhetsfaktor 100.</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
1,4-diklorbensen	0,107	0 %	TDI satt av WHO ⁶ er basert på 2-årig oral rottestudie med funn av nyretoksisitet (histologiske forandringer) med LOAEL (150 mg/kg kv per dag). De korrigerte for dosering 5 dager per uke og brukte usikkerhetsfaktor 1000 (x10 ekstra for ekstrapolering fra LOAEL til NOAEL) som resulterte i en TDI på 0,107 mg/kg kv per dag. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
1,2,3-triklorbensen	0,0077	0 %	TDI satt av WHO ⁷ er basert på 13-ukers oral rottestudie med funn av levertoksisitet (økt relativ levervekt og histologiske endringer) (NOAEL 7,7 mg/kg kv per dag, usikkerhetsfaktor 1000 (x10 for å ekstrapolere fra subkronisk til kronisk studie)). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
1,2,4-triklorbensen	0,0077	0 %	TDI satt av WHO ⁷ - se oven (de tre triklorbensen-isomerene har lignende levertoksisitet). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
1,3,5-triklorbensen	0,0077	0 %	TDI satt av WHO ⁷ - se oven (de tre triklorbensen-isomerene oppviser lignende levertoksisitet). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
1,2,4,5-tetraklorbensen	0,0017	0 %	US EPA ⁸ identifiserte en oral (fôr) 13 ukers rottestudie med funn av nyretoksisitet (NOAEL=0,34 mg/kg kv per dag) som kritisk studie. FHI anvender en usikkerhetsfaktor på 200 (i henhold til ECHA guidance R.8 ² bør ekstra faktor 2 brukes ved ekstrapolering fra subkronisk til kronisk) for å komme fram til MTDI. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Pentaklorbensen	0,0138	0 %	US EPA ⁹ identifiserte en oral subkronisk (hanner 100 dager, hunner 180 dager) rottestudie med funn av lever- og nyretoksisitet (LOAEL=8,3 mg/kg kv per dag) som kritisk studie. FHI anvender en usikkerhetsfaktor på 600 (i henhold til ECHA guidance R.8 ² bør en ekstra faktor 2 for usikkerhet for ekstrapolering fra subkronisk til kronisk

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			varighet, samt ekstra faktor 3 for bruk av LOAEL) for å komme fram til MTDI. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Heksaklorbensen	0,00016	0 %	MTDI verdi på 0,00016 mg/kg kv per dag er hentet fra vurdering fra RIVM ¹⁰ og er fremkommet via en beregning av livstidsrisiko for kreft i en oral 130 ukers rottestudie (funn av neoplastiske leverknuter) på 1 per 10000 personer. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Diklormetan	0,002	0 %	Oral stigningsfaktor (engelsk: slope factor) 0,002 mg/kg kv per dag er beregnet av US EPA fra kronisk oral (drikkevann) studie i mus med funn av leverkreft (BMDL ₁₀ =60 mg/kg kv per dag) ¹¹ . Diklormetan anses å være mutagen. FHI velger å bruke den orale stigningsfaktoren som MTDI. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Triklormetan	0,015	0 %	TDI satt av WHO ¹² er basert på økt forekomst av levercyster i hund, rotte og mus. Kreft kan dannes som en sekundær konsekvens, men ikke som et resultat av direkte DNA skader. TDI beregnet med bruk av PBPK modell for metabolisme hos mennesker og dyr, og usikkerhetsfaktor 25. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Tetraklormetan	0,0014	0 %	TDI satt av WHO ¹³ er basert på 12-ukers oral rottestudie med funn av levertoksiske effekter (NOAEL 1 mg/kg kv per dag, usikkerhetsfaktor 500 (100 for interspecies og interindividuell variasjon, x10 ekstra da subkronisk studie, modifierende faktor x0,5 da bolusstudie), og korrigering for dosering 5 av 7 dager per uke gir: $1/500 * (5/7) = 0,0014$)). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Tetrakloreten	0,014	0 %	TDI satt av WHO ¹⁴ er basert på levertoksiske effekter i en 6-ukers oral (gavage) studie i mus og i en 90-dagers oral (drikkevann) studie i rotte (begge

