Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products

**PRODUCT ASSESSMENT REPORT OF A BIOCIDAL PRODUCT FAMILY FOR NATIONAL AUTHORISATION APPLICATION**

(submitted by the evaluating Competent Authority)



Product Family “Wolmanit CX-8WB\_family”

Product type 8

Cu-HDO and basic copper carbonate as included in the Union list of approved active substances

Case Number in R4BP: BC-BN019319-37

Evaluating Competent Authority: eCA Austria

**19/01/2022 (Final)**

Table of Contents

[1 CONCLUSION 5](#_Toc61959755)

[2 ASSESSMENT REPORT 8](#_Toc61959756)

[2.1 Summary of the product assessment 8](#_Toc61959757)

[2.1.1 Administrative information 8](#_Toc61959758)

[2.1.1.1 Identifier of the product family 8](#_Toc61959759)

[2.1.1.2 Authorisation holder 8](#_Toc61959760)

[2.1.1.3 Manufacturer of the products of the family 8](#_Toc61959761)

[2.1.1.4 Manufacturers of the active substances 8](#_Toc61959762)

[2.1.2 Product family composition and formulation 9](#_Toc61959763)

[2.1.2.1 Identity of the active substances 9](#_Toc61959764)

[2.1.2.2 Candidates for substitution 10](#_Toc61959765)

[2.1.2.3 Qualitative and quantitative information on the composition of the biocidal product family 10](#_Toc61959766)

[2.1.2.4 Information on technical equivalence 14](#_Toc61959767)

[2.1.2.5 Information on the substance(s) of concern 14](#_Toc61959768)

[2.1.2.6 Type of formulation 15](#_Toc61959769)

[2.1.3 Hazard and precautionary statements 16](#_Toc61959770)

[2.1.4 Authorised use(s) 19](#_Toc61959771)

[2.1.4.1 Use description 19](#_Toc61959772)

[2.1.4.2 Use-specific instructions for use 21](#_Toc61959773)

[2.1.4.3 Use-specific risk mitigation measures 21](#_Toc61959774)

[2.1.4.4 Where specific to the use, the particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment 21](#_Toc61959775)

[2.1.4.5 Where specific to the use, the instructions for safe disposal of the product and its packaging 21](#_Toc61959776)

[2.1.4.6 Where specific to the use, the conditions of storage and shelf-life of the product under normal conditions of storage 21](#_Toc61959777)

[2.1.5 General directions for use 22](#_Toc61959778)

[2.1.5.1 Instructions for use 22](#_Toc61959779)

[2.1.5.2 Risk mitigation measures 22](#_Toc61959780)

[2.1.5.3 Particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment 23](#_Toc61959781)

[2.1.5.4 Instructions for safe disposal of the product and its packaging 23](#_Toc61959782)

[2.1.5.5 Conditions of storage and shelf-life of the product under normal conditions of storage 23](#_Toc61959783)

[2.1.6 Other information 24](#_Toc61959784)

[2.1.7 Packaging of the biocidal product 24](#_Toc61959785)

[2.1.8 Documentation 24](#_Toc61959786)

[2.1.8.1 Data submitted in relation to product application 24](#_Toc61959787)

[2.1.8.2 Access to documentation 24](#_Toc61959788)

[2.2 Assessment of the biocidal product family 24](#_Toc61959789)

[2.2.1 Intended use(s) as applied for by the applicant 24](#_Toc61959790)

[2.2.2 Physical, chemical and technical properties 25](#_Toc61959791)

[2.2.3 Physical hazards and respective characteristics 39](#_Toc61959792)

[2.2.4 Methods for detection and identification 45](#_Toc61959793)

[2.2.5 Efficacy against target organisms 51](#_Toc61959794)

[2.2.5.1 Function and field of use 51](#_Toc61959795)

[2.2.5.2 Organisms to be controlled and products, organisms or objects to be protected 51](#_Toc61959796)

[2.2.5.3 Effects on target organisms, including unacceptable suffering 51](#_Toc61959797)

[2.2.5.4 Mode of action, including time delay 51](#_Toc61959798)

[2.2.5.5 Efficacy data 52](#_Toc61959799)

[2.2.5.6 Occurrence of resistance and resistance management 66](#_Toc61959800)

[2.2.5.7 Known limitations 66](#_Toc61959801)

[2.2.5.8 Evaluation of the label claims 66](#_Toc61959802)

[2.2.5.9 Relevant information if the product is intended to be authorised for use with other biocidal product(s) 67](#_Toc61959803)

[2.2.6 Risk assessment for human health 67](#_Toc61959804)

[2.2.6.1 Assessment of effects on Human Health 67](#_Toc61959805)

[2.2.6.2 Exposure assessment 78](#_Toc61959806)

[2.2.6.2.1 Scenario [1] 79](#_Toc61959807)

[2.2.6.2.2 Scenario [2] 85](#_Toc61959808)

[2.2.6.2.3 Scenario [3] 89](#_Toc61959809)

[2.2.6.2.4 Scenario [4] 92](#_Toc61959810)

[2.2.6.2.5 Scenario [5] 97](#_Toc61959811)

[2.2.6.2.6 Scenario [6] 101](#_Toc61959812)

[2.2.6.3 Risk characterisation for human health 115](#_Toc61959813)

[2.2.6.3.1 Risk characterisation for local effects 115](#_Toc61959814)

[2.2.6.3.2 Risk characterisation for systemic effects 119](#_Toc61959815)

[2.2.6.4 Risk assessment for animal health 136](#_Toc61959816)

[2.2.7 Risk assessment for the environment 140](#_Toc61959817)

[2.2.7.1 Effects assessment on the environment 140](#_Toc61959818)

[2.2.7.2 Exposure assessment 151](#_Toc61959819)

[2.2.7.3 Risk characterisation 176](#_Toc61959820)

[2.2.8 Measures to protect man, animals and the environment 196](#_Toc61959821)

[2.2.9 Assessment of a combination of biocidal products 196](#_Toc61959822)

[2.2.10 Comparative assessment 197](#_Toc61959823)

[2.2.11 ED assessment 197](#_Toc61959824)

[3 Annexes 200](#_Toc61959825)

[3.1 List of studies for the biocidal product family 200](#_Toc61959826)

[3.2 Output tables from exposure assessment tools 214](#_Toc61959827)

[3.2.1 Relevant calculations for primary and secondary human exposure 214](#_Toc61959828)

[3.2.2 Relevant environmental exposure calculations 228](#_Toc61959829)

[3.2.2.1 Exposure estimate sheets from ECHA 228](#_Toc61959830)

[3.2.2.1.1 Assessed substance: Copper 228](#_Toc61959831)

[3.2.2.1.2 Assessed substance: Cu-HDO 239](#_Toc61959832)

[3.2.2.2 Calculated PEC values (EUSES 2.1.2) 256](#_Toc61959833)

[3.2.2.2.1 Assessed substance: Copper 256](#_Toc61959834)

[3.2.2.2.1.1 SCENARIO [1]: INDUSTRIAL PROCESS, VACUUM PRESSURE: EUSES 2.1.2 OUTPUT FILE 256](#_Toc61959835)

[3.2.2.2.1.2 SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 1: EUSES 2.1.2 OUTPUT FILE 270](#_Toc61959836)

[3.2.2.2.1.3 SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 2: EUSES 2.1.2 OUTPUT FILE 273](#_Toc61959837)

[3.2.2.2.1.4 SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 3: EUSES 2.1.2 OUTPUT FILE 276](#_Toc61959838)

[3.2.2.2.2 Assessed substance: Cu-HDO 279](#_Toc61959839)

[3.2.2.2.2.1 SCENARIO [1]: INDUSTRIAL PROCESS, VACUUM PRESSURE: EUSES 2.1.2 OUTPUT FILE 279](#_Toc61959840)

[3.2.2.2.2.2 SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 1: EUSES 2.1.2 OUTPUT FILE 293](#_Toc61959841)

[3.2.2.2.2.3 SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 2: EUSES 2.1.2 OUTPUT FILE 296](#_Toc61959842)

[3.2.2.2.2.4 SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 3: EUSES 2.1.2 OUTPUT FILE 299](#_Toc61959843)

[3.2.2.3 Refined PECsed calculation (i.e. including adsorption of Cu on suspended particles) 302](#_Toc61959844)

[3.2.2.3.1 Assessed substance: Copper 302](#_Toc61959845)

[3.2.2.3.1.1 Bridge over pond scenario 302](#_Toc61959846)

[3.2.2.3.1.2 Jetty in a lake 303](#_Toc61959847)

[3.2.2.3.1.3 Sheet piling in a waterway 304](#_Toc61959848)

[3.2.2.4 Assessed substance: 2-Aminoethanol (MEA) 306](#_Toc61959849)

[3.3 New information on the active substance 341](#_Toc61959850)

[3.4 Residue behaviour 341](#_Toc61959851)

[3.5 Summaries of the efficacy studies (B.6.7-01 - B6.7-09) 341](#_Toc61959852)

[3.6 Confidential annex 341](#_Toc61959853)

[3.7 Other 341](#_Toc61959854)

[3.7.1 Reference list (excluding list of studies, cf. to chapter 3.1) 341](#_Toc61959855)

# CONCLUSION

Austria was the Competent Authority responsible for evaluation of the biocidal product family Wolmanit CX-8WP\_family.

The products within the biocidal product family Wolmanit CX-8WP\_family are liquid, soluble concentrates which contain 2.80%(w/w) of the active substance Cu-HDO and 13.04%(w/w) of the a.s. basic copper carbonate. 2-aminoethanol was identified as substance of concern and is present in a concentration of 28.6 to 31.6%(w/w), furthermore 2-ethylhexanoic acid with 4.90%(w/w), polyethylenimine in water (50%) with 0 to 6.0 %(w/w) and n-heptanoic acid with 3.1%(w/w).

The assessment considered:

* The conclusions and recommendations of the Assessment Report for the approval of the active substances Cu-HDO and basic copper carbonate including the “elements to be taken into account by Member States when authorising products”
* The specific provisions from Inclusion Directive for the active substances Cu-HDO (Austria 2013) and basic copper carbonate (France 2011)

Approval of the active substances:

The active substance **Cu-HDO** is included in the Union list of approved active substances and the specific provisions laid down there are fulfilled:

* The product assessment shall pay particular attention to the exposures, the risks and the efficacy linked to any uses covered by an application for authorisation, but not addressed in the Union level risk assessment of the active substance.
* Authorisations are subject to the following conditions:

1. For industrial users, safe operational procedures and appropriate organisational measures shall be established. Where exposure cannot be reduced to an acceptable level by other means, products shall be used with appropriate personal protective equipment.

2. Appropriate risk mitigation measures shall be taken to protect the terrestrial compartment. In particular, labels and, where provided, safety data sheets of products authorised shall indicate that industrial application shall be conducted within a contained area or on impermeable hard standing with bunding, that freshly treated timber shall be stored after treatment under shelter or on impermeable hard standing, or both, to prevent direct losses to soil or water, and that any losses from the application of the product shall be collected for reuse or disposal.

The active substance **basic copper carbonate** is included in the Union list of approved active substances and the specific provisions laid down there are fulfilled:

* When assessing the application for authorisation of a product in accordance with Article 5 and Annex VI, Member States shall assess, where relevant for the particular product, those uses or exposure scenarios and those risks to human populations and to environmental compartments that have not been representatively addressed in the Union level risk assessment.
* Member States shall ensure that authorisations are subject to the following conditions:

(1) Products shall not be authorised for application by dipping, unless data have been submitted in the application for product authorisation demonstrating that that application meets the requirements of Article 5 and Annex VI, if necessary by the application of appropriate risk mitigation measures.

(2) For products authorised for industrial use, safe operational procedures shall be established, and products shall be used with appropriate personal protective equipment unless it can be demonstrated in the application for product authorisation that risks to industrial users can be reduced to an acceptable level by other means.

(3) Labels and, where provided, safety data sheets of products authorised shall indicate that freshly treated timber shall be stored after treatment under shelter or on impermeable hard standing, or both, to prevent direct losses to soil or water, and that any losses from the application of the product shall be collected for reuse or disposal.

(4) Products shall not be authorised for treatment of wood that will be used in outdoor constructions near or above water, or for the treatment of wood in direct contact with fresh water, unless data is submitted to demonstrate that the product will meet the requirements of Article 5 and Annex VI, if necessary by the application of appropriate mitigation measures.’

The field of use is as follows:

Fungi, beetles, termites – industrial users – vacuum/oscillating pressure treatment - indoor

(target organsims: wood destroying fungi (brown rot fungi, white rot fungi, soft rot fungi), wood boring beetles*,* termites (subterranean termites) (*Reticulitermes santonensis)*; category of user: industrial user)

Identity and analytical methods were described in sufficient detail to meet the information requirements as laid down in annex III of regulation (EU) no. 528/2012. The physico-chemical properties and respective characteristics of the biocidal products have been evaluated and are deemed acceptable for the appropriate use, storage and transport of the biocidal products.

Based on the authorised use including the general directions of use and any possibly defined risk mitigation measures and provided that there will be no misuse, the following can be concluded:

* Data on the biocidal products have demonstrated sufficient efficacy against the target organisms. No resistance is expected.
* The risk characterisation for the biocidal product family indicated acceptable risks with the proposed risk mitigation measures for human health. The assessment of the biocidal product family was conducted according to the common principles set out in Annex VI of Regulation (EC) No 528/2012 and considered the maximum risks to human health. Concerning the ED assessment no definitive conclusion is possible at this stage in line with current guidance due to indications of ED properties of one co-formulant.
* Also for the environment, the risk characterisation resulted in no unacceptable risks for all authorised uses in all exposed environmental compartments. The assessment of secondary poisoning has shown that no adverse effects for birds and mammals are to be expected.

The products contain no active substance which is a candidate for substitution.

Resistance should be monitored on a continuous basis. Should the authorisation holder become aware of reports of resistance this should be reported to the competent authorities.

**It is concluded that all conditions of article 19 of regulation (EU) no. 528/2012 are fulfilled and that the products within the biocidal product family may be authorised.**

**Post authorisation conditions:**

An accelerated storage stability test according to CIPAC method MT 46.3 (storage at 54 °C for two weeks), in order to address the stability of basic copper carbonate, together with a validated, specific analytical method for determination of the active substance, basic copper carbonate, is requested.

Please confer to the authorisation letter for the submission deadlines.

**Update 16/12/2021:**

Follwing a referral of to the Coordination Group of a disagreement on Mutual recognition (MR) in accordance with Article 35(2) of the Regulation (EU) No 528/2012 (BPR), the CG members agreed by consensus on 23 November 2021 that:

The provided additional data is acceptable and confirms that the product does not fulfil the criteria for classification as metal corrosive. Therefore, H290 and P406 will be removed.

The product family meets the condition for granting an authorisation in accordance with Article 19(1)(d) of the BPR. This formal referral is therefore closed.

Please cf. to chapter 2.1.3 and 2.2.3.

In addition, the applicant submitted further information concerning the post authorisation conditions. They are fulfilled by a detailed justification, please cf. to chapter 2.2.2.

# ASSESSMENT REPORT

## Summary of the product assessment

### **Administrative information**

#### Identifier of the product family

| **Identifier** | **Country (if relevant)** |
| --- | --- |
| Wolmanit CX-8WB\_family | Austria  **cMS:** CH, CZ, DE, DK, FR, IT, NL, PL, SE, UK |

#### Authorisation holder

|  |  |  |
| --- | --- | --- |
| **Name and address of the authorisation holder** | **Name** | Wolman Wood and Fire Protection GmbH |
| **Address** | Dr. Wolman Strasse 31 – 33 76547 Sinzheim  Germany |
| **Authorisation number** | AT-0013505-BPF | |
| **Date of the authorisation** | See authorisation letter | |
| **Expiry date of the authorisation** | See authorisation letter | |

#### Manufacturer of the products of the family

|  |  |
| --- | --- |
| **Name of manufacturer** | Wolman Wood and Fire Protection GmbH |
| **Address of manufacturer** | Dr.-Wolman-Strasse 31 – 33 76547 Sinzheim  Germany |
| **Location of manufacturing sites** | Dr.-Wolman-Strasse 31 – 33 76547 Sinzheim  Germany |

#### Manufacturers of the active substances

|  |  |
| --- | --- |
| **Active substance** | Cu-HDO |
| **Name of manufacturer** | Wolman Wood and Fire Protection GmbH |
| **Address of manufacturer** | Dr.-Wolman-Strasse 31 – 33 76547 Sinzheim  Germany |
| **Location of manufacturing sites** | Dr.-Wolman-Strasse 31 – 33 76547 Sinzheim  Germany |

|  |  |
| --- | --- |
| **Active substance** | Copper(II) carbonate - copper(II) hydroxide (1:1) |
| **Name of manufacturer** | Spiess-Urania Chemicals GmbH |
| **Address of manufacturer** | Frankenstraße 18 b  20097 Hamburg Germany |
| **Location of manufacturing sites** | Spiess-Urania Chemicals GmbH  Frankenstraße 18 b  20097 Hamburg Germany |

### **Product family composition and formulation**

The full composition of the product family is provided in the confidential annex.

Does the product have the same identity and composition as the product evaluated in connection with the approval for listing of the active substance(s) on the Union list of approved active substances under Regulation No. 528/2012?

Yes

No

#### Identity of the active substances

|  |  |
| --- | --- |
| **Main constituent of active substance 1** | |
| **ISO name** | Cu-HDO |
| **IUPAC or EC name** | Bis(N-cyclohexyl-diazenium-dioxy)-copper |
| **EC number** | - |
| **CAS number** | 312600-89-8 |
| **Index number in Annex VI of CLP** | - |
| **Minimum purity / content** | 981 g/kg |
| **Structural formula** |  |

|  |  |
| --- | --- |
| **Main constituent of active substance 2** | |
| **ISO name** | Basic copper carbonate |
| **IUPAC or EC name** | Copper(II) carbonate-copper(II) hydroxide (1:1) |
| **EC number** | 235-113-6 |
| **CAS number** | 12069-69-1 |
| **Index number in Annex VI of CLP** | - |
| **Minimum purity / content** | 957g/kg equivalent to 550 g/kg as copper |
| **Structural formula** |  |

#### Candidates for substitution

The active substances Cu-HDO and basic copper carbonate contained in the biocidal product Wolmanit CX-8WB\_family are not considered as “candidates for substitution” according to article 10 of Regulation (EU) No 528/2012.

#### Qualitative and quantitative information on the composition of the biocidal product family

***FIRST INFORMATION LEVEL***

***Composition of biocidal product family ”Wolmanit CX-8WB\_family”***

| **Common name** | **IUPAC name** | **Function** | **CAS number** | **EC number** | **Content**  **[% (w/w)]** | |
| --- | --- | --- | --- | --- | --- | --- |
| **Min** | **Max** |
| Cu-HDO | Bis(N-cyclohexyl-diazenium-dioxy)-copper | Active substance | 312600-89-8 | - | 2.81 | 2.81 |
| Basic copper carbonate | Copper(II) carbonate-copper(II) hydroxide (1:1) | Active substance | 12069-69-1 | 235-113-6 | 13.042 | 13.042 |
| 2-Aminoethanol | 2-Aminoethanol; ethanolamine | Substance of concern | 141-43-5 | 205-483-3 | 28.60 | 31.60 |
| 2-Ethylhexanoic acid | 2-Ethylhexanoic acid | Substance of concern | 149-57-5 | 205-743-6 | 4.90 | 4.90 |
| n-Heptanoic acid | n-Heptanoic acid | Substance of concern | 111-14-8 | 203-838-7 | 3.10 | 3.10 |
| Polyethyleneimine (50 % in water) | Polyethyleneimine (50 % in water) | Substance of concern | 9002-98-6 | 618-346-1 | 0.0 | 6.0 |
| Non-active substances: see confidential annex | | | | | | |

1amount of Cu-HDO without impurities (pure): 2.7468 – 2.7468 %w/w

2 amount of basic copper carbonate without impurities (pure): 12.5836 – 12.5836 %w/w

***SECOND INFORMATION LEVEL – META SPCs***

***Meta SPC 1:***

| **Common name** | **IUPAC name** | **Function** | **CAS number** | **EC number** | **Content**  **[% (w/w)]** | |
| --- | --- | --- | --- | --- | --- | --- |
| **Min** | **Max** |
| Cu-HDO | Bis-(N-Cyclohexyl-diazeniumdioxy)-copper | Active substance | 312600-89-8 | - | 2.81 | 2.81 |
| Basic copper carbonate | Copper(II) carbonate-copper(II) hydroxide (1:1) | Active substance | 12069-69-1 | 235-113-6 | 13.042 | 13.042 |
| 2-Aminoethanol | 2-Aminoethanol | Substance of concern | 141-43-5 | 205-483-3 | 28.60 | 28.60 |
| 2-Ethylhexanoic acid | 2-Ethylhexanoic acid | Substance of concern | 149-57-5 | 205-743-6 | 4.9 | 4.9 |
| n-Heptanoic acid | n-Heptanoic acid | Substance of concern | 111-14-8 | 203-838-7 | 3.1 | 3.1 |
| Polyethyleneimine (50 % in water) | Polyethyleneimine (50 % in water) | Substance of concern | 9002-98-6 | 618-346-1 | 6.0 | 6.0 |
| Non-active substances: see confidential annex | | | | | | |

1amount of Cu-HDO without impurities (pure): 2.7468 – 2.7468 %w/w

2 amount of basic copper carbonate without impurities (pure): 12.5836 – 12.5836 %w/w

***Meta SPC 2:***

| **Common name** | **IUPAC name** | **Function** | **CAS number** | **EC number** | **Content  [% (w/w)]** | |
| --- | --- | --- | --- | --- | --- | --- |
| **Min** | **Max** |
| Cu-HDO | Bis-(N-Cyclohexyl-diazeniumdioxy)-copper | Active substance | 312600-89-8 | - | 2.81 | 2.81 |
| Basic copper carbonate | Copper(II) carbonate-copper(II) hydroxide (1:1) | Active substance | 12069-69-1 | 235-113-6 | 13.042 | 13.042 |
| 2-Aminoethanol | 2-Aminoethanol | Substance of concern | 141-43-5 | 205-483-3 | 31.60 | 31.60 |
| 2-Ethylhexanoic acid | 2-Ethylhexanoic acid | Substance of concern | 149-57-5 | 205-743-6 | 4.9 | 4.9 |
| n-Heptanoic acid | n-Heptanoic acid | Substance of concern | 111-14-8 | 203-838-7 | 3.1 | 3.1 |
| Non-active substances: see confidential annex | | | | | | |

1amount of Cu-HDO without impurities (pure): 2.7468 – 2.7468 %w/w

2 amount of basic copper carbonate without impurities (pure): 12.5836 – 12.5836 %w/w

As the biocidal products Wolmanit CX-8WB and Wolmanit CX-8F comprise different supplementary hazard statements (EUH), two meta SPCs were created according to CA-Nov14-Doc5.8-final. This specially refers to EUH208 – “Contains polyethyleneimine, may produce an allergic reaction”, which is only relevant for meta-SPC 1.