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			<p>med NOAEL 14 mg/kg kv per dag, usikkerhetsfaktor 1000 (10 ekstra for mulig kreftpensiale). En ekstra faktor for korrigering av studiens lengde ble bedømt som unødvendig av WHO med tanke på database og hensyn til dosering via drikkevann i en av de to kritiske studiene. Tetrakloreten er antatt å ikke være gentoksisk.</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>
1,2-dikloreten	0,014	0 %	<p>Maximal permissible risk (MPR) verdi på 0,014 mg/kg kv per dag er hentet fra rapport av RIVM¹⁰. Den er fremkommet via en beregning av livstidsrisiko for kreftutvikling på 1 per 10000 personer, basert på en oral rottestudie med svulster i for-mage og bryst. 1,2-dikloreten er antatt å være gentoksisk. FHI setter med bakgrunn i dette MTDI til 0,014 mg/kg kv per dag.</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>
1,2-dibrometan	0,009	0 %	<p>US EPA¹⁵ valgte en kronisk oral hannrotte studie med effekter i lever, testis og binyrer (LOAEL 27 mg/kg kv per dag) som kritisk studie. FHI bruker usikkerhetsfaktor 3000 (x3 ekstra ved bruk av LOAEL i henhold til ECHA guidance R.8², og en faktor av 10 for å korrigere for usikkerhet i database som er angitt i US EPA rapporten).</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>
1,1,1-trikloreten	0,6	0 %	<p>TDI satt av WHO¹⁶ er basert på endringer i nyrene som var i samsvar med hyalindråpe nefropati observert i en 13-ukers oral studie hos hannrotter (NOAEL 600 mg/kg kv per dag, usikkerhetsfaktor 1000 (10 ekstra da sub-kronisk studie), og tar hensyn til den korte varigheten av studien).</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>
1,1,2-trikloreten	0,6	0 %	<p>Spesifikk risikovurdering ble ikke funnet. Samme MTDI som 1,1,1-trikloreten brukes pga. stor strukturlikhet.</p>
Fenol	0,04	0 %	<p>TDI satt av RIVM¹⁰ er basert på utviklingstoksisitet i rotter (NOAEL 40 mg/kg kv per dag,</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			usikkerhetsfaktor 1000 (100 med x3 ekstra for korrigeringsfaktor av studiens lengde, og x3 ekstra på grunn av begrenset database). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Sum mono,di,tri,tetra klorfenol	0,0030	0 %	RIVM ¹⁰ har for 2,4-diklorfenol satt TDI til 0,0030 mg/kg kv per dag basert på immuntoksisitet i en rotte reproduksjons-studie (NOAEL 0,3 mg/kg kv per dag, usikkerhetsfaktor 100). Videre vurderer RIVM at TDler for mono-, di-, tri- og tetraklorfenol er de samme (0,0030 mg/kg kv per dag). FHI har vurdert at de fire klorfenolene til sammen får en maksimal MTDI på 0,0030 for summen av stoffene. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Pentaklorfenol	0,003	0 %	TDI satt av RIVM ¹⁰ er basert på kronisk studie på mink, med mindre endringer i skjoldkjertelhomeostase (LOAEL 1 mg/kg kv per dag, usikkerhetsfaktor 300 (x3 ekstra for ekstrapolering av LOAEL til NOAEL)). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Toluen	0,223	0 %	TDI satt av WHO ¹⁷ er basert på marginal lever-toksisitet i 13-ukers oral musestudie (LOAEL 312 mg/kg kv per dag, korrigert for dosering 5 av 7 dager per uke, og usikkerhetsfaktor 1000 (x10 ekstra da subkronisk studie og bruk av LOAEL istedenfor NOAEL)). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Etylbensen	0,0971	0 %	TDI satt av WHO ¹⁸ er basert på lever- og nyre-toksisitet i 6-måneders rottestudie (NOAEL 136 mg/kg kv per dag, korrigert for dosering 5 av 7 dager per uke, usikkerhetsfaktor 1000 (x10 ekstra for begrenset database og studiens korte varighet)). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Xylen	0,179	0 %	TDI satt av WHO ¹⁹ er basert på lavere kroppsvekt i 103-ukers oral rottestudie (NOAEL 250 mg/kg kv

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			per dag, korrigert for dosering 5 av 7 dager per uke, usikkerhetsfaktor 1000 (x10 ekstra for det begrensninger i det toksikologiske endepunktet)). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Alifater C5-C8	5,0	0 %	En oral RfD ble satt av TPHCWG ²⁰ og var basert på kroniske inhalasjonsstudier av kommersiell hexan (en blanding inneholdende 53 % n-hexan) i gnagere. Toksiske effekter (slimhinneirritasjon i nese og strupehode hos rotter, samt forekomst av cystisk endometriumhyperplasi hos mus) hadde inhalasjons-NOAEL på 1840 mg/m ³ , som ble omregnet til menneske ved å anta inhalasjon 20 m ³ /dag for en person med vekt 70 kg og 100 % absorpsjon. Ved bruk av usikkerhetsfaktor 100 ga dette en oral RfD på 1840x20/70/100= 5,0 mg/kg kv per dag. FHI har valgt å bruke oral RfD 5,0 mg/kg kv per dag som MTDI. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
MTBE (metyl tertiær-butyl eter)	0,5	0 %	Health Canada ²¹ brukte en oral 90-dagers rottestudie med funn av økt relativ nyre-vekt, senket blod urea nitrogen, serum kalsium og glukose (NOAEL 100 mg/kg/day) som kritisk studie. FHI har beregnet MTDI til 0,5 mg/kg kv per dag ved anvendende av sikkerhetsfaktor på 200 (x2 ekstra for overgang sub-kronisk – kronisk i henhold til ECHA guidance R.8, tabell R.8-5 ²) Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Tetraetylbley	0,000002	0 %	US EPA ²² har brukt en oral 20-ukers rottestudie med funn av lever- og skjoldkjertel endringer samt nerveskader (LOAEL=1,2 µg/kg kv per dag) som kritisk studie. FHI har beregnet MTDI til 0,000002 mg/kg kv per dag ved anvendende av usikkerhetsfaktor 600 (2x ekstra for overgang sub-kronisk – kronisk, 3x ekstra for bruk av LOAEL istedenfor NOAEL i henhold til ECHA guidance R.8 ²)). Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
PBDE-99	0,0000017	25 %	<p>EFSA (2011)²³ fastsatte ikke TDI på grunn av datamangler. Ny risikovurdering av PBDE er i gang i EFSA CONTAM Panel per. juli 2021. I 2011 beregnet EFSA MOE basert på body burden (BB) i forsøksdyr. Humant inntak av 4,2 ng/kg/dag tilsvarer BMDL₁₀ body burden (BB) i forsøksdyr. EFSA anga at usikkerhetsfaktorer kan reduseres fra standard 100 fordi usikkerhetsfaktorer for toksikokinetikk er overflødig når beregning er basert på BB. Utviklingstoksisitet var kritisk effekt så mest sensitive gruppe var tatt hensyn til grunn. MOE 2,5 ble derfor regnet som tilstrekkelig av EFSA. Dette tilsvarer en TDI-verdi på (4,2/2,5) 1,68 ng/kg/dag, som rundes av til 1,7 ng/kg/dag.</p> <p>Gjennomsnittsinntak i voksne ble av EFSA beregnet til 0,11 til 0,65 ng/kg/dag. Gjennomsnittsbidrag fra mat anslås derfor til 25 %.</p>
PBDE-209	0,0017	0 %	<p>EFSA (2011)²³ fastsatte ikke TDI på grunn av datamangler. Ny risikovurdering av PBDE er i gang i EFSA CONTAM Panel per. september 2021. I 2011 beregnet EFSA MOE fra laveste BMDL₁₀, som var 1700 µg/kg/dag, med utviklingseffekter som kritisk effekt. EFSA anga at MOE bør være minst 100. Dette tilsvarer en TDI-verdi på (1700/100) 1,7 µg/kg/dag.</p> <p>Inntak ble beregnet til å være maksimalt 18 ng/kg kv per dag, så MOE er svært stor og bidrag fra mat settes til 0 %.</p>
PFOS	0,000000315 (3.15 E-7)	100 %	<p>EFSA²⁴ fastsatte i 2020 en TWI på 4,4 ng/kg kv per uke for sum av fire PFAS (PFOS, PFOA, PFHxS og PFNA), med immuntoksisitet som kritisk effekt. Uttrykt som daglig inntak tilsvarer dette 0,63 ng/kg kv per dag for summen av disse stoffene. TWI er beregnet ut fra serumkonsentrasjoner som ikke gir effekt på vaksinerespons hos ett år gamle barn. PFOS og PFOA bidro omtrent like mye til denne serumkonsentrasjonen, med små bidrag fra PFHxS og PFNA. Derfor settes MTDI-verdien for PFOS til 0,315 ng/kg kv per dag.</p> <p>Eksponering fra mat er på samme nivå som TWI eller høyere, og bidrag fra mat settes derfor til 100 %.</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
TBT-oxid (TBTO)	0,0001	25 %	<p>TDI fastsatt av EFSA²⁵ i 2004 er for sum tributyltin (TBT), dibutyltin (DBT), trifenylytin (TPT) og di-n-oktyltin (DOT) og er 0,025 mg/kg kv per dag (basert på TBTO molekylmasse) eller 0,1 µg/kg kv per dag basert på Sn innhold, eller 0,27 µg/kg kv per dag uttrykt som TBT klorid. MTDI er summen av organotinforbindelsene uttrykt som Sn.</p> <p>Gjennomsnittseksponering fra mat var ca. 33 % av TDI i 2005. Tinnorganiske forbindelser er faset ut som bunnstoff til båter og plantevernmidler, og inntaket fra mat er sannsynligvis lavere nå. Bidrag fra mat settes derfor til 25 %.</p>
Trifenylytinnklorid	0,0001	25 %	Se TBT-oxid
<i>Mulige nye normverdier:</i>			
Benzo(a)antracen	0,000006125	50 %	<p>EFSA²⁶ risikovurderte 15 PAH og benzo[c]fluorene i 2008. EFSA konkluderte for 8 PAH som det var karsinogenisitetsdata for etter oral eksponering: benzo[a]pyrene, benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[ghi]perylene, chrysene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene.</p> <p>EFSA uttalte at det er bare disse 8 PAH (alene eller i kombinasjon) som er mulige indikatorer for karsinogent potensiale av PAH i mat.</p> <p>EFSA beregnet BMDL₁₀ for økning i tumorbærende dyr sammenliknet med kontroll for BaP alene og for blandinger av PAH. BMDL₁₀ var 0,49 mg/kg kv per dag for PAH8. Ved bruk av MOE på 10000 settes MTDI-verdien for PAH8 til 0,000049 mg/kg kv per dag.</p> <p>For hver PAH som inngår i 8 PAH antas lik potens, slik at MTDI for hvert stoff blir 0,000006125 mg/kg kv per dag.</p>
Krysen	0,000006125	50 %	Se Benzo(a)antracen
Benzo(b)fluoranten	0,000006125	50 %	Se Benzo(a)antracen
Benzo(k)fluoranten	0,000006125	50 %	Se Benzo(a)antracen
Indeno(1,2,3-cd)pyren	0,000006125	50 %	Se Benzo(a)antracen