***Third information level: individual products in the meta SPCs***

***Composition of individual products in meta SPC 1***

| **Trade names** | | | **Wolmanit CX-8WB**  Wolmanit CX-8M | | |
| --- | --- | --- | --- | --- | --- |
| **Common name** | **IUPAC name** | **Function** | **CAS number** | **EC number** | **Content**  **[% (w/w)]** |
| Cu-HDO | Bis(N-cyclohexyl-diazenium-dioxy)-copper | Active substance | 312600-89-8 | - | 2.81 |
| Basic copper carbonate | Copper(II) carbonate-copper(II) hydroxide (1:1) | Active substance | 12069-69-1 | 235-113-6 | 13.042 |
| 2-Aminoethanol | 2-Aminoethanol; ethanolamine | Substance of concern | 141-43-5 | 205-483-3 | 28.60 |
| 2-Ethylhexanoic acid | 2-Ethylhexanoic acid | Substance of concern | 149-57-5 | 205-743-6 | 4.90 |
| n-Heptanoic acid | n-Heptanoic acid | Substance of concern | 111-14-8 | 203-838-7 | 3.10 |
| Polyethyleneimine (50 % in water) | Polyethyleneimine (50 % in water) | Substance of concern | 9002-98-6 | 618-346-1 | 6.00 |
| Non-active substances: see confidential annex | | | | | |

1amount of Cu-HDO without impurities (pure): 2.7468 – 2.7468 %w/w

2 amount of basic copper carbonate without impurities (pure): 12.5836 – 12.5836 %w/w

***Composition of individual products in meta SPC 2***

| **Trade names** | | | **Wolmanit CX-8F** | | |
| --- | --- | --- | --- | --- | --- |
| **Common name** | **IUPAC name** | **Function** | **CAS number** | **EC number** | **Content**  **[% (w/w)]** |
| Cu-HDO | Bis(N-cyclohexyl-diazenium-dioxy)-copper | Active substance | 312600-89-8 | - | 2.81 |
| Basic copper carbonate | Copper(II) carbonate-copper(II) hydroxide (1:1) | Active substance | 12069-69-1 | 235-113-6 | 13.042 |
| 2-Aminoethanol | 2-Aminoethanol; ethanolamine | Substance of concern | 141-43-5 | 205-483-3 | 31.60 |
| 2-Ethylhexanoic acid | 2-Ethylhexanoic acid | Substance of concern | 149-57-5 | 205-743-6 | 4.90 |
| n-Heptanoic acid | n-Heptanoic acid | Substance of concern | 111-14-8 | 203-838-7 | 3.10 |
| Non-active substances: see confidential annex | | | | | |

1amount of Cu-HDO without impurities (pure): 2.7468 – 2.7468 %w/w

2 amount of basic copper carbonate without impurities (pure): 12.5836 – 12.5836 %w/w

#### Information on technical equivalence

The sources of the active substances are the same as the ones evaluated in connection with the approval for listing of the active substances on the Union list of approved active substances under Regulation No. 528/2012.

An assessment of technical equivalence of the active substances is therefore not required.

#### Information on the substance(s) of concern

Based on the harmonised classification of Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation) or the classification as provided in the SDS submitted by the applicant and the concentration in the product above the specific or generic concentration limits, the components listed below were identified as substances of concern (SoC) in relation to human health:

2-Aminoethanol, 2-ethylhexanoic acid, polyethyleneimine and n-heptanoic acid.

2-Aminoethanol (2-MEA), polyethyleneimine and n-heptanoic acid contribute to the classification of the products within the biocidal product family (BPF) Wolmanit CX-8WB for Skin Corr. 1B and/or Eye Dam. 1. N-heptanoic acid is classified as Skin Corr. 1B and exceeds the generic concentration limit for Skin irrit (cf. Table 3.2.3 of the CLP Regulation). Therefore it would trigger a classification on its own and contributes to the classification of the mixture as Skin Corr. 1B. According to Article (3) of the BPR “substance of concern” means any substance, which has an inherent capacity to cause an adverse effect.

For 2-aminoethanol IOELVs of 2.5 mg/m3 (8-hour TWA) and 7.6 mg/m3 (15-minute TWA) STEL have been established for under the 2nd IOELV Directive (2006/15/EC). 2-Ethylhexanoic acid (2-EHA) is present in the products at a concentration leading to Repr. 2 (H361d). The products within the BPF differ concerning the SoCs (for details please see confidential annex).

According to ECHA (2017b) “Substances of Concern – Proposed Human Health (Toxicology) Assessment Scheme for Authorisation of Biocidal Products”, the SoC 2-aminoethanol can be assigned to both band B and C. If the SoC can be assigned to more than one band, the evaluation/risk management requirements of the higher band will apply (band C in this case). According to the guidance document, a quantitative risk assessment for the inhalation route is performed in section 2.2.7. 2-Ethylhexanoic acid assigned to Band C also warranted a full quantitative risk assessment as outlined in the same section. A qualitative local risk assessment addresses local effects of the products of the Wolmanit CX-8WB family including SoCs. Polyethyleneimine and n-heptanoic acid are assigned to the band B according to the ECHA (2017a) banding evaluation scheme for classified SoCs.

Risk mitigation measures in the form of precautionary statements triggered by hazards from these components are covered by the labelling of the product (please refer also to chapter 2.1.3). The identified SoCs meet Article 3(f) as well as criterion (5) of “other grounds for concern” specified in the guidance (ECHA, 2017b).

Based on the harmonised classification of Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation) or the classification as provided in the SDS submitted by the applicant and the concentration in the product above the specific or generic concentration limits, 2-Aminoethanol and polyethyleneimine were identified as substances of concern (SoC) in relation to the environment:

Polyethyleneimine (CAS: 9002-98-6) is classified according to the provided SDS as Aquatic Chronic 2. Due to the concentration in the biocidal product, this classification triggers a classification on its own as Aquatic Chronic 3 leading to a declaration as Substance of Concern.

2-Aminoethanol (CAS: 141-43-5) does not meet the criteria for classification for the environment, according to the harmonized classification in Annex VI of the CLP Regulation (updated on 9th September 2020). According to the provided SDS and the final decision made at the 36th meeting of the Coordination Group (2nd-3rd June 2019), 2-MEA should be classified as Aquatic Chronic 3. Due to the concentration in the biocidal product, this classification triggers a classification on its own as Aquatic Chronic 3 leading to a declaration as Substance of Concern.

#### Type of formulation

|  |
| --- |
| SL – soluble concentrate |

### **Hazard and precautionary statements**

**Classification and Labelling according to Regulation (EC) No 1272/2008:**

**Meta SPC 1:**

| **Classification** | Acute Tox. 4 (o); H302  Acute Tox. 4 (i); H332  Skin Corr. 1B; H314  Eye Dam. 1, H318 | | | Repr 2; H361d  STOT SE 3; H335  Aquatic Acute 1; H400  Aquatic Chronic 1; H410 | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Labelling** | Pictograms | | | | | |
| GHS05 | | GHS07 | | GHS08 | GHS09 |
| [Corrosive Pictogram Vinyl Label Sheets](https://www.ghsexperts.com/collections/ghs-pictograms/products/corrosive-pictogram-vinyl-label-sheets) | | GHS 07 | | GHS 08 | GHS 09 |
| Signal word | Danger | | | | | |
| Hazard  statements | H302 | Harmful if swallowed | | | | |
| H332 | Harmful if inhaled | | | | |
| H314 | Causes severe skin burns and eye damage | | | | |
| EUH071 | Corrosive to the respiratory tract | | | | |
| EUH208 | Contains polyethyleneimine. May produce an allergic reaction | | | | |
| H361d | Suspected of damaging the unborn child | | | | |
| H410 | Very toxic to aquatic life with long lasting effects | | | | |
| Precautionary statements | P201 | Obtain special instructions before use | | | | |
| P202 | Do not handle until all safety precautions have been read and understood. | | | | |
|  | P234 | Keep only in original packaging. | | | | |
|  | P260 | Do not breathe dust/fume/gas/mist/vapours/spray. | | | | |
|  | P264 | Wash hands thoroughly after handling. | | | | |
|  | P270 | Do not eat, drink or smoke when using this product. | | | | |
|  | P271 | Use only outdoors or in a well-ventilated area. | | | | |
|  | P273 | Avoid release to the environment | | | | |
|  | P280 | Wear protective gloves/protective clothing/eye protection/face protection | | | | |

|  | P301+P330+P331 | IF SWALLOWED: rinse mouth. Do NOT induce vomiting. |
| --- | --- | --- |
|  | P303+P361+P353 | IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. |
|  | P304+P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
|  | P310 | Immediately call a POISON CENTER or doctor. |
|  | P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing |
|  | P308+P313 | IF exposed or concerned: Get medical advice/attention |
|  | P390 | Absorb spillage to prevent material damage. |
|  | P391 | Collect spillage |
|  | P405 | Store locked up |

**Meta SPC 2:**

| **Classification** | Acute Tox. 4 (o); H302  Acute Tox. 4 (i); H332  Skin Corr. 1B; H314  Eye Dam. 1, H318 | | | Repr 2; H361d  STOT SE 3; H335Aquatic Acute 1; H400  Aquatic Chronic 1; H410 | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Labelling** | Pictograms | | | | | |
| GHS05 | | GHS07 | | GHS08 | GHS09 |
| [Corrosive Pictogram Vinyl Label Sheets](https://www.ghsexperts.com/collections/ghs-pictograms/products/corrosive-pictogram-vinyl-label-sheets) | | GHS 07 | | GHS 08 | GHS 09 |
| Signal word | Danger | | | | | |
| Hazard  statements | H302 | Harmful if swallowed | | | | |
| H332 | Harmful if inhaled | | | | |
| H314 | Causes severe skin burns and eye damage | | | | |
| EUH071 | Corrosive to the respiratory tract | | | | |
| H361d | Suspected of damaging the unborn child | | | | |
| H410 | Very toxic to aquatic life with long lasting effects | | | | |

| Precautionary statements | P201 | Obtain special instructions before use |
| --- | --- | --- |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P234 | Keep only in original packaging. |
| P260 | Do not breathe dust/fume/gas/mist/vapours/spray. |
| P264 | Wash hands thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P273 | Avoid release to the environment |
| P280 | Wear protective gloves/protective clothing/eye protection/face protection |
| P301+P330+P331 | IF SWALLOWED: rinse mouth. Do NOT induce vomiting. |
| P303+P361+P353 | IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. |
| P304+P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| P310 | Immediately call a POISON CENTER or doctor. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing |
| P308+P313 | IF exposed or concerned: Get medical advice/attention |
| P390 | Absorb spillage to prevent material damage. |
| P391 | Collect spillage |
| P405 | Store locked up |

### **Authorised use(s)**

#### Use description

**Meta SPC 1 and 2**

**# Use 1** - Fungi, beetles, termites – industrial users – vacuum/oscillating pressure treatment - indoor

|  |  |
| --- | --- |
| **Product Type(s)** | 8 |
| **Where relevant, an exact description of the authorised use** | --- |
| **Target organism (including developmental stage)** | Wood destroying fungi (no data):  Brown rot fungi  White rot fungi  Soft rot fungi  Wood boring beetles: (larvae)  *Wood destroying beetles*  Termites (subterranean termites): (no data)  *Reticulitermes spp.* |
| **Field of use** | Application: indoor use in dedicated treatment plants  Preservation of structural timber for indoor and outdoor use, in particular for timber used in use class 1, 2, 3 and 4, e.g. for horticulture and landscape gardening, posts, fences, palisades, playground equipment and wood paving including use class 4 special application for transmission poles with service live of 25-40 years. Please mind the restrictions. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Application method(s)** | | Vacuum pressure treatment / oscillating pressure process | | | | |
| **APPLICATION RATES** | ***Without protection against termites*** | UC 1 | UC 2 | UC 3 | UC 4 | UC 4 special applicationb |
| Product retentiona [kg/m³] | 6.50 | 7.85 | 7.85 – 9.00 | 10.90 - 22.50 | 13.0 - 31.25 |
| Application Solution c [%(w/w)] | 1.08 | 1.30 | 1.30 - 1.50 | 1.82 - 3.75 | 2.17 - 5.21 |
| ***With protection against termites*** |  |  |  |  |  |
| Product retentiona [kg/m³] | 13.1 | 13.1 | 13.81 | 13.81 - 22.5 | 13.81 - 31.25 |
| Application Solution c [%(w/w)] | 2.18 | 2.18 | 2.30 | 2.30 - 3.75 | 2.30 - 5.21 |
| **FREQUENCY** | | Single application | | | | |
| **Category(ies) of user(s)** | | Industrial user | | | | |
| **Pack sizes and packaging material** | | Please see the relevant section. | | | | |

a This refers to the undiluted product (i.e. concentrate) per volume of treated wood

b The use class “UC 4 special” specifically targets treated timber with applications having an increased service life time (e.g. transmission poles). For the intended use class “UC 4 special” a service life between 25 and 40 years is to be expected.

c Based on an average solution uptake of 600 L during vacuum pressure treatment

#### Use-specific instructions for use

|  |
| --- |
| *---* |

#### Use-specific risk mitigation measures

|  |
| --- |
| --- |

#### Where specific to the use, the particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

|  |
| --- |
| --- |

#### Where specific to the use, the instructions for safe disposal of the product and its packaging

|  |
| --- |
| --- |

#### Where specific to the use, the conditions of storage and shelf-life of the product under normal conditions of storage

|  |
| --- |
| --- |

### **General directions for use**

**Meta SPC 1 and 2, Use # 1 -** Fungi, beetles, termites – industrial users – vacuum/oscillating pressure treatment - indoor

#### Instructions for use

|  |
| --- |
| Apply the product via vacuum pressure / oscillating pressure treatment.  Dilute the product with water table via automated dosing. Please take into account the required concentration of the application solution.  The fixation time is minimum 48h.  Do not use on wood that may come in direct contact with food and feeding stuff or drinking water.  Regard that efficacy assessment has been performed according to the reference wood *Pinus silvestris*. |

#### Risk mitigation measures

|  |
| --- |
| The following personal protective equipment should be worn during product handling phase (application and cleaning):  Wear protective chemical resistant gloves during product handling phase (glove material to be specified by the authorisation holder within the product information). (N78)  A protective coverall (at least type 6, EN 13034) shall be worn. (N78)  Wear suitable protective footwear (EN 13832) when applying the product. (N79)  Wear a face shield when applying the product.  The process of dilution has to be carried out using an automatic dosing system.  Avoid contact with skin and eyes.  Handle product and dry freshly treated wood in areas with good ventilation.  Cleaning of the treatment chamber as well as pressure treatment of wood shall not be performed by the same operator on the same day.  All industrial application processes must be carried out within an area situated on impermeable hard standing with bunding to prevent run-off and a recovery system in place (e.g. sump).  Freshly treated timber must be stored after treatment under shelter or on impermeable hard standing, or both, to prevent direct losses to soil, sewer or water, and that any losses of the product, including any contaminated water/soil must be collected for reuse or disposal in accordance with local/national/international requirements.  The product must not be applied on wood for use class 4, that is foreseen to be placed directly in water bodies.  Use of the product on wood that is foreseen for use classes 1 and 2 in residential areas is restricted to small-scale and/or static wood constructions that do not have direct contact to the interior space. |

#### Particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

|  |
| --- |
| **First aid instructions:**  General: In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth or induce vomiting if a person is unconscious. If unconscious, place in recovery position and seek medical advice.  IF IN EYES: Immediately rinse eyes with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for 15 to 30 minutes. Seek immediate medical attention.  IF ON SKIN: Immediately wash skin with plenty of water. Thereafter take off immediately all contaminated clothing and shoes. Rinse skin with lukewarm, gently flowing water/shower for at least 15 to 30 minutes. Seek immediate medical attention.IF SWALLOWED: Immediately rinse mouth. Give something to drink, if exposed person is able to swallow. Do NOT induce vomiting. Immediately seek medical advice Seek immediate medical attention.  IF INHALED**:** Move to fresh air and keep at rest in a position comfortable for breathing.If symptoms: Call 112/ambulance for medical assistance. If no symptoms: Call a POISON CENTRE or a doctor  **Emergency measures to protect the environment:**  If the product contaminates lakes, rivers, sewers or soil, inform the appropriate authorities in accordance with local regulations.  Contain and collect spillage with an inert absorbent (e.g. sand, earth etc.). For large amounts: Pump off the product.  Dispose of contents/container to a special waste collection point in accordance with local/national/international requirements. |

#### Instructions for safe disposal of the product and its packaging

|  |
| --- |
| Product residues, contaminated materials (including sawdust) and empty containers must be collected and disposed of in accordance with the national waste disposal legislation and any regional and/or local authority requirements.  Do not discharge the biocidal product nor the diluted solution of the biocidal product into the sewage system or the environment (in particular surface water). |

#### Conditions of storage and shelf-life of the product under normal conditions of storage

|  |
| --- |
| The product must be stored only in original containers tightly closed and out of reach of unauthorised persons.  Recommended storage temperature range: ≥0°C to + 40°C.1  Protect from frost.  At low temperatures, crystallisation may occur. Redissolve precipitated ingredients by raising the temperature.  The shelf life of the product is 24 months. |

1 This recommendation is provided by the applicant. The accelerated storage test showed stability up to 54°C.

### **Other information**

Resistance should be monitored on a continuous basis. Should the authorisation holder become aware of reports of resistance this should be reported to the competent authorities.

### **Packaging of the biocidal product**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of packaging** | **Size/volume of the packaging** | **Material of the packaging** | **Type and material of closure(s)** | **Intended user (e.g. professional, non-professional)** | **Compatibility of the product with the proposed packaging materials (Yes/No)** |
| Jerrycan | 30 L | HDPE | Screw cap; HDPE | Industrial | Yes |
| Drum | 60 L | HDPE | Screw cap; HDPE | Industrial | Yes |
| IBC | 600 L | HDPE | Screw cap; HDPE | Industrial | Yes |
| IBC | 1000 L | HDPE | Screw cap; HDPE | Industrial | Yes |
| Bulk container\* | 30,000 L | Stainless steel | --- | Industrial | Yes |

\* For transport by road; No commercial packaging. These containers are for transport only and are not intended for long term storage.

### **Documentation**

#### Data submitted in relation to product application

A list of studies for the biocidal product can be found in annex 3.1. Furthermore, new human exposure data for refinement of the indicative dermal hand exposure value of handling model 1 are available.

#### Access to documentation

A letter of access for the active substance basic copper carbonate has been attached to section 13 of the IUCLID-Dossier “Wolmanit CX-8WB\_family”.

## Assessment of the biocidal product family

### **Intended use(s) as applied for by the applicant**

Please confer to the DRAs in the respective IUCLID files, section 13.

### **Physical, chemical and technical properties**

Tests have been performed with Wolmanit CX-8WB / Wolmanit CX-8M and Wolmanit CX-8F.

Please note that for use, the product will be diluted with water. The concentration range of the biocidial product after dilution is 1.08 – 5.21%w/w.

| **Property** | **Guideline and Method** | **Purity of the test substance** (% (w/w) | **Results** | | | | | | | | | **Remarks** | **References** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Physical state at 20°C and 101.3 kPa | Visual inspection | 100% | *Product* | | | | | Liquid | | | |  | XXXXXXXXX 2014a;  XXXXXXXXX 2014b |
| Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | | | | |
| Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | | | | |
| Colour at 20°C and 101.3 kPa | Visual inspection | 100% | *Product* | | | | | Blue | | | |  |
| Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | | | | |
| Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | | | | |
| Odour at 20°C and 101.3 kPa | Olfactory inspection | 100% | *Product* | | | | | characteristic | | | |  |
| Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | | | | |
| Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | | | | |
| Acidity / alkalinity | CIPAC MT 75 | 1% aqueous dilution and concentrates (100%) of the products | *Product* | | | | | *pH (25°C)* | | | |  |
| *1% sol.* | | *Conc.* | |
| Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | | | | | 9.8 | | 11.2 | |
| Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | | | | | 9.6 | | 11.1 | |
| CIPAC MT 191 | 100% | *Product* | | | | | *Alkalinity as NaOH* | | | |  |  |
| Wolmanit CX-8WB  Internal sample Nr.: 1000232733 | | | | | 16.21% | | | | XXXXXXXXX 2020a |
| Wolmanit CX-8F  Internal sample Nr.: 1000226502 | | | | | 18.12% | | | |  | XXXXXXXXX 2020b |
| Relative density / bulk density | OECD guideline 109 | 100% | *Product* | | | | | *Density (g/m³ at 20.0°C.)* | | | | DIN EN ISO 2811-3:2001 - Oscillating densitimeter method | XXXXXXXXX 2014c;  XXXXXXXXX 2014d |
| Wolmanit CX-8WB | | | | | 1.191 | | | |
| Wolmanit CX-8F | | | | | 1.189 | | | |
| Storage stability test – **accelerated storage** |  |  | Post authorisation condition: An accelerated storage stability test according to the CIPAC method MT 46.3 (storage at 54 ° C for two weeks) to examine the stability of basic copper carbonate, together with a validated, specific analysis method to determine the active ingredient (basic copper carbonate), is required.  Company’s statement:  The biocidal products Wolmanit CX-8WB and Wolmanit CX-8F are based on the active ingredients basic copper carbonate (CAS No. 12069-69-1) and Cu-HDO (CAS No. 312600-89-8).  Both active ingredients are insoluble substances in water.  The solubility of basic copper carbonate in water given in the product assessment report of this active ingredient is 1.2 mg/L at pH 6.  In the presence of complexing agents (e.g. amines and carboxylic acids) and therefore also in the amine-based, alkaline medium of Wolmanit CX-WB and Wolmanit CX-8F at pH values > 9, basic copper carbonate is completely dissolved.  In the assessment report of basic copper carbonate it is pointed out that the active substance is not the salt itself, but the cupric ion Cu2+ which is released from the copper carbonate. A range of validated analytical methods are available for the determination of this cupric ion Cu2+. These methods were collaboratively validated and are very widely used in Europe and the US in the entire wood preservation industry. The analytical method for the determination of the cupric ion Cu2+ has been validated for different Wolmanit CX products [XXXXXXXXX 2014k].  Like basic copper carbonate, Cu-HDO is a water-insoluble active ingredient (cf. product assessment report Cu-HDO: solubility in water: 6.1 mg/L at pH 7). In the presence of complexing agents (e.g. amines and carboxylic acids) and therefore also in the amine-based, alkaline medium of Wolmanit CX-WB and Wolmanit CX-8F at pH values > 9, Cu-HDO is completely dissolved.  Based on this, Cu2+ ions are formed by both, dissolving basic copper carbonate and Cu-HDO in the Wolmanit CX-8WB and Wolmanit CX-8F matrices. In the readily formulated Wolmanit CX products this leads to a situation where it is not possible to distinguish the source the Cu2+ ions are coming from.  Due to the impossibility to distinguish the Cu2+-source, specific methods were developed to determine Cu2+ and the HDO- levels in the Wolmanit CX formulations analytically. The method to analytically determine HDO- was developed and validated by Wolman in 2014 [XXXXXXXXX 2014l], concerning the method for Cu2+ cf. [XXXXXXXXX 2014k].  It is still possible to determine the levels of Cu-HDO and basic copper carbonate in Wolmanit CX formulations and solutions. To do so, the overall Cu2+ and HDO-levels in the Wolmanit CX formulation are measured initially. Based on these levels as well as on the given stoichiometric frame conditions (i.e. chemical formulas of basic copper carbonate, Cu-HDO) the allocated levels of Cu-HDO and basic copper carbonate in Wolmanit CX solutions can precisely be determined.  Conclusion: Therefore, the post-approval condition is fulfilled with the reports submitted with the product submission dossier of the Wolmanit CX-8WB\_family. | | | | | | | | | | XXXXXXXXX  2014k;  XXXXXXXXX  2014l |
| Storage stability test – **accelerated storage** | CIPAC MT 46 | 100% | *Product* | | pH, 2 % w/w solution, 25 °C | | | Density, 20 °C [g/cm3] | | Copper [% (w/w)] | | No degradation of a.s. after 2 weeks storage at 54°C; no significant changes of pH, density, appearance properties, packaging  Wolmanit CX-8WB 2 weeks storage at 54°C:  Copper-Degradation: +0,5%  Cu-HDO–Degradation: 0.0%  Wolmanit CX-8F 2 weeks storage at 54°C:  Copper-Degradation: -0.88%  Cu-HDO–Degradation: +0.88% | XXXXXXXXX 2014e;  XXXXXXXXX 2015a;  XXXXXXXXX 2014g;  XXXXXXXXX 2015c |
| Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | | Start: 9.79; end: 9.73 | | | Start: 1.191; end: 1.190 | | Start: 7.96; end: 8.00 | |
| Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | | Start: 9.67; end: 9.77 | | | Start: 1.189; end: 1.188 | | Start: 7.98; end: 7.91 | |
| Storage stability test – **long term storage at ambient temperature** | OPPTS 830.6317 | 100% | *Product* | pH, 2 % w/w solution, 25 °C | | Density, 20 °C [g/cm3] | | | Dynamic viscosity, 20 °C [mPas] | | Copper [% (w/w)] | 5000 mL, white HDPE bottles were used for storage of the biocidal product.  No relevant degradation of a.s. after long-term storage at ambient temperatures observed  Wolmanit CX-8WB  Copper–Degradation after 1 years:  -2.40%  Copper–Degradation after 2 years:  -2.53%  Cu-HDO–Degradation after 1 years:  -2.82%  Cu-HDO–Degradation after 2 years:  -1.88%  Wolmanit CX-8F  Copper–Degradation after 1 years:  +0.25%  Copper–Degradation after 2 years:  +0.63%  Cu-HDO–Degradation after 1 years:  -3.07%  Cu-HDO–Degradation after 2 years: +3.07%  Under consideration of all available storage stability tests a long-term storage stability of at least 2 years can be deduced for the products of the Wolmanit CX-8WB\_family.  The products of the Wolmanit CX-8WB\_family contain the following non-active ingredients classified as substances of concern (SoC):  The amine 2-aminoethanol (CAS 141-43-5), polyethyleneimine (50 % in water, CAS 9002-98-6), the carboxylic acids 2-ethylhexanoic acid (CAS 149-57-5) and n-heptanoic acid (CAS 111-14-8). The concentration of these components in the Wolmanit CX-8WB\_family ranges from 28.6 – 31,6 % for 2-aminoethanol, 0 – 8 % for 2-ethylhexanoic acid, 0 – 5% for n-heptanoic acid.  All ingredients listed above are chemically stable under the tested storage conditions.  No precipitation and no generation of different phases has been observed in the long-term storage test and in the accelerated storage test. Furthermore, no significant change of the physicochemical parameters of the formulations has been observed during the long-term storage test. Density, pH, colour, odour and viscosity remained unchanged. Likewise, the technical parameters remained unchanged. Also, the unchanged weight of the stored product at the end of the long-term storage test in comparison to the weight of the beginning of the long-term storage test indicates that no significant concentration changes of any component of the formulation occurred during the storage period.  Furthermore, and in accordance with the state-of-the-art concerning the manufacturing of the mentioned components of the Wolmanit CX-8WB\_family, the conditions to synthesize these compounds during the storage stability tests do not exist, nor does the products contain any possible precursor molecules for generation of these compounds.  In conclusion the consideration of the mentioned ingredients in context of the storage stability tests is considered to be scientifically not justified because neither an increase nor a decrease of the mentioned Wolmanit CX-8WB SoCs is possible under the conditions of the storage stability tests. This is also in accordance with the Guidance on the BPR: Volume I Parts A+B+C Version 2.0 May 2018 which states that “*In cases where the substance of concern or relevant impurity cannot possibly increase on manufacture or storage of the biocidal product then they do not need to be included in the storage stability/shelf life study.*” | XXXXXXXXX 2014f;  XXXXXXXXX 2015b;  XXXXXXXXX 2014h;  XXXXXXXXX 2015d; |
| Wolmanit CX-8WB  Sample Nr.: TH Ch 523582 | Start: 9.86; end: 9.81 | | Start: 1.184; end: 1.183 | | | Start: 36; end: 32 | | Start: 7.92; end: 7.72 |
| Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | Start: 9.59; end: 9.50 | | Start: 1.189; end: 1.192 | | | Start: 28; end: 28 | | Start: 7.93; end: 7.98 |
| Storage stability test – **low temperature stability test for liquids** |  |  | No tests performed; products should be stored frost protected | | | | | | | | |  |
| Effects on content of the active substance and technical characteristics of the biocidal product - **light** | OPPTS 830.6317 | 100% | No effect on technical properties (dilution stability, persistence of foam) during long-term storage observed; no change of appearance properties of the formulation; no effect of daylight exposure | | | | | | | | |  | XXXXXXXXX 2014f;  XXXXXXXXX 2014h; |
| Effects on content of the active substance and technical characteristics of the biocidal product – **temperature and humidity** | CIPAC MT 46  OPPTS 830.6317 | 100% | No effect during accelerated storage and long-term storage observed; no effect of the temperature within the range of 4 – 32 °C; humidity is of no concern because the products are based on water. | | | | | | | | | XXXXXXXXX 2014e;  XXXXXXXXX 2015a;  XXXXXXXXX 2014h;  XXXXXXXXX 2015d; |
| Effects on content of the active substance and technical characteristics of the biocidal product - **reactivity towards container material** | OPPTS 830.6317 | 100% | No effect during long-term storage observed; container material remains intact during long-term storage  Material of the packaging HDPE canister | | | | | | | | | XXXXXXXXX 2014f;  XXXXXXXXX 2015b;  XXXXXXXXX 2014h;  XXXXXXXXX 2015d; |
| Wettability |  |  | Not applicable for liquids | | | | | | | | |  |  |
| Suspensibility, spontaneity and dispersion stability |  |  | Not applicable for non-suspensions | | | | | | | | |  |  |
| Wet sieve analysis and dry sieve test |  |  | Not applicable for liquids | | | | | | | | |  |  |
| Emulsifiability, re-emulsifiability and emulsion stability |  |  | Not applicable for non-emulsions | | | | | | | | |  |  |
| Disintegration time |  |  | Not applicable | | | | | | | | |  |  |
| Particle size distribution, content of dust/fines, attrition, friability |  |  | Not applicable for liquids | | | | | | | | |  |  |
| Persistent foaming | CIPAC-MT 47 | Min. and max. application solutions | Foam volume after 1 minute for all products clearly below the limit value of 60 ml | | | | | | | | | The results of the persistent foam tests confirm that there is no unacceptable risk to operators following use of the Wolmanit CX-products through the appropriate application equipment. |  |
| Test formulation | | | | *Test sol. %* | | | *Foam Vol. after 1 min. (ml) at 22°C* | |
| Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | | | | 0.9 | | | 0.0 | | XXXXXXXXX 2014a |
| 3.75 | | | 0.0 | |
| Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | | | | 0.9 | | | 0.0 | | XXXXXXXXX 2014b |
| 5.25 | | | 0.0 | |
| Flowability/Pourability/Dustability |  |  | Not applicable for liquids | | | | | | | | |  |  |
| Burning rate — smoke generators |  |  | Not applicable; the Wolmanit CX-products are no smoke generators | | | | | | | | |  |  |
| Burning completeness — smoke generators |  |  | Not applicable | | | | | | | | |  |  |
| Composition of smoke — smoke generators |  |  | Not applicable | | | | | | | | |  |  |
| Spraying pattern — aerosols |  |  | Not applicable; Wolmanit CX-products will not be applied by spraying | | | | | | | | |  |  |
| Physical compatibility |  |  | Not applicable; use with other products is not intended | | | | | | | | |  |  |
| Chemical compatibility |  |  | Not applicable; use with other products is not intended | | | | | | | | |  |  |
| Degree of dissolution and dilution stability | CIPAC-MT 41 |  | No separated material, no precipitation has been observed neither directly after dilution nor after the storage period of 18 h.  Wolmanit CX-products are fully dilutable into water | | | | | | | | | The test has been performed with the  maximum in use concentration (i.e. 3.75 % w/w) of Wolmanit® CX-8F (Batch/Lot Nr.: TH3267) and (i.e. 3.75 % w/w) of Wolmanit® CX-8WB (Batch/Lot Nr.: TH3333). | XXXXXXXXX 2014c  XXXXXXXXX 2014d |
| Surface tension | OECD – 115 | *Test concentration* | *Test product* | | | | | *Test sol. %* | | *Surface tension mN/m* | | The surface tension was determined by a tensiometer with a measuring body (platinium ring). |  |
|  | Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | | | | |  | |  | |  |
| 38 g/L at 20°C | 3.8 | | 53.5 | | XXXXXXXXX 2015a |
|  | Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | | | | |  | |  | |  |
| 38 g/L at 20°C | 3.8 | | 60 | | XXXXXXXXX 2015b |
| Viscosity | OECD 114 | *Test concentration* | *Test product* | | | | | *Temp. °C* | | *Viscosity mPa.s* | | Measurement of viscosities and flow curves was carried out with a rotation viscosimeter with standard geometry, normal type (DIN 53019 – Part 1). The flow curve is starting with share rate of 20 R/s and end up at 500 R/s). |  |
| 100% | Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | | | | | 20°C | | 36 | | XXXXXXXXX 2014i |
| 40°C | | 16 | |
| 100% | Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | | | | | 20°C | | 28 | | XXXXXXXXX 2014j |
| 40°C | | 12 | |

|  |
| --- |
| **Conclusion on the physical, chemical and technical properties of the product** |
| Relevant experimental data of the biocidal product family Wolmanit CX-8WB is avilable and the relevant endpoints of the reference products Wolmanit CX-8WB and Wolmanit CX-8F are exemplarily summarized as follows:  The appearance of the formulations Wolmanit CX-8WB, Wolmanit CX-8M and Wolmanit CX-8F is identical. It is a homogenious blue liquid and fully miscible with water. The pH value of the formulations is basic and nearly identical (9.8 as 1% dilution at 25°C and 11.2 as undiluted formulation at 25°C for Wolmanit XC-8WB and 9.6 as 1% dilution at 25°C and 11.1 as undiluted formulation at 25°C for Wolmanit CX-8F respectively).  The density of Wolmanit CX-8WB is 1.191 g/cm³ at 20°C and 1.189 at 20 °C in the case of Wolmanit CX-8F. A surface tension of 72.4 mN/m was determinedat a concentration of 1 g/L at 20°C for both formulations, Wolmanit CX-8WB and Wolmanit CX-8F. At higher concentrations (38g/L) the surface tension differs, depending on the formulation: 53.5 mN/m was determined for Wolmanit CX-8WB, whereas Wolmanit CX-8F delivered 60 mN/m as value at 20°C. The dynamic viscosity of the product Wolmanit CX-8WB is determined to 36 mPa · s at 20°C and to 16 mPa · s at 40°C. Similar values were obtained for Wolmanit CX-8FB, 28 mPa · s at 20°C and to 12 mPa · s at 40°C respectively. The results of the persistent foam tests confirmed that there is no unacceptable risk to operators following use of the Wolmanit CX-products through the appropriate application equipment, as no foam was detected for the test formulations Wolmanit CX-8WB and Wolmanit CX-8FB. The long-term storage test at ambient temperature revealed that a storage stability and shelf life of 2 year at ambient temperatures can be attributed, as less than 10 % of the active substances degraded during two years of storage (Wolmanit CX-8WB: Copper: -2.53%, Cu-HDO: -1.88%; Wolmanit CX-8F: Copper: +0.63%, Cu-HDO: +3.07%). It could be demonstrated that the biocidal product family is stable after 2 weeks storage at 54 °C, as no significant degradation of the active substances have been observed (Wolmanit CX-8WB: Copper: +0.5%, Cu-HDO: +0.0%; Wolmanit CX-8F: Copper: -0.88%, Cu-HDO: +0.88%). |

### **Physical hazards and respective characteristics**

The tests concerning physical hazards have been performed with Wolmanit CX-10. The results can be read across to all other Wolmanit CX-8-formulations. Results of the corrosivity tests can be read-across to Wolmanit CX-8 (9176).

| **Property** | **Guideline and Method** | **Purity of the test substance (% (w/w)** | | **Results** | | **Reference** |
| --- | --- | --- | --- | --- | --- | --- |
| Explosives | Differential Scanning Calorimetrie (DSC) according to OECD Guideline 113 | 100% Wolmanit CX-10  Batch/Lot Nr.: U9027 | | Onset temperature: 105°C  Peak temperature: 158°C  Energy release:  210 J/g  The test substance is not explosive because the exothermic decomposition energy, determined by a DSC, is less than 500 J/g; due to the high similarity of the test formulation with the individual members of the Wolmanit CX-8WB\_family, the results can be read-across to formulations of the Wolmanit CX-8WB\_family. Furthermore, none of the components of the Wolmanit CX-8WB\_family-formulations is classified as explosive. Therefore, the Wolmanit CX-8WB\_formulations are considered as non-explosive. | | XXXXXXXXX 2003 |
| Flammable gases |  |  | | Not applicable for liquids | |  |
| Flammable aerosols |  |  | | Not applicable for liquids | |  |
| Oxidising gases |  |  | | Not applicable for liquids | |  |
| Gases under pressure |  |  | | Not applicable for liquids | |  |
| Flammable liquids | 92/69/EEC, appendix A9  DIN EN 22719 and DIN 51755 | 100% Wolmanit CX-10  Batch/Lot Nr.: U9027 | | In accordance with the EU Evaluation Manual for the Authorisation of Biocidal Products the test is not required because the product contains no flammable components. The flash point of all components of Wolmanit CX-8F are clearly above 60°. Wolmanit CX-8F is therefore regarded as non-flammable. | |  |
| Flammable solids |  |  | | Not applicable for liquids | |  |
| Self-reactive substances and mixtures |  |  | | Not applicable. The product has no explosive and no oxidative properties. Furthermore the decomposition energy from DSC measurement is <300 kJ/kg. Also none of the ingredients is classified as explosive or oxidative.The product is not flammable and the auto-ignition temperature is 420°C. Self-reactivity of the product can therefore be excluded. This is also confirmed by our long-term experience with the Wolmanit CX-formulations. | |  |
| Pyrophoric liquids |  |  | | Not applicable; the Wolmanit CX-products are not pyrophoric; decades of experience with Wolmanit CX-formulations have shown that the products do not ignite within five minutes after coming into contact with air. This is also shown by the long-term storage test where contact to air was permanently for up to 2 years. | |  |
| Pyrophoric solids |  |  | | Not applicable for liquids | |  |
| Self-heating substances and mixtures |  |  | | Not applicable for liquids | |  |
| Substances and mixtures which in contact with water emit flammable gases |  |  | | Not applicable; the Wolmanit CX-products are water-dilutable products which do not emit flammable gases in contact with water | |  |
| Oxidising liquids |  |  | | None of the components of the Wolmanit CX-formulations are classified as oxidizing. Furthermore, the Wolmanit CX-formulations are not flammable and the auto-ignition temperature is very high. Due to this and based on decades of experience the Wolmanit CX-formulations are regarded as not oxidising. | |  |
| Oxidising solids |  |  | | Not applicable for liquids | |  |
| Organic peroxides |  |  | | Not applicable | |  |
| Corrosive to metals | DIN 52 168 part 1  The test is performed at room temperature over 28 days at 22 °C ± 1.8 °C.  Steel surface that submerged: 9044 mm2 | Test concentration (% w/w) | | Test product | Result |  |
| 0.9 | 5.25 | Wolmanit CX-8WB  Batch/Lot Nr.: TH3333 | Mass loss absolute: 0.0018 g  Mass loss relatively: 0.002 %  Mass loss related to surface after 28 days: -0.20 g/m2  pH-value start: 10.10  pH-value end: 10.09  Not corrosive to steel | XXXXXXXXX 2014e |
| 0.9 | 5.25 | Wolmanit CX-8F  Batch/Lot Nr.: TH3267 | Mass loss absolute: 0.0027 g  Mass loss relatively: 0.003 %  Mass loss related to surface after 28 days: -0.30 g/m2  pH-value start: 9.99  pH-value end: 9.99  Not corrosive to steel | XXXXXXXXX 2014f |
| UN test C.1 described in part III, Section 37.4.1.1 of the UN-MTC  Determination of the corrosive effect to metals. | 100% Wolmanit CX-8WB  Internal sample No: TH Ch 532582 | | Corrosiveness of Wolmanit® CX-8WB against mild steel DC 01  and aluminium 7075; test duration 7 days  The steel and aluminium sheets are not attacked. The surface shows a little change  of appearance. On the aluminium sheets there were some deposit in liquid phase.  The overall corrosion was referred to the different phases of the sheets.  The relatively mass loss shows no corrosion for Wolmanit® CX-8WB for the  classification criteria of the UN Test C.1. | | XXXXXXXXX 2015a |
| UN test C.1 described in part III, Section 37.4.1.1 of the UN-MTC  Determination of the corrosive effect to metals. | 100% Wolmanit CX-8F  Internal sample No: TH 3267 | | Corrosiveness of Wolmanit® CX-8F against mild steel DC 01 and  aluminium 7075; test duration 7 days  The steel sheets are not attacked. The aluminium sheets are coated with product.  After cleaning the metal was shiny and has blue deposit.  The overall corrosion was referred to the different phases of the sheets.  The relatively mass loss shows no corrosion for Wolmanit® CX-8F for the classification  criteria of the UN Test C.1. | | XXXXXXXXX 2015b |
| UN test C.1 described in part III, Section 37.4.1.1 of the UN-MTC  Determination of the corrosive effect to metals. | 100% Wolmanit CX-8WB  Internal charge No: 1000 3099 78 | | Corrosiveness of Wolmanit® CX-8WB against mild steel DC 01 and aluminium 7075; test duration 28 days.  The steel and aluminium sheets showed mat and partly blue surface after cleaning. The highest uniform corrosion occurred at the fully submerged aluminium specimens.  As localised corrosion does not occur and the mass loss for uniform corrosion was by far below the thresholds, Wolmanit® CX-8WB is not to be classified as corrosive to metals according to (the requirements of the) UN Test C.1. | | XXXXXXXXX 2021a |
| UN test C.1 described in part III, Section 37.4.1.1 of the UN-MTC  Determination of the corrosive effect to metals. | 100% Wolmanit CX-8F  Internal charge No: 1000 4004 64 | | Corrosiveness of Wolmanit® CX-8F against mild steel DC 01 and aluminium 7075-T6; test duration 28 days.  The steel and aluminium sheets showed both a darker and aluminium additionally a rougher surface after cleaning. The highest uniform corrosion occurred at the fully submerged aluminium specimens.  As localised corrosion does not occur and the mass loss for uniform corrosion was by far below the thresholds, Wolmanit® CX-8F is not to be classified as corrosive to metals according to (the requirements of the) UN Test C.1. | | XXXXXXXXX 2021b |
| Auto-ignition temperatures of products (liquids and gases) | 92/69/EC, appendix A15 | 100% Wolmanit CX-10  Batch/Lot Nr.: U9027 | | 420°C | | XXXXXXXXX 2003 |
| Relative self-ignition temperature for solids |  |  | | Not applicable for liquids | |  |
| Dust explosion hazard |  |  | | Not applicable for liquids | |  |

|  |
| --- |
| **Conclusion on the physical hazards and respective characteristics of the product** |
| The biocidal product Wolmanit CX-8WB and the other members of the biocidal product family do not display any flashpoint because of the high water content. Explosive or oxidising properties can be excluded. The auto-ignition temperature of the biocidal product Wolmanit CX-10 is 420 °C. Due to the similarity in composition, the members of the Wolmanit CX-8WB\_family have an auto-ignition temperature above 400°C with the utmost probability. The products are not classified. The shelf life is 2 years. |

### **Methods for detection and identification**

Validated analytical methods are available for the determination of the active substances of the products of the Wolmanit CX-8WB\_family. The analytical methods are useful for the determination of the active substances in concentrates of the wood preservatives as well as for the determination of the actives substances in solutions of the wood preservatives. Copper originating from basic copper carbonate as well as from Cu-HDO can be determined very specific via atom absorption spectrometry. The Cu-HDO content of the Wolmanit CX products can be determined by photometer after dilution of the wood preservative and conversion with FeCl3 forming a yellow-orange complex. The UV-VIS spectrum of this complex can be differentiated by other coloured FeCl3 complexes by its specific maximum.