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
Dibenzo(a,h)antrac en	0,000006125	50 %	Se Benzo(a)antrac en
Benzo(g,h,i)perylene	0,000006125	50 %	Se Benzo(a)antrac en
PBDE-153	0,0000038	0 %	<p>TDI for PBDE-153 ble ikke fastsatt på grunn av datamangler ved forrige risikovurdering fra EFSA²³ i 2011. EFSA er per. september 2021 i gang med ny risikovurdering. Laveste BMDL₁₀ BB i 2011 var 62 µg/kg kv per dag, dette er assosiert med humant kronisk inntak på 9,6 ng/kg kv per dag. EFSA anga at MOE på 2,5 ble regnet som tilstrekkelig. Dette var fordi usikkerhetsfaktorer kan reduseres fra standard 100 siden usikkerhetsfaktorer for inter-og intraspecies variasjon i toksikokinetikk (2,5x3,2) er overflødig når beregning er basert på BB. Videre var utviklingstoksitet kritisk effekt, så mest sensitive gruppe var tatt hensyn til. Toksikodynamisk usikkerhetsfaktor (4) var derfor overflødig. MTDI-verdi er beregnet av FHI til (9,6/2,5) 3,84 ng/kg kv per dag, som rundes av til 3,8 ng/kg kv per dag.</p> <p>Gjennomsnittsinntak i voksne ble av EFSA beregnet til 0,03 til 0,42 ng/kg kv per dag, som er 5,8 % av TDI-verdien. Gjennomsnittsbidrag fra mat anslås derfor til 0 %.</p>
HBCDD	0,000098	0 %	<p>TDI for HBCDD (sum av α, β and γ HBCDD) ble ikke satt av EFSA²⁷ i 2021 på grunn av utilstrekkelig datagrunnlag. Det ble beregnet MOE med grunnlag i effekter på utvikling av nervesystemet som resulterte i endret adferd hos mus, med LOAEL på 0,9 mg/kg kv (engangsdose). Dette tilsvarer kronisk humant inntak på 2,35 µg/kg kv per dag, beregnet via BB. MOE bør ifølge EFSAs vurdering være minimum 24. For å komme fram til denne MOE ble det benyttet usikkerhetsfaktorer for toksikokinetikk på 8 (2,5 x 3,2) og en ekstra faktor 3 for ekstrapolering fra LOAEL til NOAEL. En verdi for MTDI beregnes derfor til (2,35/24) 0,098 µg/kg kv per dag.</p> <p>Gjennomsnittsinntaket utgjorde i EFSAs beregninger mindre enn 2 % av MTDI, og bidraget fra mat settes til 0 %.</p>
Tetrabrombisfenol A	0,053	0 %	TDI for tetrabrombisfenol A ble ikke fastsatt på grunn av datamangler ved forrige risikovurdering i