For substances of concern (SoCs), such as 2-aminoethanol, 2-ethyl hexanoic acid and n-heptanoic acid validated analytical methods are available. Determinations have been carried out by HILIC-LC-MS/MS in the case of 2-aminoethanol and GC-MS after derivatization with Trimethylsulfonium hydroxide (TMSH) in the case of 2-ethyl hexanoic acid and n-heptanoic acid, using Wolmanit CX-8WB as test formulation.

| **Analytical methods for the analysis of the product as such including the active substance, impurities and residues** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Analyte (type of analyte e.g. active substance)** | **Analytical method** | **Fortification range / Number of measurements** | **Linearity** | **Specificity** | **Recovery rate (%)**  **Products of Wolmanit CX\_family** | | | **Limit of quantification (LOQ) or other limits** | **Reference** |
| Range | Mean | RSD |
| *Basic copper carbonate* | A validated, specific analytical method for determination of basic copper carbonate was requested as post-authorisation condition |  |  |  |  |  |  |  |  |
| *Cu* | flame atom absorption spectrometer (AAS) | 5 measurements per test concentration | Content [mg/L] = 21.80 x Absorbance + 0.038;  Correlation coefficient: 0.999957; Range: 1 – 5 mg Cu/L;  this corresponds to: 27.0-135.0 % of the active substance concentration in Wolmanit CX-8WB sample concentrates | no interference by other elements | 96.2 – 103.6 | 101.2 | 0.89 | LOD: 0.08 mg Cu/L  LOQ: 0.15 mg Cu/L | XXXXXXXXX 2014k |
| *Cu-HDO* | The Cu-HDO content of the Wolmanit CX products can be determined by photometer after dilution of the wood preservative and conversion with FeCl3 forming a yellow-orange complex. | 5 measurements per test concentration | Content [mg/L] = 186,1 x Absorbance - 1,27; Correlation coefficient: 0.999967;  Range: 18.1 – 217 mg Cu-HDO/L; this corresponds to: 15.8-188.9 % of the active substance concentration in Wolmanit CX-8WB sample concentrates | FeCl3 gives coloured complexes with different classes of compounds, for example with phenols, compounds able to form enols, hydroxamic acids. The presence of such compounds can lead to systematically errors. The colorations produced by these classes of compounds have in part other maxima and can be identified via comparison of the UV/VIS-spectra with a standard spectrum if necessary. | 98.9 – 100.4 | 99.6 | 0.27 | LOD: 4.6 mg Cu-HDO/L  LOQ: 15.4 mg Cu-HDO/L. | XXXXXXXXX 2014l |
| *2-Aminoethanol (SoC)* | HILIC-LC-MS/MS after dilution | Linearity: Single determinations at five concentrations were performed.  Recovery: 5 measurements at 2 concentration levels. | Y=1.236174\*x + 0.093058;  Correlation coefficient (R2): 0.998611, Range: 0 – 50 %; Analytical calibration extended over a range appropriate for the lowest and highest (± 20%)  nominal concentration of the analyte | LC-MS/MS measurements show high specificity. No interfering with other Wolmanit CX co-formulants observed. | Level 1 (40 %): 97.2 – 100.2  Level 2 (50 %): 96.9 – 101.3 | Level 1 (40 %): 98.2  Level 2 (50 %): 98.9 | Level 1 (40 %): 1.17  Level 2 (50 %): 1.74 | The method is working with a dilution of the wood preservative and its LoQ is several orders of magnitude lower than the test concentration. | XXXXXXXXX 2019a |
| *2-ethyl hexanoic acid (SoC)* | GC-MS after derivatization | Linearity: Single determinations at five concentrations were performed.  Recovery: 5 measurements at 2 concentration levels. | Y=0.245\*x + 0.00642;  Correlation coefficient (R2): <0.999, Range: Analytical calibration extended over a range appropriate for the lowest and highest (± 20%)  nominal concentration of the analyte | GC-MS measurements show high specificity. No interfering with other Wolmanit CX co-formulants observed. | Level 1 (6.31 %): 99.1 – 102.4  Level 2 (7.32 %): 101.1 – 106.1 | Level 1 (6.31 %): 100.3  Level 2 (7.32 %): 103.0 | Level 1 (6.31 %): 1.58  Level 2 (7.32 %): 1.91 | The method is working with a dilution of the wood preservative and its LoQ is several orders of magnitude lower than the test concentration. | XXXXXXXXX 2019a |
| *n-heptanoic acid (SoC)* | GC-MS after derivatization | Linearity: Single determinations at five concentrations were performed.  Recovery: 5 measurements at 2 concentration levels. | Y=0.375\*x-0.0738;  Correlation coefficient (R2)= 0.999, Range: Analytical calibration extended over a range appropriate for the lowest and highest (± 20%)  nominal concentration of the analyte | GC-MS measurements show high specificity. No interfering with other Wolmanit CX co-formulants observed. | Level 1 (3.83 %): 91.1 – 102.5  Level 2 (4.58 %): 101.2 – 105.7 | Level 1 (3.83 %): 98.1  Level 2 (4.58 %): 102.9 | Level 1 (3.83 %): 4.37  Level 2 (4.58 %): 2.02 | The method is working with a dilution of the wood preservative and its LoQ is several orders of magnitude lower than the test concentration. | XXXXXXXXX 2019a |

**Analytical methods for monitoring**

Reference is made to the assessments reports for the active substances Cu-HDO [Austria 2013] and basic copper carbonate [France 2011].

**Analytical methods for soil**

Reference is made to the assessments reports for the active substances Cu-HDO [Austria 2013] and basic copper carbonate [France 2011].

**Analytical methods for air**

Reference is made to the assessments reports for the active substances Cu-HDO [Austria 2013] and basic copper carbonate [France 2011].

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Analytical methods for water** | | | | | | | | | | |
| **Analyte (type of analyte e.g. active substance)** | **Analytical method** | **Fortification range / Number of measurements** | **Linearity** | **Specificity** | **Recovery rate (%)** | | | | **Limit of quantification (LOQ) or other limits** | **Reference** |
| fortification levels | Range | Mean | RSD |
| Cu-HDO | UPLC-UV method | 3 fortification levels:  3.2 μg/L;  12.9 μg/L;  64 μg/L 5 measurements per level | Content Cu(HDO)2 [μg/L] = 0.01369 x Area - 0.086; Correlation coefficient: 0.9999; Range: 6.4- 129 μg Cu-HDO/L | No significant interfering peaks of the matrix water at the retention time of Cu-HDO were observed. With regard to the range of the presented method the influence of the matrix of water can be disregarded. | 3.2 μg/L | 97.5% – 99.1% | 98.1% | 3.3%. | LOQ is 2.8 μg Cu-HDO/L | XXXXXXXXX 2015 |
| 12.9 μg/L | 95.5% – 97% | 96.2% | 0.7% |
| 64 μg/L | 97.5% – 99.1% | 98.1% | 0.6% |
| Cu-HDO | UPLC-DAD | 3 fortification levels: 0.05 / 0.1 / 0.2 μg/L | Content Cu(HDO)2 [μg/L] = 82.914 x peak hight + 0.975;  Correlation coefficient: 0.9998;  Range: 10 - 100 µg Cu-HDO/L | No significant interfering peaks of the tap water matrix water were observed at the retention time of Cu-HDO. The influence of the tap water matrix can be disregarded for the range of the presented method. | 0.05 μg/L | 53 – 83% | 66% | 17% | LoD: 0.05 Cu-HDO/L | XXXXXXXXX 2014m |
| 0.1 μg/L | 67 – 94% | 80% | 11% |
| 0.2 μg/L | 71 – 85% | 81% | 6% |

A refined analytical method for the determination of Cu-HDO as summarised in the table above is available. The limit of quantification of this refined method amounts to 2.8 Cu-HDO/L.

The method has further been refined. The UPLC-DAD method in combination with solid phase extraction allows to determine traces of Cu-HDO. The described solid phase extraction method can be applied to control the concentration of Cu-HDO in tap water at a level of 0.1 μg/L. Recoveries were determined to be 80 ± 11% at this concentration. Minimum concentrations of Cu-HDO in tap water that can be determined using this method, are in the range of 0.05 μg/L.

**Analytical methods for animal and human body fluids and tissues**

These analytical methods are only required where an active substance is classified as toxic or highly toxic, which is not the case for the used active substances Cu-HDO and basic copper carbonate. Reference is also made to the assessments reports for the named active substances.

**Analytical methods for monitoring of active substances and residues in food and feeding stuff**

Not necessary. No direct contact of treated wood with food and feeding stuff is expected.

### **Efficacy against target organisms**

#### Function and field of use

Wolmanit CX-8WB (or Wolmanit CX-8M as an additional name for Wolmanit CX-8WB) and Wolmanit CX-8F are two wood preservatives based on the same active ingredients. Both products contains 13.04% Copper(II) carbonate-copper(II) hydroxide (1:1) and 2.80% Bis(N-cyclohexyl-diazenium-dioxy)-copper. The total copper content of both formulations is 8%. The field of use envisaged covers the preventive protection of timber for interior and exterior use (use classes 1 to 4), timber with ground and water contact. Scope of application is the preventive protection of wood and constructional timber against wood-destroying fungi including those causing soft-rot as well as insects including termites. The products are delivered as concentrate and are diluted with water to a suitable working concentration before application. The degree of dilution is depending on the wood species, type of wood product and the intended use of the treated wood.

#### Organisms to be controlled and products, organisms or objects to be protected

Wood-destroying fungi (brown rot, white rot) including those causing soft rot as well as wood-destroying insects (wood boring beetles) including termites. The product is not effective against blue-stain and mould:

Wood-Preservative (PT 08) for the preservation of structural timber (solid wood, reconstituted wood and panels) for interior and exterior use, for timber with ground and water contact, in particular for timber used in horticulture and landscape gardening, posts, poles, vine support, fences, palisades, playground equipment and wood paving.

#### Effects on target organisms, including unacceptable suffering

Wolmanit CX-8WB (Wolmanit CX-8M) and Wolmanit CX-8F show fungicidal and insecticidal effects. The products prevent the development of wood destroying organisms by inhibition of their metabolism after contact and/or ingestion.

#### Mode of action, including time delay

Wolmanit CX-8WB (Wolmanit CX-8M) and Wolmanit CX-8F prevent the development of the wood destroying organisms by contact or ingestion (inhibition of metabolism), no time delay.

The active substances Cu-HDO and basic copper carbonate are used as fungicide and insecticide. Wolmanit CX-8WB is intended for treatment of wood in use classes 1 – 4. Wolmanit CX-8WB prevents the development of wood destroying organisms by inhibition of their metabolism after contact and/or ingestion. The effect on the target organisms to be controlled and the molecular mode-of-action of Wolmanit CX-8WB can be deduced from the respective properties of the active substances of the product.

According to the CA-Report of Cu-HDO and basic copper carbonate these active substances belong to the group of copper biocides and inhibit enzymatic activity in fungi. Upon contact with the fungicide the spores passively take up copper II cations which hinder their germination. Copper II cations have a high binding affinity to amino- and carboxyl-groups and therefore act on many sites in the fungal metabolism. They combine with the sulfhydryl groups of amino acids and with carboxyl groups of the cell or membrane proteins. These reactions are unspecific and varied. Metabolism is interrupted through inhibition of many enzyme reactions. Copper II cations compete with other metals and their derivatives in the cell through chelation.

Amongst others the influence of copper II cations in the organism causes unspecific denaturation of proteins and enzymes. That is why it also acts as feeding and cell poison for insects (CA Report of basic copper carbonate).

Information from the IRAC project is not available indicating that no insecticidal resistance is known by copper compounds.

#### Efficacy data

The efficacy of the Wolmanit CX-8WB\_family (Wolmanit CX-8WB, Wolmanit CX-8M and Wolmanit CX-8F) has been evaluated by internationally recognized and accredited laboratories which are competent for testing wood preservatives. Tests were carried out at the following institutes and laboratories: XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX XXXXXXXXX.

Biological testing of the Wolmanit CX-8WB\_family was conducted with Wolmanit CX-8WB (Wolmanit CX-LP14781) and Wolmanit CX-8F. Both products contain 13.04% Copper(II) carbonate-copper(II) hydroxide (1:1) and 2.80% Bis(N-cyclohexyl-diazenium-dioxy)-copper as active ingredients. The total copper content of both formulations is 8%. The formulations additives are in a large extend identical but there is a very slight difference in the complexing agents (amines) used in the tested formulations. One of the formulation contains only 2-aminoethanol (31.60%) and the second contains 2-aminoethanol (28.60%) and 3% of a second amine – polymeric amine. However, the results from the different efficacy tests carried out demonstrate that the slight deviation does not affect the efficacy of the products. The formulation additives used do not have any fungicidal or insecticidal properties. The argumentation has up to now been accepted in all countries in which the products have been authorised.

The test results are listed in Table “Experimental data on the efficacy of the biocidal product against target organism(s)” (see below). Nine studies according to EN standards are provided to demonstrate the efficacy of the Wolmanit CX-8WB\_family.

The results of the EN 113, ENV 807, EN 47 and EN 117 tests confirm the preventive efficacy of the Wolmanit CX-8WB\_family against wood destroying fungi (brown rot, white rot, soft rot) and wood destroying insects including termites. Tests were conducted in combination with evaporating and/or leaching procedures (EN 73 and EN 84).

The critical values for the Wolmanit CX-8WB\_family in each of the use classes 1, 2, 3, and 4 as defined in EN 335-1 were calculated according to EN 599-1.

**Use class 1**

Wood preservative products in use class 1 shall be effective against specific or all wood boring beetles as specified in 599-1. The Wolmanit CX-8WB\_family is effective against all wood boring beetles. As stipulated in EN 599-1 (6.1 c), the tests were carried out with the representative beetle species, the “Longhorn beetle” (*Hylotrupes bajulus*), which is the most tolerant beetle against copper containing preservatives.

Becker (1967) evaluated the efficacy of copper compounds and copper containing wood preservatives against *Hylotrupes bajulus*. He found that a solution of CuSO4 had a preventive efficacy against newly hatched larvae of *Hylotrupes bajulus* at a concentration of 0.25% to 0.4% (Table 2, page 417). Harrow (1954) determined the effective concentration of CuSO4 solution against newly hatched larvae of *Anobium punctatum* and found a concentration between 0.1% and 0.25% to be effective (page 418 of Becker (1967)). Becker (1967) and Harrow (1954) also tested the efficacy of CC preservatives against newly hatched larvae of *Hylotrupes bajulus* and *Anobium punctatum* and determined toxic values similar to those for CuSO4 (Fig. 4, page 420 and page 419 of Becker (1967)). In all tests *Hylotrupes bajulus* was more tolerant to copper than *Anobium punctatum*. This was also stated by Becker (1964) (page 180 below Fig. 5): “Anobien- and Lyctus-Eilarven sind giftempfindlicher als die viel größeren Hausbock-Eilarven. Schutzmittel, die gegen letztere ausreichend vorbeugend wirksam sind, müssen sich auch gegen Anobien and Lyctus-Arten bewähren.“ The above mentioned literature data of Becker 1967, Becker 1964 and Harrow 1954 have been included to allow a waiving due to a read across between the dossier and the respective literature data (see reference list table 109 sorted by author name).

Translation: „Newly hatched larvae of Anobium and Lyctus are more susceptible to toxins than the much bigger newly hatched larvae of a longhorn beetle. Preservatives, having sufficient preventive efficacy against the latter, will also prove themselves against species of Anobium and Lyctus.”

To determine the critical value for use class 1, only the results from the EN 47 + EN 73 are considered. The toxic values against *Hylotrupes bajulus* were 5.6 – 7.3 kg/m³ (Ref. B.6.7-04). The biological reference value calculates to 6.5 kg/m³. The real upper threshold value for this test is certainly much lower than 7.3 kg/m³ because at the lower threshold value of 5.6 kg/m³ only 2 larvae from 30 were alive.

For use class 1 the critical value is identical with the biological reference value. The critical value and the minimal retention for use class 1 is therefore 6.5 kg/m³.

**Use class 2**

The critical value for use class 2 must be determined using the critical value of use class 1 and the biological reference value determined in an additional tests performed with basidiomycetes on test specimens that were treated by an evaporative ageing procedure (EN 73). An additional test for the Wolmanit CX-8WB\_family was conducted according to EN 113 + EN 73 (Ref. B 6.7-01).

The result of the EN 113 + EN 73 test with Wolmanit CX-LP14781 leads to a biological reference value against wood destroying basidiomycetes (excluding *C. versicolor*) of < 7.85 kg/m³ (highest biological reference value against *Poria placenta*). The biological reference value for the wood destroying basidiomycetes is therefore considered to be 7.85 kg/m³.

**Use class 3**

The critical value for use class 3 is defined by the critical value of use class 2 and by biological reference values determined in additional tests carried out with basidiomycetes or beetles on test specimens that were treated by a leaching procedure (EN 84). Additional tests carried out for the Wolmanit CX-8WB\_family were EN 47 + EN 84 (Ref. B 6.7-03) and EN 113 + EN 84 (Ref. B 6.7-01).

From the EN 47 + EN 84 test with Wolmanit CX-LP 14781 a biological reference value of < 4.3 kg/m³ can be derived.

The result of the EN 113 + EN 84 test with Wolmanit LP 14781 leads to a biological reference value against wood destroying basidiomycetes (excluding *C. versicolor*) of < 7.85 kg/m³ (highest biological reference value against *Gloeophyllum trabeum*).

The critical value for use class 3 is identical with the highest biological reference value determined in the tests stated above. The critical value and the minimal retention for use class 3 is 7.85 kg/m³.

**Use class 4**

The critical value for use class 4 is derived from the critical value of use class 3 and additional tests carried out on test specimens that were treated by a leaching procedure (EN 84) and subsequently subjected to attack by basidiomycetes (test according to EN 113 including *Coriolus versicolor*) and soil inhibiting microorganisms (test according to ENV 807). The following additional tests were performed: EN 113 + EN 84 (Ref. B 6.7-01), ENV 807 (Ref. B 6.7-06) and ENV 807 (Ref. B 6.7-01).

The biological reference value of the EN 113 + EN 84 test with Wolmanit CX-LP 14781 (Ref. B 6.7-01) including *C. versicolor* on beech was < 7.56 kg/m³.

The biological reference value of Wolmanit CX-LP 14781 determined in an ENV 807 test (Ref. B 6.7-06) was 10.9 kg/m³ and calculated as shown below.

**Mass losses of Wolmanit CX-LP 14781 determined in an ENV 807 test**



The table shows the mass losses of the reference preservative and the test product Wolmanit CX-LP 14781 after various test periods (data from Ref. B 6.7-06).

According to ENV 807 a nominal effective retention of the reference preservative (n.r.R.) of 1.87 kg/m³ must be selected. Time periods **a** and **b** are 16 and 24 weeks respectively.

*Calculation of the nominal effective retention of the test preservative (n.e.r.)*:

Selection of the nominal effective retention of the reference preservative (n.r.R.): 1.87 kg/m³

a = 0.44%

b = 5.33%

c1 = 1.75%, c2 = 0.01%

d1 = 6.24%, d2 = 4.12%

W1 = 4.10%, W2 = 2.16%

R1 = 1.91 kg/m³, R2 = 3.02 kg/m³

Nominal retention of the test preservative (n.r.P.): 2.54 kg/m³

Nominal effective retention of the test preservative (n.e.r.) = 2.54 kg/m³ / 1.87 kg/m³ \* 8 kg/m³ = 10.87 kg/m³

The biological reference value of Wolmanit CX-8F determined in an ENV 807 test (Ref. B 6.7-07) was 10.7 kg/m³ and calculated as shown below.

**Mass losses of Wolmanit CX-8F determined in an ENV 807 test**



The table shows the mass losses of the reference preservative and the test product Wolmanit CX-8F after various test periods (data from Ref B 6.7-07).

According to ENV 807 a nominal effective retention of the reference preservative (n.r.R.) of 1.87 kg/m³ must be selected. Time periods **a** and **b** are 16 and 24 weeks respectively.

*Calculation of the nominal effective retention of the test preservative (n.e.r.)*:

Selection of the nominal effective retention of the reference preservative (n.r.R.): 1.87 kg/m³

a = 0.44%

b = 5.33%

c1 = 1.74%, c2 = 0.21%

d1 = 6.39%, d2 = 3.27%

W1 = 4.17%, W2 = 1.81%

R1 = 1.92 kg/m³, R2 = 3.09 kg/m³

Nominal retention of the test preservative (n.r.P.): 2.50 kg/m³

Nominal effective retention of the test preservative (n.e.r.) = 2.50 kg/m³ / 1.87 kg/m³ \* 8 kg/m³ = 10.695 kg/m³

The nominal effective retentions obtained in the two soft rot tests (ENV 807) are nearly the same: 10.87 kg/m³ and 10.695 kg/m³. The results of both studies confirm clearly that the very slight difference in the formulation additives does not have any influence on the efficacy of the formulations. The results of the provided tests can be transposed within the different products of the Wolmanit CX-8WB\_family.

The critical value for use class 4 is identical with the highest biological reference value determined in the tests stated above. The critical value and minimal retention for the Wolmanit CX-8WB family (Wolmanit CX-8WB, Wolmanit CX-8M and Wolmanit CX-8F) in use class 4 is therefore 10.9 kg/m³.

**Termites**

The termiticidal efficacy of the Wolmanit CX-8WB\_family can be deduced from results of laboratory tests conducted with products of the Wolmanit CX-10\_family and was evaluated in an additional laboratory test with Wolmanit CX-LP 14781.

The EN 117 test with Wolmanit CX-LP 14781 was performed using test specimens that were subjected to an evaporating procedure (EN 73) (Ref. B 6.7-09). The toxic values of this test were 9.8 kg/m³ – 13.1 kg/m³. A biological reference value of 13.1 kg/m³ can be derived.

The biological reference value against termites after ageing of the test specimens according to EN 84 can be derived from the result of the test performed with Wolmanit CX-10 (80% solution) (Ref. B 6.7-08). Wolmanit CX-10 is from the active ingredient point of view a 1.25 higher concentrated version compared to the Wolmanit CX-8WB\_family products. The product has been tested as an 80% aqueous dilution so that the active ingredient content (Copper(II) carbonate-copper(II) hydroxide (1:1) content and the Bis(N-cyclohexyl-diazenium-dioxy)-copper content) in the test is identical with the active ingredient content of the Wolmanit CX-8WB\_family products. Wolmanit CX-10 (80% solution) contains in addition 4,0% boric acid but can nevertheless be used for the Wolmanit CX-8WB\_family products because boron is leached out of the treated samples during EN84 ageing. This was shown by a leaching study carried out at Biological Testing Laboratory BASF Wolman GmbH with different Wolmanit CX formulations. After leaching according to EN 84, 85.34% which represent 0.6% of boric acid was found in the leachate so that the efficacy of the formulation against termites may only be regarded as supplementary for efficacy assessment.. The biological reference value determined in the test with Wolmanit CX-10 (80% solution) was <8.975 kg/m³.

A new study performed with Wolmanit CX-LP 14781 using test specimens that were subjected to a leaching procedure (EN 84) confirm the biological reference value determined in the test with Wolmanit CX-10 (80% solution). The toxic value of Wolmanit CX-LP 14781 against termites after leaching is between 8.13 kg/m³ and 13.81 kg/m³.

Therefore, the biological reference value against termites for Wolmanit CX-8WB is derived from the tests after evaporation respectively after leaching procedure performed with Wolmanit CX-LP 14781 (= Wolmanit CX-8WB) which are the decisive tests in this case and amounts to 13.1 kg/m³ (Ref. B 6.7-09) respectively 13.8 kg/m³ (Ref. B 6.7-11).

For protection against termites in use class 1, 2, 3 and 4 the lower application rate defined previously must therefore be raised to a retention of 13.1 kg/m³ for use class 1 and 13.81 for use classes 2, 3 and 4.

**Field tests according to EN 252**

The EN 599-1 (2013) specifies for each of the five use classes defined in EN 335-1, the biological tests required for evaluating the efficacy of wood preservatives for the preventive treatment of solid timber.

Field tests acc. to EN 252 are not obligatorily required for UC 4 but are listed under additional requirements. EN 252 may be required due to local conditions or to support the demands of specifiers or the claims of the manufacturer.

For more important construction products, harmonised standards have been developed under the legislation of the Regulation (EU) No 305/2011 -Construction Product Regulation (CPD) laying down harmonised conditions for the marketing of construction products. In these standards, specific requirements concerning the durability of the construction product are determined.

In EN 14081 (2011) “Timber structures –Strength graded structural timber with rectangular cross section–“reference is made to EN15228 but field tests are not required.

Different from that in EN 14229 (2011) “Structural timber – Wood poles for overhead lines” in the section durability for wood preservatives used for the treatment for poles for overhead lines field tests acc. to EN 252 are explicitly required.

For most timber-construction products the recommended retentions in UC 4 for wood preservatives should not be derived from EN 252 but from the biological tests required as obligatory in EN 599.

Wood poles for overhead lines or for other construction products with a very long service life expectation, the in ground (UC 4) retention shall be derived from the EN 599 tests required including EN 252.

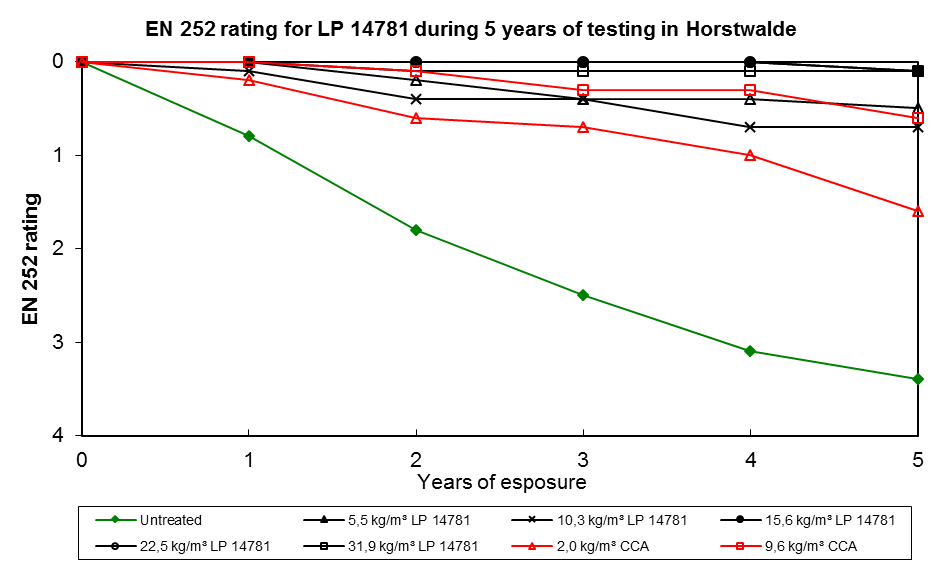
The EN 252 test enclosed is therefore relevant only for the treatment of wooden poles or when specifiers require EN 252 tests explicitly.

This is even more important as for all timber structures also for the ones, where the requirements have been defined in harmonized standards, timber species with an adequate natural durability could be used as an alternative to timber protected with wood preservatives.

For the classification of wood species in natural durability classes, field tests for use class 4 are not obligatory.

**Assessment of EN 252 field test results for Wolmanit CX-8WB\_family**

The efficacy of Wolmanit CX-8WB (formulation LP 14781) was tested by XXXXXXXXX according to the field test standard EN 252 “Field test method for determining the relative protective effectiveness of a wood preservative in ground contact”. The field test was started in August 2008 in Horstwalde, Germany. Test report B 6.7/10 contains the evaluation data after five years exposure of the test stakes. Further, the ratings for each individual stake during the five years of testing are documented. This data was used to plot Figure 1. The graph shows the development of the rating for the five test retentions of LP 14781, the two test retentions of the reference preservative CCA and the untreated control, during five years of testing (Figure 1). After 5 years of testing the stakes treated with 1.4% CCA (9.6 kg/m³) were rated 0.6. Stakes treated with 0.8% (5.5 kg/m³) or 1.55% (10.3 kg/m³) of LP 14781 were rated 0.5 and 0.7, respectively. Stakes treated with higher retentions (15.6 kg/m³, 22.5 kg/m³ and 31.9 kg/m³) were rated with 0.1. Untreated control stakes were rated 3.4.

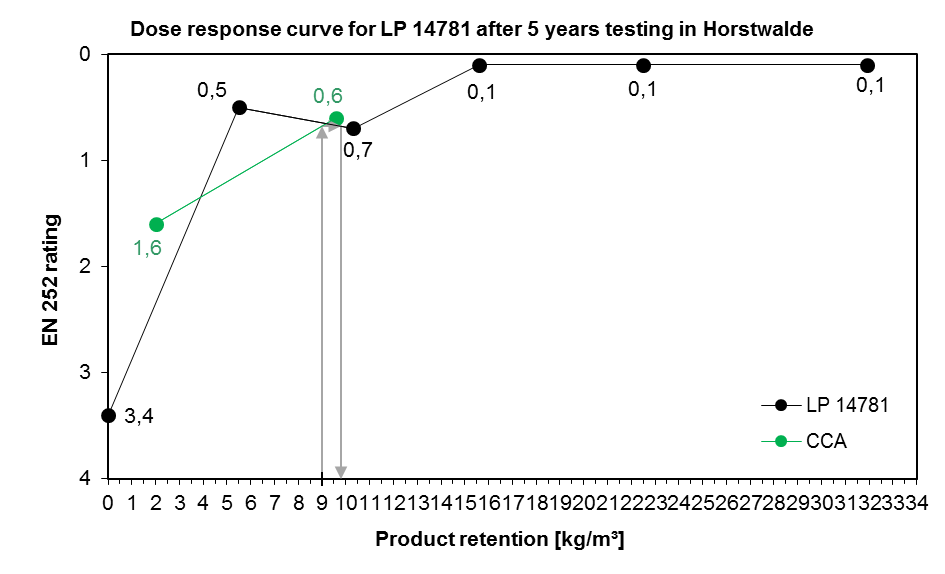


**Figure 1:** **EN 252 rating of stakes treated with LP 14781, CCA and of untreated control stakes.**

The upper biological test value for this EN 252 test was determined according to DIN EN 599-1:2014-03 Section 5.2.27. In short, this value must be derived by plotting the ratings of the test product against those of the reference preservative.

The upper retention of the reference preservative must approximate 9 kg/m³ CCA (cv DIN EN 252:2014-01 Section 6.1). In the present test, the upper retention of the reference preservative was slightly higher: 9.6 kg/m³. The mean rating at the required upper retention of 9.0 kg/m³ CCA can be derived graphically and amounts to 0.7 (Figure 2). This rating is ≥0.5; therefore, the upper biological test value for LP 14781 must be derived from the upper nominal retention of LP 14781 only.

According to the test data, the test product retention of 10.3 kg/m³ shows a slightly lower efficacy than the lower retention of 5.5 kg/m³. At first this finding seems to be not conclusive, however, one of the stakes treated with 10.3 kg/m³ shows a gradual decline in performance. Therefore, the upper nominal retention was graphically determined from this retention and was 9.8 kg/m³ (Figure 2). The upper biological test value is calculated by dividing the upper nominal retention by 0.75. Therefore, this value amounts to 13.0 kg/m³. In comparison with the result of the ENV 807 test (10.87 kg/m³) this value is slightly higher. This can be explained by a higher virulence in the test field.

****

**Figure 2: Derivation of the upper nominal retention of LP 14781 after 5 years of testing.**

**Efficacy:**

The efficacy tests have shown that the products of the Wolmanit CX-8WB\_family provide preventive efficacy against wood-destroying fungi including soft rot as well as against wood-destroying insects including termites.

The applied field of application - Wood preservative for industrial use against wood destroying fungi and insects on internal and external structural timber with and without ground and water contact, in particular for timber used in horticulture and landscape gardening, playground equipment, posts, vine support, fences, palisades and wood paving – is supported by the submitted efficacy tests.

For the insecticidal efficacy the required tests – EN47 + EN84, EN47 + EN73, EN117 + EN84 and EN117 + EN73 - were provided. The results show that for the efficacy against wood boring beetles a retention of 6.5 kg/m³ is sufficient for the use classes 1 - 4. For the protection against termites the results of the tests show that a retention of 13.1 kg/m³ is sufficient for use class 1 and a retention of 13.81 kg/m³ is sufficient for the use classes 2, 3 and 4.

For the fungicidal efficacy the required tests – EN113 + EN84, EN113 + EN73 and ENV807 – were provided. The results show that for the efficacy against brown rot and white rot a retention of <7.9 kg/m³ is sufficient for use classes 1 - 4. Based on the results of the additional study performed with Wolmanit CX-LP 15687, a retention of 6.5 kg/m³ is considered sufficient for use class 1, 2 and 3. For the efficacy against soft rot fungi a retention of 10.9 kg/m³ is sufficient for use class 4. The critical values are summarised in the table below.

**Results of fungicide and termiticide laboratory tests**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Use Class 1 | Use Class 2 | Use Class 3 | Use Class 4 |
| Wood boring beetles | 6.5 kg/m³ | 6.5 kg/m³ | 6.5 kg/m³ | 6.5 kg/m³ |
| Termites | 13.1 kg/m³ | 13.1 kg/m³ | 13.81 kg/m³ | 13.81 kg/m³ |
| Brown and white rot fungi | 7.85 kg/m³ | 7.85 kg/m³ | 7.85 kg/m³ | < 7.9 kg/m³ |
| Soft rot fungi |  |  |  | 10.9 kg/m³ |

Overall, the efficacy of the products has been demonstrated for all intended use classes. Since termites occur only in the southern part of Europe, use against termites will not be needed in all member states. Therefore, a distinction is made between use against fungi and insects including termites and use against fungi and insects without termites.

The critical values for the single products in the Wolmanit CX-8WB\_family in all use classes are summarised in the tables below.

**Product retentions based on fungicide testing**

|  |  |  |
| --- | --- | --- |
| Use class | Critical value (without termite testing) | |
| Wolmanit CX-8 WB (Wolmanit CX-8M) | Wolmanit CX-8F |
| 1 | 6.5 kg/m³ | 6.5 kg/m³ |
| 2 | 7.85 kg/m³ | 7.85 kg/m³ |
| 3 | 7.85 kg/m³ | 7.85 kg/m³ |
| 4 | 10.9 kg/m³ | 10.9 kg/m³ |

**Product retentions based on termiticide testing**

|  |  |  |
| --- | --- | --- |
| Use class | Critical value (with protection against termites) | |
| Wolmanit CX-8 WB (Wolmanit CX-8M) | Wolmanit CX-8F |
| 1 | 13.1 kg/m³ | 13.1 kg/m³ |
| 2 | 13.1 kg/m³ | 13.1 kg/m³ |
| 3 | 13.81 kg/m³ | 13.81 kg/m³ |
| 4 | 13.81 kg/m³ | 13.81 kg/m³ |

The retentions for each use classes given in the tables above correspond to the minimum retentions as derived from EN 599. According to the retention requirements mentioned in EN 351-1, additional adjustments can be made to take account of regional variations in building practices and climate as well as the variations in exposure conditions and service life (estimated service life ESL) requirements for different treated components within a use class.

According to the available guidance on efficacy (ECHA 2018a; chapter 5.5.8.2.2.6): “Because the concept of ESL is not part of the BPR and claims for a specific service life is consequently solely the applicant’s responsibility, the applicant must have the right to apply for lower or higher retentions than just the CV up to the retention rate which is limited by the human health and environmental risk assessments.” Subsequently it is not required from the efficacy testing strategy to cover the set service life.

In use class 3 without protection against termites, the retention is therefore adjusted and set at 9.0 kg/m³. The retentions range therefore from 7.85 kg/m³ to 9.0 kg/m³.

In use class 4 – normal use, the minimum retention is derived from the lab tests only and the maximum retention is adjusted and set at 22.5 kg/m³. The retentions range therefore from 10.9 kg/m³ to 22.5 kg/m³ without protection against termites and 13.81 kg/m³ to 22.5 kg/m³ with protection against termites.

In use class 4 – special application such as transmission poles, the minimum retention is derived from the lab tests and the field test and the maximum retention is adjusted and set at 31.25 kg/m³. The retentions range therefore from 13.0 kg/m³ to 31.25 kg/m³ without protection against termites and 13.81 kg/m³ to 31.25 kg/m³ with protection against termites.

The adjusted retentions correspond to the highest recommended/selected retentions from single specifiers in Europe in order to meet their enhanced expectations for the treated timber regarding its durability within selected frame conditions.

**Minimal and adjusted product retentions of the Wolmanit CX-8WB\_family:**

|  |  |  |
| --- | --- | --- |
|  | **Wolmanit CX-8WB\_family products without protection against termites** | **Wolmanit CX-8WB\_family products with protection against termites** |
| 1 | 6.5 kg/m³ | 13.1 kg/m³ |
| 2 | 7.85 kg/m³ | 13.1 kg/m³ |
| 3 | 7.85 – 9 kg/m³ | 13.81 kg/m³ |
| 4 | 10.9 - 22.5 kg/m³ | 13.81 - 22.5kg/m³ |
| 4 special | 13.0 - 31.25 kg/m³ | 13.81 - 31.25 kg/m³ |

**Experimental data on the efficacy of the biocidal product against target organism(s)**

| **Function** | **Field of use envisaged** | **Test substance** | **Test method** | **Test system / concentrations applied / exposure time** | **Test organism(s)** | | **Test results: effects** | | **Reference** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Limit of efficacy / toxic value / threshold value** | |
| *Treating solution* | Preservative concentrate |
| III.1 | PT08 | Wolmanit CX-LP 14781 | EN 113 + EN 84 | Test concentrations:  0 – 2.8% (w/w)  Wood species:   * pine sapwood * beech   Exposure time: 16 weeks | *Coniophora puteana (pine)* | | <1.0 % (w/w) | <7.6 kg/m³ | Ref. B 6.7-01 |
| *Poria placenta (pine)* | | <1.0 % (w/w) | <7.7 kg/m³ |
| *Gloeophyllum trabeum (pine)* | | <1.0 % (w/w) | <7.7 kg/m³ |
| *Coriolus versicolor (pine)* | | <1.0 % (w/w) | <7.6 kg/m³ |
| *Coriolus versicolor (beech)* | | <1.0 % (w/w) | <7.0 kg/m³ |
| III.1 | PT08 | Wolmanit CX-LP 14781 | EN 113 + EN 73 | Test concentrations:  0 – 2.8% (w/w)  Wood species:   * pine sapwood * beech   Exposure time: 16 weeks | *Coniophora puteana (pine)* | | <1.0 % (w/w) | <7.7 kg/m³ | Ref. B 6.7-01 |
| *Poria placenta (pine)* | | <1.0 % (w/w) | <7.6 kg/m³ |
| *Gloeophyllum trabeum (pine)* | | <1.0 % (w/w) | <7.9 kg/m³ |
| *Coriolus versicolor (pine)* | | <1.0 % (w/w) | <7.6 kg/m³ |
| *Coriolus versicolor (beech)* | | <1.0 % (w/w) | <7.2 kg/m³ |
| III.1 | PT08 | Wolmanit CX-LP 15687 | ÖNORM EN 113 + ÖNORM EN 84 | Test concentrations:  0 - 1.63% (w/w)  Wood species: pine  Exposure time: 16 weeks | *Coniophora puteana* | | < 0.68 % (w/w) | <5.25 kg/m³ | Ref. B 6.7-05 |
| *Gloeophyllum trabeum* | | < 0.68 % (w/w) | <5.26 kg/m³ |
| *Poria placenta* | | < 0.68 % (w/w) | <5.15 kg/m³ |
| III.1 | PT08 | Wolmanit CX-LP 15687 | ÖNORM EN 113 + ÖNORM EN 73 | Test concentrations:  0 - 1.63% (w/w)  Wood species: pine  Exposure time: 16 weeks | *Coniophora puteana* | | < 0.68 % (w/w) | <5.23 kg/m³ | Ref. B 6.7-02 |
| *Gloeophyllum trabeum* | | < 0.68 % (w/w) | <5.25 kg/m³ |
| *Poria placenta* | | < 0.68 % (w/w) | <5.39 kg/m³ |
| III.1 | PT08 | Wolmanit CX-LP 14781 | ENV 807 + EN 84 | Test concentrations:   * Pine: 0 - 1.0% v/v   Exposure:   * Pine: 32 weeks | Soil inhabiting microorganisms | | *1.8 % v/v* | 10.9 kg/m³ | Ref. B 6.7-06 |
| III.1 | PT08 | Wolmanit CX-8F | ENV 807 + EN 84 | Test concentrations:   * Pine: 0 - 1.0% v/v   Exposure:   * Pine: 32 weeks | Soil inhabiting microorganisms | | *1.7 % v/v* | 10.7 kg/m³ | Ref. B 6.7-07\* |
| III.2 | PT08 | Wolmanit CX-LP 14781 | DIN EN 47 + EN 84 | Test concentrations:  0 - 1.7%  Wood species: pine  Exposure time: 4 and 12 weeks | Egg larvae of *Hylotrupes bajulus* | 4 wks | >1.7% | >12.1 kg/m³ | Ref. B 6.7-03 |
| Egg larvae of *Hylotrupes bajulus* | 12 wks | <0.6% | <4.3 kg/m³ |
| III.2 | PT08 | Wolmanit CX-LP 14781 | DIN EN 47 + EN 73 | Test concentrations:  0 - 1.7%  Wood species: pine  Exposure time: 4 and 12 weeks | Egg larvae of *Hylotrupes bajulus* | 4 wks | >1.7% | >12.0 kg/m³ | Ref. B 6.7-04 |
| Egg larvae of *Hylotrupes bajulus* | 12 wks | 0.8 – 1.0% | 5.6 – 7.3 kg/m³ |
| III.2 | PT08 | Wolmanit CX-10 (80%) | EN 117 + EN 84 | Test concentrations:  0 – 2.25%  Wood species: pine  Exposure time: 8 weeks | *Reticulitermes santonensis* | | <1.75% | <8.975 kg/m³ | Ref. B 6.7-08 |
| III.2 | PT08 | Wolmanit CX-LP 14781 | EN 117 + EN 73 | Test concentrations:  0 – 3.0%  Wood species: pine  Exposure time: 8 weeks | *Reticulitermes santonensis* | | 1.4 – 1.8% | 9.8 – 13.1 kg/m³ | Ref. B 6.7-09\* |
| III.1 | PT08 | Wolmanit CX-LP 14781 | EN 252 | Field test / 0.80 - 1.55 - 2.30 - 3.40 - 4.60% (w/w) / 5 years | *Soil microorganism* | | Upper nominal retention: 9.8 kg/m³  Upper biological test value: 13.0 kg/m³ | | Ref. B 6.7-10\* |

| **Function** | **Field of use envisaged** | **Test substance** | **Test method** | **Test system / concentrations applied / exposure time** | **Test organism(s)** | **Test results: effects** | | **Reference** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Limit of efficacy / toxic value / threshold value** | |
| *Treatment solution* | Preservative concentrate |
| III.2 | PT08 | Wolmanit CX-LP 14781 | EN 117 + EN 84 | Test concentrations: %  Wood species: Pinus sylvestris  Exposure time: 8 wks | *Reticulitermes grassei* | <1.92% (w/w) | < 13.81 kg/m³ | 6.7/11 |

\*Remark: The respective efficacy tests were all performed with the formulation Wolmanit CX-LP 14781. For a short description, only the nominal content of the active ingredients is mentioned in some study reports. Wolmanit CX-LP 14781 has a nominal content of 13.04% basic copper carbonate and 2.8% Cu-HDO.

During analytical control of the formulation, the measured concentration can vary from the nominal concentrations. The test laboratory MPA Eberswalde has mentioned analytical test concentrations instead of the nominal active ingredient concentrations in the study reports Ref B 6.7-03, B.6.7-04 and B 6.7-09.

The measured concentrations in the study reports of XXXXXXXXX are 13.59 % basic copper carbonate and 2.94% Cu-HDO. Therefore, the relative deviation from the nominal concentration for the basic copper carbonate content of the test formulation is + 4.2% and for the Cu-HDO content is +5.0%.

The slight deviation of the active substances concentration from the nominal content is within the acceptable range specified by the DIN EN 599. According to Annex B - Production control – of the DIN EN 599 a tolerance of ±10.0% relative to the nominal for a content of active ingredient >2.5% (w/w) and ≤10.0% (w/w) and a tolerance of ±6.0% relative to the nominal for a content of active ingredient >10.0% (w/w) and ≤25.0% (w/w) is acceptable.

|  |
| --- |
| **Conclusion on the efficacy of the product** |
| The efficacy tests have shown that the products of the Wolmanit CX-8WB\_family provide preventive efficacy against wood-destroying fungi including soft rot as well as against wood-destroying insects including termites.  The applied field of application - Wood preservative for industrial use against wood destroying fungi and insects on internal and external structural timber with and without ground and water contact, in particular for timber used in horticulture and landscape gardening, playground equipment, posts, vine support, fences, palisades and wood paving – is supported by the submitted efficacy tests.  The retentions for each use classes given in the table below correspond to the minimum retentions as depicted from EN 599. The retention rates have been taken from the most tolerant strains from the respective Use classes. Maximum values have been adjusted according to experience and EN 599.  **Minimal and adjusted product retentions of the Wolmanit CX-8WB\_family:**   |  |  |  | | --- | --- | --- | |  | **Wolmanit CX-8WB\_family products without protection against termites** | **Wolmanit CX-8WB\_family products with protection against termites** | | 1 | 6.5 kg/m³ | 13.1 kg/m³ | | 2 | 7.85 kg/m³ | 13.1 kg/m³ | | 3 | 7.85 – 9 kg/m³ | 13.81 kg/m³ | | 4 | 10.9 - 22.5 kg/m³ | 13.81 - 22.5kg/m³ | | 4 special | 13.0 - 31.25 kg/m³ | 13.81 - 31.25 kg/m³ | |

#### Occurrence of resistance and resistance management

No case of resistance for the intended target species is known. However, fungal strains have been described which exhibit tolerance towards copper. The members of the Wolmanit CX-8WB\_family contain two different active substances against insects and fungi, the target organisms (basic copper carbonate and Cu-HDO) so that a resistance development is unlikely.

Management strategies to avoid resistance in wood preservation:

1. Always read the label or leaflet before use and follow all the instructions provided
2. The users should report to the authorization holder if the treatment is ineffective

#### Known limitations

When the products of the Wolmanit CX-8WB\_family are applied in the treatment concentrations and product retentions as recommended for each use class no limitations on efficacy are to be expected. After treatment the fixation period needs to be observed. For the efficacy of the wood preservative it is required that the impregnated timber is protected from outdoor weathering during storage for at least 2 days, at temperatures ≤ 5°C for at least 7 days (frost days not to be counted).

#### Evaluation of the label claims

The field of application, the recommended product retentions and the treatment solutions stated on the proposed label for the use classes 1 – 4 reflect the results of the efficacy tests.

#### Relevant information if the product is intended to be authorised for use with other biocidal product(s)

Not necessary. The products of the Wolmanit CX-8WB\_family are not intended to be authorised for use with other biocidal products.