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			<p>regi av EFSA²⁸. EFSA er per september 2021 i gang med ny risikovurdering. Ved forrige vurdering ble endringer i stoffskiftehormoner brukt som kritisk effekt og en BMDL₁₀ på 16 mg/kg kv per dag ble brukt som grunnlag for MOE beregninger. Størrelsen på MOE som ville være tilstrekkelig ble ikke anslått av EFSA og eksponeringsmarginen var i størrelsesorden 30000. FHI vurderer at MOE bør være minst 100 og i tillegg bør man ha en ekstra faktor på 3 av hensyn til datamangler. MTDI beregnes til $(16/300) = 0,053$ mg/kg kv per dag.</p> <p>Bidrag fra mat var i EFSAs beregning svært lav og settes her til 0 %.</p>
Bisfenol A	0,004	0 %	<p>Temporary TDI (t-TDI) på 4 µg/kg kv per dag er satt av EFSA²⁹ basert på funn i nyrene. Oppdatering av risikovurdering er per september 2021 pågående i EFSA.</p> <p>EFSA beregnet at 0,13 µg/kg kv per dag kommer fra mat i gjennomsnitt, dette utgjør 3,2 % av t-TDI. Bidrag fra mat settes derfor til 0 %.</p>
Nonylfenol	0,05	0 %	<p>Miljøstyrelsen i Danmark³⁰ har beregnet oral derived no effect level (DNEL_{oral}), med effekter (histopatologiske endringer i nyrene) i oral multigenerasjons rotte studie (LOAEL 15 mg/kg kv per dag, usikkerhetsfaktor 300 (x3 ekstra da LOAEL og ikke NOAEL)). FHI bruker DNEL_{oral} som MTDI.</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>
Nonylfenoletoksilat	0,13	0 %	<p>Miljøstyrelsen i Danmark³¹ har brukt 2-årige orale studier på rotte og hund med økt levervekt og minsket kroppsvekt (LOAEL 40 mg/kg kv per dag) som kritiske studier. FHI har beregnet MTDI til 0,13 mg/kg kv per dag ved anvendende av usikkerhetsfaktor (x3 ekstra da LOAEL og ikke NOAEL er blitt brukt i henhold til ECHA guidance R.8²).</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>
Oktylfenol	0,1	0 %	<p>Av industrien³² beregnet nivå som antas å ikke ha effekt (DNEL) for generell populasjon basert på forsinket økning i kroppsvekt og endret vekt av organer, f.eks. skjoldbruskkjertelen i oral 90-dagers</p>

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			rottstudie (NOAEL 300 ppm (~ 22,5 mg/kg kv per dag), usikkerhetsfaktor 200 (2x ekstra for bruk av sub-kronisk data og ikke kronisk)). Med grunnlag i dette benytter FHI 0,1 mg/kg kv per dag som MTDI. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Oktylfenoletoksilat	0,1	0 %	Da noen egen TDI ikke blitt funnet for stoffet brukes samme MTDI verdi som for oktylfenol. Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.
Mellomkjedete klorerte parafiner	0,036	0 %	For mellomkjedede klorerte parafiner (MCCP) er BMDL på 36 mg/kg per dag brukt som referansepunkt av EFSA ³³ med leverskade som kritisk effekt. TDI ble ikke satt fordi datagrunnlaget var utilstrekkelig. EFSA anga at MOE bør være minst 1000 (standard 100 og ekstra faktor 2 for ekstrapolering fra subkronisk til kronisk studie og faktor 5 for datamangler). Dette tilsvarer en MTDI på (36/1000) 0,036 mg/kg kv per dag. Det er lite data på innhold i mat. Eksponering fra kun fisk ble beregnet til å være 3,2 til 59 ng/kg kv per dag, som utgjør mindre enn 1 % av MTDI. Bidraget fra mat settes derfor til 0 %.
Kortkjedete klorerte parafiner	0,0023	0 %	For kortkjedede klorerte parafiner (SCCP) ble BMDL ₁₀ på 2,3 mg/kg/dag brukt som referansepunkt av EFSA ³³ med økning i insidens av nyreskade (nephritis) som kritisk effekt. TDI ikke satt fordi datagrunnlaget var utilstrekkelig. EFSA anga at MOE bør være minst 1000 (standard 100 og ekstra faktor 2 for ekstrapolering subchronic-chronic og faktor 5 for datamangler). Dette tilsvarer MTDI på (2,3/1000) 0,0023 mg/kg kv per dag. Det er lite data på innhold i mat. Eksponering fra kun fisk er beregnet til å være 1,9 til 35 ng/kg kv per dag, som utgjør mindre enn 2 % av MTDI. Bidraget fra mat settes derfor til 0 %.
Trikesylfosfat	0,02	0 %	Av industrien ³⁴ beregnet nivå som antas å ikke ha effekt (DNEL) for 'generell populasjon' basert på endringer i binyrene, spesielt hos hanner) i oral 2-årig studie i mus (LOAEL 60 ppm (7 mg/kg kv per

Forbindelse	MTDI ^a (mg/kg kv per dag)	Andel fra mat ^b	Vurdering
			<p>dag) ved bruk av total usikkerhetsfaktor 350 (2 (LOAEL til NOAEL (effekter oppgis som små)) x7 (forskjeller mellom arter, allometrisk skalering) x2,5 (andre forskjeller mellom arter) x10 (intraindividuelle forskjeller).</p> <p>Bidraget fra mat anses som lavt og er skjønnsmessig satt til 0 %.</p>

ADI: akseptabelt daglig inntak; BMDL: benchmark dose lower bound; DNEL; beregnet nivå som antas å ikke ha effekt (Derived No Effect Level); kv: kroppsvekt; LB: lower bound; LOAEL: Laveste dosenivå med observerte alvorlige helseeffekter (Lowest Observed Adverse Effect Level); MOE: eksponeringsmargin (Margin of Exposure); MPR: Foreløpig maksimal tillatt risikonivå (Provisional Maximum Permissible Risk); NOAEL: Høyeste dosenivå uten observerte alvorlige helseeffekter (No Observable Adverse Effect Level); RfD: Reference Dose; TDI: tolerabelt daglig inntak; TPHCWG: Total Petroleum Hydrocarbon Criteria Working Group; TWI: tolerabelt ukentlig inntak; UB: Upper Bound; UL: øvre tolerabelt inntak (Upper Level).

^a MTDI-verdi er basert på helsebasert referanseverdi og angitt som maksimalt inntak per kg kroppsvekt per dag, uavhengig av om referanseverdien som ligger til grunn er en TDI. Den kan opprinnelig være fastsatt for ukentlig eller daglig inntak, eller det er MOE som ligger til grunn i risikovurderingen som er brukt. Det kan også ha vært gjort andre avveininger, og forklaringer finnes i kolonnen «vurdering».

^b Angir den prosentandelen av MTDI som gjennomsnittlig inntak av mat og drikke fra områder uten spesiell forurensing bidrar til. Det er gjort som trinnvise anslag (0 %, 25 %, 50 %, 75 % og 100 %), begrunnelse for anslaget er gitt i kolonnen «vurdering».

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Vedlegg B

REVISJON AV DISTRIBUSJONSKOEFFISIENTEN FOR
UTVALGTE STOFFER. NGI NOTAT 20200490-01-TN REV 1,
DATERT 2021-05-31

Til: Miljødirektoratet
v/ Karianne Slåtta Haugen
Kopi til: Vanja Alling
Dato: 2021-01-14
Rev.nr. / Rev.dato: 1 / 2021-05-31
Dokumentnr.: 20200490-01-TN
Prosjekt: Oppdatering veiledningsmateriale på forurenset grunn
Prosjektleder: Gijs Breedveld
Utarbeidet av: Hans Peter Arp
Kontrollert av: Gijs Breedveld