### **Risk assessment for human health**

#### Assessment of effects on Human Health

General information: The assessment of human health effects is based on the Competent Authority Report (CAR) and assessment report (AR) of Cu-HDO (Austria, 2013) and basic copper carbonate (France, 2011). For the human health effect assessment of Wolmanit CX-8WB\_family products data on similar tested mixtures were submitted by the applicant. These data were also evaluated during the active substance evaluation of Cu-HDO. Please see the confidential Annex for further justification and “read-across”. In addition eCA AT has verified the results of the tested formulations concerning classification with data from individual co-formulants and the active substances.

***Skin corrosion and irritation***

**Summary table of in vitro studies on skin corrosion/irritation**

No in vitro skin corrosion / irritation studies available.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Summary table of animal studies on skin corrosion /irritation** | | | | | | |
| **Method. Guideline.**  **GLP status. Reliability** | **Species. Strain. Sex. No/group** | **Test substance. Vehicle. Dose levels. Duration of exposure** | **Results** | | **Remarks** *(e.g. major deviations)* | **Reference** |
| OECD  Guideline 404; GLP | New Zealand white rabbits; 3 females | Wolmanit CX-10 (VM546)  4 h semi-occlusive exposure | **Average score 24, 48, 72h** | | No deviations known | B 8.1 |
| **Erythema and eschar** | **Edema** |
| 2.9 Not reversible | 3.4  not completely rev. |
| Severe lesions, deep necrosis; Wolmanit CX-10 is corrosive to skin | |

In a skin irritation test the biocidal product Wolmanit CX-10 (“old formulation”) displays corrosive properties: 72 hours after exposure, erythema with a score of 4 and edema with a score of 3.7 could be observed. Additional examinations were performed in all animals up to 14 days after the end of exposure. The scars, noted when eschar was at least partly shedded, and thick adhesive crusts, respectively, give evidence for deep necrosis induced by the test substance. In the absence of data for a shorter exposure duration and considering the calculation approach (including one substance of concern classified for category 1B, present with more than 5%) the preparation has to be classified for skin corrosion category 1B “H314 – causes severe skin burns and eye damage” according to Regulation (EC) 1272/2008/EC. The result of this study is also valid for the Wolmanit CX-8WB\_family products (see composition and read across in the confidential annex).

**Summary table of human data on skin corrosion irritation**

No human data on skin corrosion irritation available.

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Skin corrosion and irritation** | |
| Value/conclusion | The products of the Wolmanit CX-8WB\_family are regarded to be corrosive on skin |
| Justification for the value/conclusion | A similar test formulation shows severe lesions and deep necrosis; effects are non-reversible; data available on the components of Wolmanit CX-8WB\_family support the proposed classification |
| Classification of the product according to CLP | Skin corrosion, category 1B, H314 – causes severe skin burns and eye damage (according to the CLP Regulation 1272/2008/EC). |

***Eye irritation***

**Summary table of in vitro studies on serious eye damage and eye irritation**

No in vitro studies on serious eye damage and eye irritation available.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Summary table of animal studies on serious eye damage and eye irritation** | | | | | | | | |
| **Method. Guideline.  GLP status. Reliability** | **Species. Strain. Sex. No/group** | **Test substance. Dose levels. Duration of exposure** | **Results**  *Average score (24, 48, 72h)/ observations and time point of onset. reversibility* | | | | **Remarks** *(e.g. major deviations)* | **Reference** |
| OECD Guideline 405; GLP | New Zealand White Rabbits 1 female | Wolmanit CX-10 (VM546) | Cornea Opacity | Iris | Redness Conjunctiva | Chemosis | No major deviations known | B 8.2 |
| 3.7 | 1 (24h) at reading times 48 h und 72 h the iris was not discernible due to corneal opacity | 3.0 | 4.0 |

When eye-irritating features of Wolmanit CX-10 (“old”) were tested, the average score of cornea opacity (after 24, 48 and 72 hours) was greater than 3, which is clearly indicating risk of serious damage to eyes. The test would not have been necessary, since the product showed already corrosion to the skin, which indicates also risk for serious eye damage. The test was carried out in 1994, means a long time before the European biocides review.

With the classification for skin corrosion, the additional label with regard to risk for serious eye damage can be ommited.

**Summary table of human data on serious eye damage and eye irritation**

No human data on serious eye damage and eye irritation available.

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Eye irritation** | |
| Value/conclusion | The products of the Wolmanit CX-8WB\_family are expected to provide a risk of serious damage to eyes. |
| Justification for the value/conclusion | The average score of cornea opacity (after 24, 48 and 72 hours) was greater than 3. Data available on the components of the BP family support the proposed classification. |
| Classification of the product according to CLP | With the classification for skin corrosion, serious damage to eyes is implicit as reflected in the hazard statement for skin corrosion.  Therefore labelling for risk for serious eye damage can be omitted. |

***Respiratory tract irritation***

**Summary table of animal studies on respiratory tract irritation**

From the acute inhalation toxicity study and the dermal corrosion/irritation study, a corrosive effect on the respiratory system can be deduced.

**Summary table of human data on respiratory tract irritation**

No human data on respiratory tract irritation available.

|  |  |
| --- | --- |
| **Conclusion used in the Risk Assessment – Respiratory tract irritation** | |
| Conclusion | The products of the Wolmanit CX-8WB\_family are corrosive to the respiratory tract |
| Justification for the conclusion | Corrosive effects were observed in the acute inhalation toxicity study (see section on acute inhalation toxicity). |
| Classification of the product according to CLP and DSD | EUH071 – corrosive to the respiratory tract |

***Skin sensitization***

| **Summary table of animal studies on skin sensitisation** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Method. Guideline. GLP status. Reliability** | **Species. Strain. Sex. No/group** | **Test substance. Vehicle. Dose levels. Duration of exposure Route of exposure** | **Results**  *Number of animals sensitised / total number of animal* | **Remarks**  *(e.g. major deviations)* | **Reference** |
| EPA-Guideline OPPTS 870.2600; OECD Guideline 406; GLP | Guinea pigs, Dunkin Hartley; female;  20 animals for the test substance group; 10 animals for the control group. | WOLMANIT LP16067B | No allergic reactions could be observed.  Control animals: 5/10 animals had a positive response in this test, which is markedly more than the minimum of 15%, the threshold for classification requested by the guideline. Thus the results confirm both the sensitivity and the reliability of the experimental techniques.  "Wolmanit LP16067B "is not a skin sensitizer | No major deviations known | B 8.3/01 |

In a skin sensitisation test (Bühler) performed with Wolmanit CX LP16067B, a similar formulation to products of the Wolmanit CX-8WB family, no sensitizing effects were detected (cf. confidential annex for further information).

However labelling with EUH208 is necessary to inform already sensitized people for meta SPC 1. The formulations of meta SPC 1 contain polyethyleneimine that needs to be included in the EUH208 label.

**Summary table of human data on skin sensitisation**

No human data on skin sensitisation available.

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Skin sensitisation** | |
| Value/conclusion | The products of the Wolmanit CX-8WB\_family are not sensitizing. |
| Justification for the value/conclusion | No allergic reactions in the skin sensitisation test performed with Wolmanit LP16067B were observed. |
| Classification of the product according to CLP and DSD | No classification required.  However according to the CLP Regulation Annex II, point 2.8 a labelling is necessary with EUH208 — ‘Contains polyethyleneimine. May produce an allergic reaction’. |

***Respiratory sensitization (ADS)***

**Summary table of animal data on respiratory sensitisation**

No animal data on respiratory sensitisation available.

**Summary table of human data on respiratory sensitisation**

No human data on respiratory sensitisation available.

|  |  |
| --- | --- |
| **Conclusion** **used in Risk Assessment – Respiratory sensitisation** | |
| Value/conclusion | Not sensitising. |
| Justification for the value/conclusion | No component of the Wolmanit-CX WB\_family is classified as sensitising to the respiratory tract. Furthermore, in the skin sensitisation studies performed with Wolmanit LP16067B no sensitising effect has been observed. |
| Classification of the product according to CLP and DSD | Not required. |

***Acute toxicity***

The acute toxicity of Wolmanit CX-8WB\_family can be deduced from the studies performed with Wolmanit CX-10 (“old formulation”) and Wolmanit CX-LP 15172. The results of these tests can be read across to products of the Wolmanit CX-8WB\_family (cf. confidential annex).

*Acute toxicity by oral route*

| **Summary table of animal studies on acute oral toxicity** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Method Guideline**  **GLP status. Reliability** | **Species. Strain. Sex. No/group** | **Test substance, dose levels, type of administration** | **Signs of toxicity** *(nature, onset. Duration, severity. reversibility)* | **Value LD50** | **Remarks** *(e.g. major deviations)* | **Reference** |
| OECD Guideline 401; GLP | Rats, Him:OFA, Sprague Dawley, SPF  5f/group 1  5m+5f/group 2  5f/group 3 | Wolmanit CX-10 (VM 546)  Dose levels:  group 1: 200 mg/kg bw  group 2: 447 mg/kg bw  group 3: 1000 mg/kg bw | Induction of haemorrhages at various organs and gastrointestinal irritation. | 485 mg/kg bw | -- | B 8.5.1 |

The LD50oral,rat of Wolmanit CX-10 amounts to 485 mg/kg bw and this indicates the need to classify for acute oral toxicity category 4, H302 – Harmful if swallowed (according to Regulation 1272/2008/EC).

The clinical signs found in group 2 were piloerection, incomplete/complete eyelid closure, specific toxic signs, cyanosis, and dyspnoea in the early deaths, sunken flanks, tremor, and sedation.

Pathology (group 2): All males and 1/5 females were normal. In the affected animals, changes of glandular stomach mucosa (detachable covering, redness, swelling, haemorrhages, ulcera) and thymus petechiae were noted in surviving as well as in spontaneously died animals. Intestinal and subpleural pulmonary haemorrhages, a small spleen and exsiccosis were found only in the spontaneously died animals. Changes on stomach mucosa are interpreted by a local irritative effect of the test substance. Several alterations on various organs, i.e. multiple haemorrhages (those on the thymus may be due to agonal asphyxia), small spleen, dark liver surface, and exsiccosis indicate a haemodynamic and vascular disorder. No evidence was found for impaired blood coagulation. The haemodynamic disorder was the cause of early deaths.

**Summary table of human data on acute oral toxicity**

No human data on acute oral toxicity available.

|  |  |
| --- | --- |
| **Value used in the Risk Assessment – Acute oral toxicity** | |
| Value | LD50: 485 mg/kg bw |
| Justification for the selected value | Result of acute oral toxicity study |
| Classification of the product according to CLP and DSD | Category 4, H302 – Harmful if swallowed (according to Regulation 1272/2008/EC). Data available on the components of Wolmanit CX-8WB\_family support the proposed classification. |

*Acute toxicity by inhalation*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Summary table of animal studies on acute inhalation toxicity** | | | | | | |
| **Method Guideline. GLP status. Reliability** | **Species. Strain. Sex. No/group** | **Test substance, form** *(gas, vapour, dust, mist)* **and particle size (MMAD) Actual and nominal concentration. Type of administration** | **Signs of toxicity** *(nature, onset, duration, severity, reversibility)* | **LC50** | **Remarks** *(e.g. major deviations)* | **Reference** |
| OECD Guideline 403; GLP | Rats, Crl:CD (SD)IGS BR  Sprague Dawley  5m+5f / group | Wolmanit CX-LP 15172 4 h exposure by aerosol inhalation (nose only) nominal concentration:  14.4, 26.6, 59.1 [mg/L] analytical concentration:  0.62, 1.23, 1.63 [mg/L] | Findings in life and post mortem indicate toxic / corrosive effects to the lungs. Cause of deaths was probably failure in lung functions. | LC50 [mg/L/4h]: 1.46 (male + female)  LC50 [mg/L/4h]: 1.11 (m)  LC50 [mg/L/4h]: 1.75 (f) | -- | B 8.5.2 |

Regarding the inhalative route, an acute inhalation hazard test was carried out with rats (cf. confidential annex for read across of tested formulations). The reported LC50, inhalative, rat value for both sexes is 1.46 mg/L/4h which leads to to classification for acute inhalation toxicity category 4, “H332 – Harmful if inhaled” (according to Regulation 1272/2008/EC).

Within this study the most prominent findings were lesions in the lungs. Haemorrhages, congestion, oedema and irritation/destruction was seen in animals of all groups. All other signs, exsiccosis, secret in the mouth and nose, thymus petechiae, a maximally filled urinary bladder, a sanguineus content in the thorax and a small spleen were only observed in spontaneously died animals and may be a sequel of blood loss and the general bad condition caused by the lesions in the lungs. 7 animals of the mid dosed group and 3 of the high dosed one were normal at necropsy. In the surviving animals, a concentration dependent reduction of the weight gain in the first week after the exposure was observed.

The adverse effects described above require in addition labelling with “EUH071 – corrosive to the respiratory tract”.

**Summary table of human data on acute inhalation toxicity**

No human data on acute inhalation toxicity available.

|  |  |
| --- | --- |
| **Value used in the Risk Assessment – Acute inhalation toxicity** | |
| Value | LC50 [mg/L/4h]: 1.46 (male + female) |
| Justification for the selected value | Result of experimental study. Data available on the components in Wolmanit CX-8WB\_family support the proposed classification. |
| Classification of the product according to CLP and DSD | Category 4, H332 – Harmful if inhaled (according to Regulation 1272/2008/EC)  EUH071 – corrosive to the respiratory tract |

*Acute toxicity by dermal route*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Summary table of animal studies on acute dermal toxicity** | | | | | | |
| **Method, guideline, GLP status, reliability** | **Species, strain, sex, No/group** | **Test substance, vehicle, dose levels, surface area** | **Signs of toxicity** *(nature, onset, duration, severity, reversibility)* | **LD50** | **Remarks** *(e.g. major deviations)* | **Reference** |
| OECD  Guideline  402; GLP | Rats, Him:OFA, Sprague Dawley, SPF  5m+5f | Wolmanit CX-10 (VM 546)  2000 mg/kg bw  24h exposure | All animals survived until scheduled termination. The signs in life and post mortem findings indicate no other than local toxic effects attributable to the action of the test substance. Scars indicated corrosion of the skin at the application sites. There are no differences between the sexes in the response to the test substance. | >2000 mg/kg bw | -- | B 8.5.3 |

Wolmanit CX-10 does not display any acute systemic toxicity by the dermal route: The LD50, dermal, rat is >2000 mg/kg bw, which is above the concentration range which leads to classification. All animals survived until 14 days post application, but were affected: Chromodacryorrhoea was observed in all animals of both sexes. This sign of general malaise lasted until 1 day p.a. Motor excitation was noted in all animals of both sexes, screaming was observed in 3/5 females. Except for one female, both signs lasted until maximum 1 hour p.a. A blue staining of the skin at the application site was found in all animals of both sexes after patch removal. Redness, swelling, and eschar formation were found at the application sites at both sexes. Redness and swelling diminished mainly within 1 day p.a., but in any case within maximum 4 days p.a. in the remaining animals eschar desquamated within 4 through 10 days after application of the test substance. In 2 of 5 females wounds were observed from 5 days p.a. until the scheduled termination, i.e. 14 days p.a.

One animal of each sex was normal at terminal necropsy. Pulmonary haemorraghes were observed in 2/5 males and in 1/5 females. In the same female a grey-white covering on spleen capsule was found additionally. In 4/5 males and 3/5 females scares were noted at the application sites. The results of the study can be used for read across to the similar formulations of products of the Wolmanit CX-8WB\_family.

**Summary table of human data on acute dermal toxicity**

No human data on acute dermal toxicity available.

|  |  |
| --- | --- |
| **Value used in the Risk Assessment – Acute dermal toxicity** | |
| Value | LD50, dermal, rat is > 2000 mg/kg bw, |
| Justification for the selected value | Result of acute dermal toxicity study. Data available on the components of Wolmanit CX-8WB\_family products support the proposed classification. |
| Classification of the product according to CLP and DSD | No classification required |

***Information on dermal absorption***

| **Summary table of in vitro studies on dermal absorption** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Method, guideline, GLP status, reliability** | **Species** | **Test substance, doses** | **Absorption data for each compartment and final absorption value** | | **Remarks** *(e.g. major deviations)* | **Reference** |
| OECD 428 GLP, Reliability 1 | Human skin from Abdomen | LP 16013 (Wolmanit CX) / Cu-HDO  Tested dilution: 2% formulation or 0.06% Cu-HDO |  | **% of Applied Dose** | no deviations known | B 8.6/01 |
| **Tape strips** | 6.28 |
| Membrane Washing | 78.07 |
| **Sum** | **84.36** |
|  |  |
| **Skin preparation** | **3.92** |
|  |  |
| **Absorbed Dose** |  |
| Sum Receptor Samples 0 - 24 h including Wash Out | 2.35 |
| Receptor Fluid | 3.70 |
| Receptor Chamber Washing | 0.11 |
| **Sum (after 24 h)** | **6.16** |
| **Sample Time [h]** | **% of Applied Dose** |
| 0.5 | 0.32 |
| 1 | 0.76 |
| 2 | 1.72 |
| 4 | 2.62 |
| 6 | 3.10 |
| 10 | 3.78 |

Dermal absorption properties of Cu-HDO

The in vitro dermal absorption study performed with LP 16013 (Wolmanit CX) has already been evaluated during assessment of Cu-HDO and the representative product Wolmanit CX, which is nearly identical with Wolmanit CX-8WB\_family. The in vitro dermal absorption study (B 8.6/01) was carried out with a 2% solution of Wolmanit CX and an exposure time of 24 hours. The total decrease in the donor fluid was 22% over 24 hours; but less than 75% of the absorption occurs within 10 hours. The amount penetrating to the receptor fluid till 0.5, 1, 2, 4, 6, 10 and 24 hours, the amount remaining in the skin preparation after 24 hours and the amount remaining in the superficial stratum corneum after 24 hours (tape stripping) were analysed.(Austria, 2013). Dermal absorp tion data on another (reference) formulation can be used if the formulation for which dermal absorption needs to be determined is closely related (EFSA, 2017). The justification of the use of data on this similar formulation is detailed in the confidential annex.

Based on the study B 8.6/01 dermal absorption is based on mean values:

Absorption = receptor fluid + receptor chamber washes + skin sample (including tape strips, because they were pooled). According to the EFSA (2017) method a value of 25% is calculated. Tape strip 1 and 2 were included in the calculation because individual analysis were lacking. The value of 25% dermal absorption is much higher than the indicative value of 3% from the in vivo rat dermal absorption study (see CAR for Cu-HDO, Austria 2013). This in vivo study is not fully valid because of low recovery rate of 77% with Cu-HDO in Wolmanit CX.

**Summary table of animal studies on dermal absorption**

Reference is made to respective studies discussed in the CAR (Competant Authority Report) for Cu-HDO (Austria, 2013).

Dermal absorption properties of basic copper carbonate

The following information can be taken over from the assessment report for basic copper carbonate (France, 2011):

“It was agreed during the TMIII09 that a dermal absorption of 5% has to be used for diluted solutions and 100% for the concentrated product”. This value should be equally applicable for the Wolmanit CX products and in use concentrations, since the concentrations are similar: Concentrations of products assessed in the CAR for basic copper carbonate were 1% to 15% (=10 to 150 g/L) and for the in-use solutions about 3 to 5 g Cu/L. The value of 5% was determined using a dermal penetration study on an agrochemical product and in a further study using topical formulations (emulsions or ointments, Cu2+ applied 0.13% to 0.05%) (Pirot et al 1996a; 1996b cited in the CAR for basic sopper carbonate).

The decision at the TMIII08 also stated that the dermal penetration values should also be in line with the EU-RAR for copper. In the EU-RAR, a dermal penetration value of 0.3% was agreed at TCNES and by SCHER.

Basic copper carbonate concentration in the Wolmanit CX-8WB family products is about 13% and product in use concentrations are between 1% and 5%, resulting in 0.7% or 1.3 to 6.5 g/L basic copper carbonate or 0.4% to 0.08% Cu2+ for the different use classes.

Therefore the results described above can also be read across to Wolmanit CX-8WB\_family and their aqueous dilutions. Therefore, a value of 5% has been choosen for the risk assessment of these products.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Value(s) used in the Risk Assessment – Dermal absorption** | | | |
| Substance | 2-Ethylhexanoic acid | 2- Aminoethanol | Cu-HDO | Basic copper carbonate |
| Value(s)\* | 100% for concentrate  50% for in-use dilution | 50% for in-use dilution | 100% for concentrate  25% for in-use dilution | 100% for concentrate  5% for in-use dilution |
| Justification for the selected value(s) | Default values according to EFSA 2017 | Default values according to EFSA EFSA 2017 | In-vito study calculated according to EFSA, 2017 | It was agreed during the TMIII09 that a dermal absorption of 5% has to be used for diluted solutions |

Please note that the in-use dilution (application solution) is not considered as corrosive to the skin (cf. section 2.2.6.1, local effects).

***Available toxicological data relating to non-active substance(s) (i.e. substance(s) of concern)***

Please see section 2.1.2.5 and the confidential appendix.

***Available toxicological data relating to a mixture***

Products of the Wolmanit CX-8WB\_family are not intended for concomitant use with other products.

#### Exposure assessment

A tiered approach is followed for exposure estimation. In tier 1 the maximum theoretically possible exposure is calculated (conservative assumptions, realistic worst case), considering validated toxicological parameters (e.g. dermal absorption). If this exposure assessment produces an unacceptable outcome in risk assessment, a tier 2 assessment is performed (i.e. refinement of the exposure studies/models, considering specific data like for example time budgets, transfer factors and the effects of exposure reduction measures, e.g. personal protective equipment). In case the predicted exposure from tier 2 still represents a risk, a third tier would be necessary considering surveys or studies with the actual product or with a surrogate.