Revisjon av distribusjonskoeffisienten for utvalgte stoffer

1 Innledning

Risikovurderingsverktøyet inneholder en liste med stofegenskaper som er styrende for beregning av oppførselen til de ulike forbindelsene (SFT, 1999). Fordelingskoeffisienten (K_d) er en nøkkelparameter i denne sammenhengen. Stoffparameterne har blitt revidert i 2007 (Aquateam, 2007) som grunnlag for utarbeidelse av tilstandsklasser (Klif, 2009) og brukes i den siste revisjonen av risikovurderingsverktøyet (MDir, 2013). I 2016 ble det gjort en stor gjennomgang av både stoffegenskaper og tilgjengelige toksisitetsdata som grunnlag for mulige nye (NGI, 2016). I arbeidet med revisjon av risikoveilederen for humanhelse i 2020 ble noen av K_d verdien utarbeidet i 2016 vurdert til å være høye. Dette gjelder spesielt tungmetaller. I dette notatet er grunnlagsdata fra 2016 revurdert og der nødvendig supplert med nyere informasjon for utvalgte stoffer.

2 Forslag til nye distribusjonskoeffisienter

En oversikt over distribusjonskoeffisienter som ble anvendt i risikovurderingsverktøyet i 1999 og 2013 samt forslaget utarbeidet i 2016 (NGI, 2017) er presentert i Tabell 1. I tillegg er forslaget til reviderte verdier i 2020 presentert med en begrunnelse for foreslått endring.

I rapporten fra 2016 (NGI, 2017) ble gjennomsnitt eller "typical" verdien brukt fra tilgjengelig EU dossier. Revurderingen fra 2020 bruker stort sett det samme kildematerialet men forslår å bruke de lavere verdier i litteraturen. Dette er et konservativt estimat som er i trå med metodikken som ligger til grunn for risikovurderingsverktøyet. I en trinn 3 risikovurdering vil disse K_d verdier kunne bli overstyrt av stedsspesifikke verdier bestemt fra målinger i laboratoriet eller felt. De reviderte K_d verdiene er anvendt i det reviderte risikovurderingsverktøyet som vil bli tatt i bruk i 2021.

Tabell 1 Sammenligning av Kd verdier som har blitt brukt i ulike versjoner av risikovurderingsverktøyet (for referansene henvises til NGI, 2017)

Stoff	1999	2013	2016	2020	References and Notes
Arsen	30	100	6607	6607	Value used in UK Environment Agency (As), note As(III) is less sorbed than As(V) in acid pH but both are more dissolved at high pH (no values provided background documentation)
Bly	1000	1000	154882	35481	EU dossier (Pb). Minimum of Kd range 35481-707946 (typical 154882)
Kadmium	30	100	130000	17000	EU dossier (Cd). Kd ranges from 17000 – 224000, typical value 130000
Kvikksølv	200	500	100000	5000	EU dossier (Hg). Values in the reports range from 5000 to 9000000.
Kobber	500	500	24409	8934	EU RAR (Cd) Appendix f. Kd distribution in EU surface waters is 10'th percentile 8934, 50'th percentile 24409, 90'th percentile 99,961
Sink	100	200	110000	64000	EU RAR (Zn) used mostly (110,000 l/kg), but also highest (176,000 l/kg) and lowest (64,000 l/kg).
Krom (III)	2000	2000	11000	800	(Kpsoil) of 524-24,217 l/kg (recommend 800 for acid and 15000 for alkaline), $\log Kpsoil = 0.13 \cdot pH + 0.43 \cdot \log Alox - 0.42 \cdot \log DOC + 2.75$ $R^2 = 0.75$
Krom (VI)	30	30	30	30	
Krom totalt (III + VI)	30	30	11000	800	
Nikkel	100	200	7079	2138	EU EQS (2011) Range: 2,138 – 16,982 Mean (50th percentile) = 7,079
DDT	4086	4086	62159	62159	
Pentaklorbensen	608	83	400	400	
Heksaklorbensen	375	115	1300	1300	
PBDE-209		330	5250000000	1363040	Value for octa-BDEs, Based on degradation products from EU dossier (BDE): assummes tetra; 565860 (tetra); 983340 (penta); 1363040 (and larger for octa)
Mellomkjedete kl. paraf.		912	76168	76168	
Dioksin (TCDD-ekv.)		14000	45000	45000	

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Kartblad/Map	Felt, blokknr./Field, Block No.
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