**Identification of main paths of human exposure towards active substance(s) and substances of concern from its use in biocidal product**

| **Summary table: relevant paths of human exposure** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Exposure path** | **Primary (direct) exposure** | | | **Secondary (indirect) exposure** | | | |
| **Industrial use** | **Professional use** | **Non-professional use** | **Industrial use** | **Professional use** | **General public** | **Via food** |
| Inhalation | Yes | No | No | No | Yes | Yes | No |
| Dermal | Yes | No | No | No | Yes | Yes | No |
| Oral | No | No | No | No | No | Yes | No |

***List of scenarios***

| **Summary table: scenarios** | | | |
| --- | --- | --- | --- |
| **Scenario number** | **Scenario** | **Primary or secondary exposure**  **Description of scenario** | **Exposed group** |
| 1 | Vacuum pressure treatment / oscillating pressure process | Primary Exposure:  Vacuum pressure treatment of wood; Exposure has been calculated with handling model 1 | Industrial |
| 2 | Sanding/sawing of treated wood | Secondary Exposure:  Sanding / processing of treated wood, acute or chronic | Professional/ General public |
| 3 | Mouthing of treated wood chips | Secondary Exposure:  A toddler picks up and chews a wood off-cut | General public |
| 4 | Playing on treated wood structures | Secondary Exposure:  Toddler is playing outdoors on a playground structure made of treated wood | General public |
| 5 | Inhalation of volatilised residues indoors | Secondary Exposure:  Toddlers – Inhalation of volatilised residues indoors released in the living area of a domestic house. | General public |
| 6 | Livestock exposure | Secondary Exposure of livestock | Livestock animals |

***Industrial exposure***

##### Scenario [1]

|  |  |  |  |
| --- | --- | --- | --- |
| **Description of Scenario [1]** | | | |
| The impregnation process itself represents a closed system. The timber is treated in sealed treatment vessels and the job entails a cycle of loading, waiting, unloading and removal of treated timber to storage. Dermal contamination may occur through direct contact with the surface of treated timber and through contact with ancillary equipment and contaminated process plant.  The workers in vacuum-pressure preservative plants work typically for 8 hours a day and for at least five days a week. Industrial users spend only a fraction of their time using wood preservatives. Operators also conduct other tasks so that the actual time in proximity to wood preservative or treated wood is limited.  Vacuum-pressure application is a process in which potential exposure to the operator is minimised by the use of appropriate controls (workplace safety standards). At the end of the impregnation process, a final vacuum phase follows which ensures that the treated wood leaves non-dripping the impregnation vessel. Workers are obliged to wear personal protective equipment (PPE), i.e. chemicial resistant gloves, and protective coverall (material to be specified by the authorisation holder within the product information). Furthermore, workers are expected to wear special safety shoes. Therefore, any exposure of feet can be excluded and has therefore not been considered for calculation of the total exposure. This is in line with ECHA 2017a, Table 1, line 21, where only indicative values for hands and body are given.  Exposure during mixing and loading operations is considered negligible as automated dilution by pumping transfer means exposure would be very low or accidental (EC 2008, page 8). Cf. to further considerations of the scenario.  For exposure estimation for application and post-application, Handling model 1 was used (ECHA 2017a, Table 1, line 21). The model is representative for industrial wood preservation and comprises the task of intermittent manual handling of water-wet wood and associated equipment. Dermal contamination occurs through direct contact with the surface of treated timber and through contact with ancillary equipment and contaminated process plant. Dermal exposure may also arise from the spread of contamination into areas such as control rooms and from secondary sources such as previously contaminated overalls and gloves. Handling model 1 includes application and post-application exposures.  Calculations have been performed on basis of the maximum applied water based - treatment solution (density approx. 1g/cm³) for use class 4, special application.  For Cu-HDO and basic copper carbonate the application solution concentrations of this two actual members of the biocidal product family were identified as worst case, with both having the same concentration of the active substances.  Per working day 3 treatment cycles have been considered in accordance with default assumptions of Handling model 1 (worst case), although in special application only 2 treatment cycles can be performed within an 8-hour working day, as the vacuum pressure / oscillating pressure treatment requires a prolonged treatment phase due to the required very high product retentions in wood.  Only tier 2 calculations have been performed, as the indicative value for hands is only given inside gloves.  It is considered that the scenario “cleaning of the treatment chamber”, which will occur only 1 time per year (applicant’s statement in DRA), represents a short time exposure scenario and is covered by Handling model 1 calculations. Concerning PPE the calculations were based on coated coveralls  Bystanders are covered by the exposure assessment of the user.  As explained in 2.1.2.5 “Information on the substances of concern” a quanitative risk assessment for the SoC 2-MEA only via the inhalation route was performed.  For background information on Tier 3, please see section “Further information and considerations on scenario [1]”. | | | |
|  | **Parameters** | | **Value** |
| Tier 1 | Tier 1 was not assessed, as in Handling model 1 indicative values were given for hands inside gloves. Therefore, it is not possible to recalculate potential exposure without gloves. | | |
| Tier 2 | Concentration of substance in product | 2.8% (Cu-HDO)  13.04% (Cu-Carb.)  4.9% (2-EHA)  31.60% (2-MEA) | |
| Concentration of application solution | 5.21% | |
| Indicative exposure value of hands (dermal exposure inside gloves, application solution)1 | 1080 mg/cycle | |
| Indicative exposure value rest of body (application solution)1 | 8570 mg/cycle | |
| Indicative inhalative exposure (application solution)1 | 1.9 mg/m³ | |
| Number of cycles per working day1 | 3 cycles/day | |
| Penetration through clothing (body)2  (Corresponds to coated coveralls, default protection factor 90%) | 10% | |
| Cycle time1 | 180 min | |
| Inhalation rate3 | 1.25 m³/h = 0.021 m³/min | |
| Body weight of adult4 | 60 kg | |
| Dermal absorption rate of substances (Cu-HDO, basiccopper carbonate and 2-EHA) | 25% (Cu-HDO)  5% (Cu-Carb.)  50% (2-EHA)  50% (2-MEA)  See chapter 2.2.6.1 of PAR, section “Information on dermal absorption”, table “Value(s) used in the Risk Assessment – Dermal absorption” | |
| Tier 3 | Indicative exposure value of hands (dermal exposure inside gloves, application solution)6 | 108.68 mg/cycle | |

1 ECHA 2017a, Handling Model 1, page 19-20, Table, line 21

2 ECHA 2015a, page 156, Table B

3 ECHA 2015a, page 16, Table 2

4 ECHA 2015a, page 15, Table 1

5 The applicant provided measured data, see XXXXXXXXX 2015. As only indicative values for exposure of hands inside gloves are available from the study, in Tier 3 the indicative values for the rest of body as well as inhalation are taken from Handling model 1 (ECHA 2015a). For more details on Tier 3, please see section “Further information and considerations on scenario [1]”.

***Calculations for Scenario [1]***

Detailed calculations are included in Appendix 3.2.

| **Summary table: estimated exposure from industrial uses given in [mg/kg bw/day]** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier/PPE** | **Estimated uptake** | | | | |
|  | **inhalation** | **dermal** | **oral** | **total** |
| Scenario [1] | Tier 2;  gloves, coated coverall | **Cu-HDO** | 0.0002 | 0.0353 | n.a.1 | 0.0355 |
| **Cu-Carb.** | 0.0008 | 0.0329 | 0.0337 |
| **2-EHA** | 0.0003 | 0.1236 | 0.1239 |
| **2-MEA** | 0.0020 | 0.7972 | 0.7992 |
| Scenario [1] | Tier 3; measured data combined with modelled data | **Cu-HDO** | 0.0002 | 0.0176 | n.a.1 | 0.0178 |
| **Cu-Carb.** | 0.0008 | 0.0164 | 0.0172 |
| **2-EHA** | 0.0003 | 0.0616 | 0.0619 |
| **2-MEA** | 0.0020 | 0.3975 | 0.3994 |

1n.a. not assessed

***Further information and considerations on scenario [1]***

**Calculations in the Assessment Report of the a.s.:**

The calculations in Austria 2013 have been more restrictive using the 95th percentiles. In the meantime, the Human exposure ad hoc group decided to use the 75th percentiles for Handling model 1.

**Considerations on Tier 3 (Hand exposure):**

The default/indicative exposure value for hands mentioned in Handling model 1 (ECHA 2017b) have been deduced from older studies involving timber treatment sites working with water-based formulations composed of copper, chromium and arsenic compounds commonly referred to as CCA. There is a variety of modes of action and ways in which substances migrate through, and leach out of the timber and the mentioned value may not necessarily apply to copper-Cu-HDO-amine formulation. In this case, the calculation can further be refined under consideration of actual hand exposure measurements performed in industrial treatment plants using Wolmanit CX-products under real exposure conditions. Two studies were performed with different approaches. For further considerations, please see below.

The hand exposure measurements submitted in the context of the assessment of the active substance Cu-HDO were based on a rinsing procedure of the hands (XXXXXXXXX 2004). Hand rinses were performed on an operator at different time intervals within a normal workday. The method consists in shaking the hand in a plastic bag containing an adequate solvent (ethanol – 95% in water). The amount of in-use product on a hand (actual exposure) has been reported in a range of 15 – 17 mg for a 2% treatment solution of Wolmanit CX-10 at the end of the working shift. For the applied maximum treatment solutions of 4.17% (special application, Wolmanit CX-10) the amount of in-use product on one hand is therefore expected to be in the range of 31.3 – 35.4 mg. The exposure value is far below the indicative value mentioned in Handling model 1. However, the results of the study are limited as it was only performed on one test person. This was accepted for active substance approval with regard to showing one safe use. Therefore, the test was accepted also for product authorisation, however, the results have limited conclusiveness.

The second study (XXXXXXXXX 2015) is based on the measurement of the amount of wood preservative in cotton gloves worn under the normal protective gloves during a complete treatment cycle including preparation of the application solution, operation of the treatment plant (loading, unloading) and handling of the treated wood. The measurements took place on 8 different treatment sites using different Wolmanit CX-products with different application solution concentrations. The measurements have been repeated on a daily basis during a complete normal working week. The following products were used in the study: Wolmanit CX-8, Wolmanit CX-8N, Wolmanit CX-10, Wolmanit CX-10.2, Wolmanit CX-8M. Please confer to chapter 3.3.6 for information on the detailed composition of the products.

The exposure survey has been performed in a total of 8 industrial impregnation plants performing vacuum pressure treatment and / or oscillating treatment of wood. Impregnation plants located in Northern, South-West, South and Middle Europe have been chosen for the survey. Small-sized- and medium sized enterprises as well as high sized enterprises participated in the survey. The Wolmanit CX-products used by the companies of the survey are members of the Wolmanit CX-10\_family as well as of the Wolmanit CX-8WB family. The products are used in treatment concentrations covering the maximum applied treatment concentrations of the products of the mentioned families including those for niche application. The designated use of the treated wood of the different impregnation plants includes wood products intended for horticulture, landscaping and playground structures as well as for niche use like wooden railway sleepers and wooden poles for electricityand telecommunication lines. The collected data reflect therefore the variability of treatment plants concerning location, size, and degree of automation, used product and treatment concentrations as well as the designated end-use of the treated wood.

The results of the second study (XXXXXXXXX 2015) correlate very well with the results obtained in the first study (XXXXXXXXX 2004) and can directly be used in higher Tier calculations instead of the default/indicative exposure value for hands of 1080 mg/cycle as suggested in Handling model 1 (ECHA 2015a).

The results from the exposure measurements show that the real exposure value for hands when using Wolmanit CX-products is significantly more than a factor 10 lower than the default/indicative value in the model.

A total of 50 measurements have been performed in eight different companies using Wolmanit CX-formulations for the deep impregnation of wood. The number of measurements performed allows a statistical evaluation of the results and the calculation of the median, the 75 % and the 95 % value:

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Probability of hand exposure inside gloves** | |
|  | Impregnation plants using Wolmanit CX-formulations  mg/cycle | Handling model 1  (HSE surveys 1989, 1993, 1996, AEAT survey 1997-8) mg/cycle |
| 95th % value | 108.68 | 2410 |
| 75th % value | 55.84 | 1080 |
| 50th % value (median) | 26.69 | 783 |
| Min. value | 3.33 | 42 |
| Max. value | 161.81 | 7570 |

The 95th% percentile value of the actual measurements has been used for calculation of primary hand exposure (tier 3 calculations; conservative assessment).

**Considerations on automated mixing and loading:**

In addition to the justification that the exposure is negligible compared to other related tasks, the scenario “RISKOFDERM Toolkit Connecting lines” was scrutinized, where a HI<0.01 is obtained (combined exposure to active subtances and SOCs (mixture approach)) without PPE. Thus the M&L can be considered as negligible.

**Calculation of external exposure (local effects):**

The internal exposure values in scenario 1, tier 2, can also be expressed as external exposure values: External exposure of hands inside gloves amounts to 1080 mg solution/cycle (Handling model 1), concentration of the application solution is 5.21% (worst case), number of cycles per day is 3, and the hand surface of adults is 820 cm² (ECHA 2015a). This (1080\*5.21/100\*3/820=0.2) results in a local exposure of ~0.2 mg product / cm² skin, provided that suitable protective gloves are worn.

*Combined scenarios*

It is assumed that an industrial worker encounters inhalative exposure at home.

| **Summary table: combined systemic exposure from industrial uses** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Scenarios combined** | **Estimated uptake [mg/kg bw/day]** | | | | |
|  | **inhalation** | **dermal** | **oral** | **total** |
| Scenarios [1+5],  Tier 3 | **Cu-HDO** | 0.0002 | 0.0176 | n.a.1 | 0.0178 |
| **Cu-Carb.** | 0.0008 | 0.0164 | 0.0172 |
| **2-EHA** | 0.0102 | 0.0616 | 0.0718 |
| **2-MEA** | 0.0068 | 0.3975 | 0.4043 |

1n.a. not assessed

***Professional exposure***

Primary exposure of (non-industrial) professionals is excluded because the Wolmanit CX-8WB\_family products are only applied in industrial plants.

Secondary exposure may occur during sanding of wood.

##### Scenario [2]

| **Description of Scenario [2]** |
| --- |
| Secondary exposure occurs during sanding or sawing of treated wood. For exposure assessment, use class 4 special application retention (31.25 kg/m³) is identified as worst case for professionals (See also “further information and considerations on scenario 2-4”). For general public use class 4 normal retention (22.5 kg/m³) was calculated.  The realistic worst case is based on the assumption that a wooden post is sanded by an adult worker without protective equipment. Only the amount of substance in the outer 1cm of the post was regarded, considering that the wood is impregnated evenly. The sanding generates a certain dust concentration in air. Exposure occurs via inhalation for max. 6 hours per day (reflecting professionals, long term exposure. This covers as a worst case also short term exposure as well as non-professional use).  For dermal exposure, contact with hands is assessed.  Tier 2: Transfer coefficient (dislodgeable residues) of rough sawn wood was taken into account. |

|  |  |  |
| --- | --- | --- |
| **Description of Scenario [2], continued** | | |
|  | **Parameters** | **Value** |
| Tier 1 | Concentration of substance in product | 2.8% (Cu-HDO)  13.04% (Cu-Carb.)  4.9% (2-EHA)  31.60% (2-MEA) |
| Product Retention (UC 4 special application)9 | 31.25 kg/m³ |
| Product retention (UC 4 normal application) | 22.5 kg/m³ |
| Volume of post1 | 0.04 x 0.04 x 2.5 m |
| Exposure duration2 | 6 h per day |
| Inhalation rate3 | 1.25 m³/h |
| Dust concentration in air1 | 5 mg/m³ |
| Wood density2 | 400 mg/cm³ |
| Inhalative absorption4 | 100% |
| Body weight of adult5 | 60 kg |
| amount of a.s. in the outer 1cm layer, all on surface, UC 4 special | 0.875 mg a.s./cm² (Cu-HDO)  4.075 mg a.s./cm² (Cu-Carb.)  1.531 mg a.s./cm² (2-EHA)  9.875 mg a.s./cm² (2-MEA) |
| amount of a.s. in the outer 1cm layer, all on surface, UC 4 normal | 0.630 mg a.s./cm² (Cu-HDO)  2.934 mg a.s./cm² (Cu-Carb.)  1.103 mg a.s./cm² (2-EHA)  7.110 mg a.s./cm² (2-MEA) |
| Hand surface area (palms)5 | 410 cm² |
| Contaminated hand surface area8 | 40% |
| Dermal absorption rate of substances (Cu-HDO, basic copper carbonate, 2-EHA) | 25% (Cu-HDO)  5% (Cu-Carb.)  50% (2-EHA)  50% (2-MEA)  See chapter 2.2.6.1 of PAR, section “Information on dermal absorption”, table “Value(s) used in the Risk Assessment – Dermal absorption” |
| Frequency of sanding/sawing1 | 1 per day |
| Tier 2 | Transfer coefficient (dislodgeable residues) of rough sawn wood7 | 2% |
| Tier 3 | Not applicable. As already Tier 2 results in an acceptable risk, the submitted wipe studies were not taken into consideration (See further information and considerations on scenario [2-4]). | |

1 EC, 2002, page 50f; This guidance document was used as this scenario was not described in ECHA, 2015a

2 Austria 2013, Doc II-B, page 29

3 ECHA, 2015a, page 16, Table 2

4 ECHA, 2017b, page 194

5 ECHA, 2015a, page 15, Table 1

6 OECD 2013a, page 124, Table A1\_I

7 ECHA, 2015a, page 171, Table

8 ECHA, 2015b, HEAdhoc recommendation No 5

9 Please refer to section 2.1.4.1 of this document

**Calculations for Scenario [2]**

Detailed calculations are included in Appendix 3.2.

| **Summary table: systemic exposure from non-professional uses  given in [mg/kg bw/day]** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier/PPE** | **Estimated uptake** | | | | |
|  | **inhalation** | **dermal** | **oral** | **total** |
| Scenario [2] UC 4 special | Tier 1 / no PPE | **Cu-HDO** | 0.0018 | 0.5979 | n.a.1 | 0.5997 |
| **Cu-Carb.** | 0.0085 | 0.5569 | 0.5654 |
| **2-EHA** | 0.0032 | 2.0927 | 2.0959 |
| **2-MEA** | 0.0205 | 13.4958 | 13.5164 |
| Scenario [2] UC 4 normal | Tier 1 / no PPE | **Cu-HDO** | 0.0013 | 0.4305 | n.a.1 | 0.4318 |
| **Cu-Carb.** | 0.0061 | 0.4010 | 0.4071 |
| **2-EHA** | 0.0023 | 1.5068 | 1.5090 |
| **2-MEA** | 0.0148 | 9.7170 | 9.7318 |
| Scenario [2] UC 4 special | Tier 2 / no PPE | **Cu-HDO** | See above  (Tier 1) | 0.0120 | n.a.1 | 0.0138 |
| **Cu-Carb.** | 0.0111 | 0.0196 |
| **2-EHA** | 0.0419 | 0.0450 |
| **2-MEA** | 0.0.2699 | 0.2904 |
| Scenario [2] UC 4 normal | Tier 2 / no PPE | **Cu-HDO** | See above  (Tier 1) | 0.0086 | n.a.1 | 0.0099 |
| **Cu-Carb.** | 0.0080 | 0.0141 |
| **2-EHA** | 0.0301 | 0.0324 |
| **2-MEA** | 0.1943 | 0.2091 |

1n.a. not assessed

***Non-professional exposure***

Non-professional primary exposure does not occur. The products of the Wolmanit CX-8WB\_family are only sold to industrial treatment plants.

Secondary exposure may occur during sanding of wood. This scenario is covered by professional sanding (scenario 2).

***Exposure of the general public***

##### Scenario [3]

| **Description of Scenario [3]** |
| --- |
| Mouthing of treated wood chips (secondary exposure): A toddler picks up and chews a wood cut-off. (See also “further information and considerations on scenario 2-4”).  The relevant exposure route is oral. This is an incidental event and exposure duration is therefore best described as acute. It is assumed that 100% of all a.s. and SoC are retained and bound in the outermost 1 cm of the timber volume and that this part is accessible to toddlers for chewing. It is further assumed that only a small fraction of the total preservative become released by chewing, as most of it is bound inside of the piece of wood. A reasonable assumption is that 10% may become released. A piece of the size of 16 cm3 is chewed.  Tier 1: The post was treated at the utmost with a treatment rate of 22.5 kg/m³ of one the Wolmanit CX-8-formulations (corresponding to UC4; chewing of a wood chip intended for UC4 special applications is not considered realistic). Thereby, substances are extracted by chewing. Oral absorption is 100%.  Tier 2: Refinement: Extraction from the cut-off can be assumed to be in the range of the water solubility of the substances as well as by the saliva produced by toddler per day. It is assumed that the mouthing takes place during 5 hours (very conservative assumption). For 2-EHA an oral absorption refinement of Tier 1 was performed.  Remarks: The scenario 3 is considered highly conservative. First, it is expected to be unlikely that parents allow their toddlers to stay near a working place where treated wood is processed. Furthermore, chewing the raw surface of the wood off-cut is considered unpleasant. It is therefore unlikely that the toddler would chew for a significant time like 5 hours a wood off-cut. |

|  |  |  |
| --- | --- | --- |
| **Description of Scenario [3], continued** | | |
|  | **Parameters** | **Value** |
| **Tier 1** | Size of wood chip (4x4x1 cm)1 | 16 cm³ |
| Concentration of substance in product | 2.8% (Cu-HDO)  13.04% (Cu-Carb.)  4.9% (2-EHA) |
| Product retention | 22.5 kg/m³ |
| Extraction of substance by chewing1 | 10% |
| Frequency1 | 1/day |
| Body weight toddler2 | 10 kg |
| **Tier 2** | Water solubility of substance3 | 6.1 mg/L (Cu-HDO)  1.237 mg/L (Cu-Carb.) |
| Salvia produced by toddler per day4 | 0.2 L |
| Duration of chewing4 | 5 h / day |
| Oral absorption | 100% (Cu-HDO)  36% (Cu-Carb.)5  90% (2-EHA) |
| **Tier 3** | Not applicable. As already Tier 2 results in an acceptable risk, the submitted wipe studies were not taken into consideration (See further information and considerations on scenario [2-4]). | |

1 EC, 2002, page 50ff; This guidance document was partly used as this scenario was not described in ECHA, 2015a.

2 ECHA, 2015a, page 15, Table 1

3 Austria 2013, Assessment report page 44; France 2011, Assessment report page 43,

4 Austria 2013, Doc II-B, page 29.

5 cf. to chapter 2.2.6.3 of this document

**Calculations for Scenario [3]**

Detailed calculations are included in Appendix 3.2.

| **Summary table: systemic exposure for general public  given in [mg/kg bw/day]** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier/PPE** | **Estimated uptake** | | | | |
|  | **inhalation** | **dermal** | **oral** | **total** |
| Scenario [3] | Tier 1 / no PPE | **Cu-HDO** | n.a.1 | n.a.1 | 0.1008 | 0.1008 |
| **Cu-Carb.** | 0.4694 | 0.4694 |
| **2-EHA** | 0.1764 | 0.1764 |
| Scenario [3] | Tier 2 / no PPE | **Cu-HDO** | n.a.1 | n.a.1 | 0.0254 | 0.0254 |
| **Cu-Carb.** | 0.0019 | 0.0019 |
| **2-EHA** | 0.1588 | 0.1588 |

1n.a. not assessed

##### Scenario [4]

| **Description of Scenario [4]** | | |
| --- | --- | --- |
| Playing on treated wood structures (secondary exposure): Toddler is playing outdoors on a playground structure made of treated wood. The scenario for the toddler covers the scenario for the child. For exposure assessment, use class 4 retentions (22.5 kg/m³) are identified as worst case (See also “further information and considerations on scenario 2-4”).  In general, both cases - dermal and oral exposure - are expected to occur in parallel. As a worst case it is assumed that all of the contamination of the toddler’s hand is ingested during mouthing behavior for the active substances and the SoCs. This reflects the worst case absorption values.  Tier 1: The realistic worst case is based on the assumption that an toddler is playing outdoors on a playground structure made of treated wood. The surface concentration is assumed to be 100%. The hand surface area is given with 230.4/2=115.2 cm² (both hand palms without backs) of which 40% are contaminated (1 event per day).  Tier 2: Tier 2 considers a transfer coefficient for dislodgeable residues.  Tier 3: Submitted studies by the applicant. For background information on tier 3, please see section “Further information and considerations on scenario [2]-[4]”. To account for multiple hand contacts of children on playgrounds a preliminary contact number of 10 was assumed. However this value has no scientific base and is a pragmatic approach and accounts for the test conditions in the submitted study. | | |
|  | **Parameters** | **Value** |
| **Tier 1** | Concentration of substance in product | 2.8% (Cu-HDO)  13.04% (Cu-Carb.)  4.9% (2-EHA)  31.60% (2-MEA) |
| Product retention6 | 22.5 kg/m³ |
| Hand surface area2 | 115.2 cm² |
| Contaminated hand surface area3 | 40% |
| amount of a.s. in the outer 1cm layer, all on surface, UC 4 normal | 0.630 mg a.s./cm² (Cu-HDO)  2.934 mg a.s./cm² (Cu-Carb.)  1.103 mg a.s./cm² (2-EHA)  7.110 mg a.s./cm² (2-MEA) |
| Oral absorbtion rates of substances (Cu-HDO, Cu-Carb., 2-EHA) | 100% (Cu-HDO)  36% (Cu-Carb.)  90% (2-EHA)  100% (2-MEA) |
| Playing events5 | 1 / day |
| Body weight of toddler² | 10 kg |

| **Tier 2** | Transfer factor (dislodgeable residues)4 | 2% |
| --- | --- | --- |
| **Tier 3** | Measured concentration via wipe test | 0.0375 µg/cm² = **0.0000375 mg/cm² (Cu-HDO)**  0.235 µg/cm² (Cu)  corresponds to\*:  **0.7944 µg/cm2 (CuCO3) =0.0007944 mg/cm² (CuCO3)** |
| Number of contacts7 | 10 |

1 OECD 2013a, page 124, Table A1\_I

2 ECHA, 2015a, page 15, Table 1

3 ECHA, 2015b, HEAdhoc recommendation No 54 ECHA, 2015a, page 171, Table

5 EC, 2002, page 50ff; This guidance document was partly used as this scenario was not described in ECHA, 2015.

6 Please refer to section 2.1.4.1 of this document

7 as agreed in CG-teleconference on 13/01/2021 for this particular case, NOT a harmonised default

**\*Calculation for CuCO3 (as all present Copper was analysed in one step):**

n(mol)=m/M

Mw=349.9 µg/µmol (Cu-HDO) m(Cu-HDO)= 0.0375 µg **n=0.000107 µmol (Cu-HDO)**

Mw=63.546 µg/µmol (Cu) m(Cu)= 0.2350 µg **n=0.0037 µmol (Cu)**

**n(CuCO3)=** n(Cu) – n(Cu-HDO) = n=0.0037 µmol (Cu) - n=0.000107 µmol (Cu-HDO) = **0.003593 µmol**

Mw=221.1 µg/µmol (CuCO3)

m(CuCO3) = n(CuCO3)\* M (CuCO3) = 0.003593 µmol \* 221.1 µg/µmol = **0.7944 µg/cm2**

**Calculations for Scenario [4]**

Detailed calculations are included in Appendix 3.2.

| **Summary table: systemic exposure for general public  given in [mg/kg bw/day]** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier/PPE** | **Estimated uptake** | | | | |
|  | **inhalation** | **dermal** | **oral** | **total** |
| Scenario [4] | Tier 1 / no PPE | **Cu-HDO** | n.a.1 | **-**3 | 2.90302 | 2.9030 |
| **Cu-Carb.** | 4.86722 | 4.8672 |
| **2-EHA** | 4.57232 | 4.5723 |
| **2-MEA** | 32.76292 | 32.7629 |
| Scenario [4] | Tier 2 / no PPE | **Cu-HDO** | n.a.1 | **-**3 | 0.05812 | 0.0581 |
| **Cu-Carb.** | 0.09732 | 0.0973 |
| **2-EHA** | 0.09142 | 0.0914 |
| **2-MEA** | 0.65532 | 0.6553 |
| Scenario [4] | Tier 3 / no PPE | **Cu-HDO** | n.a.1 | **-**3 | 0.00152 | 0.0015 |
| **Cu-Carb.** | 0.01132 | 0.0113 |

1n.a. not assessed

2worst case for combined dermal and oral route

3Please see description of scenario [4]

**Further information and considerations on scenario [2-4]**

**Product retentions used for risk assessment**

The maximum applied product retention of 31.25 kg/m³ Wolmanit CX-8WB products has been considered for calculation of human exposure of professionals (secondary exposure). Therefore the maximum product retentions correspond to 0.146% Cu-HDO, 0.680% basic copper carbonate, 0.417% 2-ethylhexanoic acid (2-EHA), and 1.646% 2-MEA in the treatment solution.

However, UC4 special application, which is used in practice only for the impregnation of transmission poles was taken into account as a worst case, as impregnated transmission poles are thought to be processed any further by professionals before being placed in the ground. Therefore secondary exposure calculations for scenario 2 - professionals sanding treated wood - are based on use class 4 product retentions for special application. For non-professionals calculations are based on UC 4 normal product retentions.

For the other secondary exposure scenarios 3 to 4 (toddler chewing wood cut-off; toddler/child playing on treated wood structures) the calculation with the “normal” UC 4 retentions represent a worst case.

**Considerations on Tier 3 (Dislodgeable residues, wipe test):**

The default value for transfer of a substance from treated wood to hands (dislodgeable residues) is given with 2% for a dried fluid on rough sawn wood (ECHA 2015a, page 171, table).

The applicant provided two studies (wipe tests) for determination of the migration of the substances.

In study XXXXXXXXX 2002, the surface residue dissipation of Cu-HDO treated wood was determined by wipe samples according to the US EPA Guidelines OPPTS 875.2300 and 875.2400. Freshly treated lumber after a fixation time of 2 weeks, lumber which has been exposed to natural weathering for some three weeks after fixation and lumber exposed to natural weathering for 4 years were examined and analysed for copper as well as for Cu-HDO. As the analytical method for determination of Cu-HDO is not described in sufficient detail and is not validated, it is assumed as a worst case scenario that the whole amount of copper which was detected correlates to Cu-HDO. This yields in a maximum amount of Cu-HDO of 1.377 µg/cm2.

The second study (XXXXXXXXX 2015) also uses a wipe test according to the US EPA Guidelines OPPTS 875.2300 and 875.2400. Treated wood boards were examined after a fixation period of several weeks, when the moisture content of the wood decreased below 30%. A second set of boards was additionally weathered for 14 days before examination. The following maximum amounts of substance were detected: please find relevant table in confidential annex, section 3.6.7.

**Scenario 4:**

Tier 1 exposure assessment can be estimated as a fast and conservative approach. Tier 2 considers a transfer coefficient for dislodgeable residues. With this refinement, 2-EHA and 2-MEA already resulted in acceptable exposure levels, but resulted in unacceptable risk concerning the active substances. This is why AT CA proceeded with Tier 3 calculations as studies are available and additional exposure assessments become inevitable.

Therefore above mentioned study (XXXXXXXXX 2015) using a wipe test according to the US EPA Guidelines OPPTS 875.2300 and 875.2400 in Tier 3 with the biocidal product family member Wolmanit CX-8F was taken into account (application solution 3.75%, measured retention rate ~26 kg/m³, concentration a.s. and SoCs as provided in table: 2.8% Cu-HDO, 13.04% Cu-Carb, 4.9% 2-EHA, and 31.60% 2-MEA).

##### Scenario [5]

| Description of Scenario [5] |
| --- |
| Inhalation of volatilised residues: toddler inhaling volatilised residues from treated timber indoors. As worst case 24 h/day of inhalation exposure is assumed. This scenario also covers children and adults.  According to the HEEG Opinion 13 endorsed at TM IV 2011 and amended after TM III 2013 long-term exposure to volatilised residues can be neglected if the following Tier 1 screening tool which is based on the toddler (inhalation rate of 8 m³/24 h and bw of 10 kg) representing the worst case, is ≤ 1:  cid:image001.png@01D40D5E.6727DE60  As this is true for Cu-HDO (0.348) and basic copper carbonate (0.0102) long-term exposure to volatilised residues is negligible for adults, infants and children for this two a.s.  For the both SoCs 2-EHA and 2-MEA following equation was used:    in which AEC long-term (mg/m3) was replaced by the comparable DNELinhalation long-term (mg/m3). Calculated values for 2-EHA (67.6) and 2-MEA (626.1) showed that the two SoCs have to be included in further considerations with regard to long-term inhalation exposure to volatilised residues.  For tier 1 assessment it is assumed a toddler is exposed to the saturated vapour concentration of the active substance/SoC for 24 hours a day. This represents a very conservative estimation as it is not possible for the air to hold more than the saturated vapour concentration of a substance at a given temperature. No ventilation rate assumed.  Tier 2 was skipped due the reason that studies were submitted by the applicant.  For background information on tier 3, please see section “Further information and considerations on scenario [5]”. |

|  |  |  |
| --- | --- | --- |
| **Description of Scenario [5], continued** | | |
|  | **Parameters** | **Value** |
| **Tier 1** | Concentration of active substance/SoC in product | 4.9% (2-EHA)  27.6% (2-MEA) |
| Inhalative absorption1 | 100 % |
| long-term inhalation rate2 | 8.0 m3/24 h |
| Long-term inhalation rate2 | 16.0 m3/24 h |
| Bodyweight (toddler)3 | 10 kg |
| Bodyweight (adult)3 | 60 kg |
| Exposure duration | 24 hours |
| Gas constant | 8.31451 J/molK |
| Vapour pressure | <0.0001 Pa (Cu-HDO, between 20 °C and 50 °C)7  <0.00001 Pa (CuCO3 25 °C)4  4 Pa (2-EHA 20 °C)6  50 Pa (2-MEA 20 °C)5 |
| Molecular weight | Mw=349.9 g/mol (Cu-HDO)  Mw=221.1 g/mol (CuCO3)  Mw=61.08 g/mol (2-MEA)  Mw=144.2 g/mol (2-EHA) |
| **Tier 3** | Measured concentration in air (mg/m³)8 | 0.018 (2-MEA)  <0.037 (2-EHA) |

1 ECHA, 2017b, page 193

2 ECHA, 2015a, page 16, Table 2

3 ECHA, 2015a, page 15, Table 1

4 France, 2011, Assessment report page 43

5 Safety Data Sheet, Monoethanolamine EG

6 Safety Data Sheet, 2-Ethylhexanoic acid

7 Safety Data Sheet, Cu-HDO

8 The applicant provided measured data, the concentration in air was derived from two exposure studies (please see studies XXXXXXXXX 2018 and XXXXXXXXX 2002). For more details on Tier 3, please see section “Further information and considerations on scenario [6]”.

**Calculations for estimating inhalative exposure for Scenario [5]**

Detailed calculations are included in Appendix 3.2.

| **Summary table: systemic exposure for general public from volatilised residues given in [mg/kg bw/day]** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier/PPE** | **Estimated uptake** | | | | |
|  | **inhalation** | **dermal** | **oral** | **total** |
| Scenario [5]  toddler | Tier 1 /no PPE | **Cu-HDO** | negligible | n.r. | n.r. | n.r. |
| **Cu-Carb.** | negligible | n.r. |
| **2-EHA** | 189.4135 | 189.4135 |
| **2-MEA** | 1002.8933 | 1002.8933 |
| Scenario [5] toddler | Tier 3 /no PPE | **2-EHA** | 0.0296 | n.r. | n.r. | 0.0296 |
| **2-MEA** | 0.0144 | 0.0144 |
| Scenario [5]  adult | Tier 3 /no PPE | **2-EHA** | 0.0099 | n.r. | n.r. | 0.0099 |
| **2-MEA** | 0.0048 | 0.0048 |

n.r.: not relevant

***Further information and considerations on scenario [5]***

For further information on Tier 3, please see section “Further information and considerations on scenario [6]”.

*Combined scenarios*

| **Summary table: combined systemic exposure for general public** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Scenarios combined** | **Estimated uptake [mg/kg bw/day]** | | | | |
|  | **inhalation** | **dermal** | **oral** | **total** |
| Scenarios [3+4+5],  Tier 2/3, | **Cu-HDO** | negligible | -1 | 0.0269 | 0.0269 |
| **Cu-Carb.** | negligible | -1 | 0.0132 | 0.00132 |
| **2-EHA** | 0.0296 | -1 | 0.2849 | 0.2798 |
| **2-MEA** | 0.0144 | -1 | -1 | 0.6697 |

1cf. to explanation in scenario [4]

***Monitoring data***

No surveys or studies with the biocidal products of the Wolmanit CX-8WB\_family or with a surrogate are available for monitoring.

***Dietary exposure***

Direct contact of Wolmanit CX-8WB\_family biocidal products to human and animal food or feed can be excluded due to the authorised use. A dietary risk assessment due to direct contact to foodstuff is therefore not necessary. Copper and copper compounds are approved and used in other regulatory fields (e.g. plant protection, veterinary, food additives, cosmetics) implying dietary exposure to Cu.

The European Medicine Agency (EMA) published in 2016 an European public MRL assessment report (EPMAR) on copper carbonate for all food producing species. The assessment showed “that the administration of copper carbonate by dietary formulations leads to a systemic absorption not significantly exceeding the other copper derivatives and is therefore unlikely to result in residues in liver that exceed physiological values. It was also shown that copper residues in liver after parenteral administration, although increased when compared with controls, remained within the physiological range” (EMA, 2016). The conclusion of this evaluation is that the establishment of MRL values for copper carbonate is not needed for the protection of the consumer. The substance can thus be included in the list of substances approved for use in all food-producing species with a ‘No MRL required’ classification (EMA, 2016).

*Information of non-biocidal use of the active substance*

According to ECHA 2017b, section 4.4, combined exposures stemming from different uses (i.e. combination of biocidal and non-biocidal uses) is not assessed at present due to lack of guidance. Therefore, information of non-biocidal use was not examined at this stage. If relevant, it will be provided at a later stage (e.g. renewal phase).

*Estimating Livestock Exposure to Active Substances used in Biocidal Products*

##### Scenario [6]

| **Description of Scenario [6]** |
| --- |
| An estimation of potential exposure of livestock to wood treated with the biocidal product is required and an assessment is included for Wolmanit CX-8WB.  Treated materials can be formed into structures that livestock animals have access to (e.g. wooden fence rails around paddocks), and may become part of animal housing (e.g. edgings of the livestock’s stalls) and transport vehicles. Livestock animals can be exposed orally by chewing on the wood, dermally by rubbing/leaning on the fencing/wooden wall and via inhalation of volatilised residues.  The extent of the oral and dermal exposures will be dependant on the animals’ behaviour and husbandry practices; e.g. dermal exposure will result during rubbing on treated timber, but oral exposure (chewing/licking) will be more likely to occur during routine stabling or grazing where access to treated timber is commonplace.  This scenario is calculated in line with ECHA 2017b (chapter 6.5.3.1). Horses, beef and dairy cattle, pigs and goats were considered as recommended by the guidance. As no values of wood consumption for goats are available the value for horses was used for calculation. No oral exposure was calculated for beef and dairy cattle and pigs as they do not show a stereotypic chewing behavior. As calves show a different behaviour than grown-up beef cattle therefore a scenario "Oral exposure through licking treated surfaces" was calculated in line with ECHA 2017b (chapter 6.5.1.2, page 344).  Furthermore as no extraction factor for livestock as well as no transfer coefficient from treated wood to livestock skin/fur is provided in ECHA guidances, 100% were used for calculations in both cases.  The guidance states that the default maximum absorption of biocidal product into the treated wood is 50 L/m3, which corresponds to the outer 1 cm layer of treated wood. As a worst case it is considered that the total amount of (active) substances from this layer is available through chewing or licking.  As parts of the horse stalls or fencing and paddocks might be outdoor, the calculations are based on the highest treatment solution of 3.75% Wolmanit CX-8WB biocidal products in water for UC4 conditions.  The inhalation exposure assessment can be regarded as very conservative estimation since a saturated vapour concentration (SVC) is considered. Furthermore, the most volatile substances can be assumed to already have evapourated after the drying phase of the treated wood. However this statement is not substantiated by data.  As inhalation exposure of active substances Cu-HDO and Cu-Carb. already showed acceptable values in Tier 1 SVC-approach, AT CA proceeded with Tier 3, as measured data for the SoCs 2-EHA and 2-MEA studies are available.For background information on Tier 3, please see section “Further information and considerations on scenario [6]”. |

|  |  |  |
| --- | --- | --- |
| **Description of Scenario [6], continued** | | |
|  | **Parameters** | **Value** |
| Tier 1 | Concentration of substance in product | 2.80% (Cu-HDO)  13.04% (Cu-Carb.)  4.9% (2-EHA)  31.6% (2-MEA) |
| Maximum absorption of biocidal product into treated wood in the outer 1 cm layer (density ~1) | 50 L/m³ |
| Application solution UC 4 | 3.75% |
| Amount of active substance in the outer 1 cm layer of wood | 52.5 g/m3 (Cu-HDO)  244.5 g/m3 (Cu-Carb.)  91.88 g/m3 (2-EHA) |
| Horse wood consumption1 | 1.9E-05 m3 per day |
| Body weight1  horse  lactating goat  slaughter goat  fattening pig  breeding pig  beef cattle  dairy cattle  calf cattle | 400 kg  70 kg  13 kg  100 kg  260 kg  500 kg  650 kg  200 kg |
| Thickness of surface layer of the wooden wall representing the amount of substance per square meter | 0.05 mm = 0.05x10-3 m |
| Body surface area in contact with surface1:  horse  lactating goat  slaughter goat  fattening pig  breeding pig  beef cattle  dairy cattle  calf cattle | 1.62 m2  0.45 m2  0.15 m2  0.45 m2  0.84 m2  1.44 m2  1.68 m2  0.87 m2 |
| Tongue surface area calf2 | 0.008 m2 |
| Licks per day2 | 10 |
| Thickness of treated wood of which a. s./SoC is extracted by licking | 0.01 m |
| Transfer coefficient | 100% |
| Amount of a.s. / SoC per square meter | 2.63 mg/m² (Cu-HDO)  12.23 mg/m² (Cu-Carb.)  4.59 mg/m² (2-EHA)  29.63 mg/m² (2-MEA) |
| Vapour pressure | <0.0001 Pa (Cu-HDO, between 20 °C and 50 °C)8  <0.00001 Pa (CuCO3 25 °C)5  4 Pa (2-EHA 20 °C)7  50 Pa (2-MEA 20 °C)6 |
| Molecular weight | Mw=349.9 g/mol (Cu-HDO)  Mw=221.1 g/mol (basic CuCO3)  Mw=61.08 g/mol (2-MEA)  Mw=144.2 g/mol (2-EHA) |
| Gas constant | 8.31451 J/K mol |
| Temperature | 293 K |
| Alveolar ventilation rate1  horse  lactating goat  slaughter goat  fattening pig  breeding pig  beef cattle  dairy cattle  calf cattle | 43 m3/d  11 m3/d  3 m3/d  14 m3/d  30 m3/d  51 m3/d  62 m3/d  25 m3/d |
| Inhalative absorption | 100% |
|  | Extraction factor by chewing | 100% |
| Tier 2 | Oral absorption (Cu-Carb.)3 | 25% |
| Tier 3 | Measured concentration in air (mg/m³)10 | 0.018 (2-MEA)  <0.037 (2-EHA) |

1 ECHA, 2017b, page 366

2 ECHA, 2017b, page 344

3 France, 2011, Assessment report page 48

4 ECHA, 2015a, page 171, Table

5 France, 2011, Assessment report page 43

6 Safety Data Sheet, Monoethanolamine EG

7 Safety Data Sheet, 2-Ethylhexanoic acid

8 Safety Data Sheet, Cu-HDO

10 The applicant provided measured data, the concentration in air was derived from two exposure studies (please see studies XXXXXXXXX 2018 and XXXXXXXXX 2002). For more details on Tier 3, please see section “Further information and considerations on scenario [6]”.

**Calculations for estimating livestock exposure for Scenario [6]**

Total exposure: oral exposure + dermal exposure + inhalation exposure

Detailed calculations are included in Appendix 3.2.

| **Summary table: exposure of livestock exposure  given in [mg/kg bw/day]** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Exposure scenario** | **Tier/PPE** | **Estimated inhalation uptake** | **Estimated dermal uptake** | **Estimated oral uptake** | **Estimated total uptake** |
| Scenario [6] Horses | Tier 1 | Cu-HDO: 0.0015  Cu-Carb.: 0.0001  2-EHA: 25.4524  2-MEA: 134.7638 | Cu-HDO: 0.0106  Cu-Carb.: 0.0495  2-EHA: 0.0186  2-MEA: 0.1200 | Cu-HDO: 0.0025  Cu-Carb.: 0.0116  2-EHA: 0.0044 | Cu-HDO: 0.0147  Cu-Carb.: 0.0612  2-EHA: 25.4754  2-MEA: 134.8838 |
| LactatingGoats | Tier 1 | Cu-HDO: 0.0023  Cu-Carb.: 0.0001  2-EHA: 37.2062  2-MEA: 196.9969 | Cu-HDO: 0.0169  Cu-Carb.: 0.0786  2-EHA: 0.0295  2-MEA: 0.1904 | Cu-HDO: 0.0143  Cu-Carb.: 0.0664  2-EHA: 0.0249 | Cu-HDO: 0.0334  Cu-Carb.: 0.1451  2-EHA: 37.2607  2-MEA: 197.1873 |
| Slaughter goats | Tier 1 | Cu-HDO: 0.0033  Cu-Carb.: 0.0002  2-EHA: 54.6385  2-MEA: 289.2962 | Cu-HDO: 0.0303  Cu-Carb.: 0.1411  2-EHA: 0.0530  2-MEA: 0.3418 | Cu-HDO: 0.0767  Cu-Carb.: 0.3573  2-EHA: 0.1343 | Cu-HDO: 0.1103  Cu-Carb.: 0.4986  2-EHA: 54.8258  2-MEA: 289.6380 |
| Fattening pig | Tier 1 | Cu-HDO: 0.0020  Cu-Carb.: 0.0001  2-EHA: 33.1474  2-MEA: 175.5063 | Cu-HDO: 0.0118  Cu-Carb.: 0.0550  2-EHA: 0.0207  2-MEA: 0.1333 | n.r. | Cu-HDO: 0.0138  Cu-Carb.: 0.0551  2-EHA: 33.1680  2-MEA: 175.6263 |
| Breeding pig | Tier 1 | Cu-HDO: 0.0017  Cu-Carb.: 0.0001  2-EHA: 27.3193  2-MEA: 144.6481 | Cu-HDO: 0.0085  Cu-Carb.: 0.0395  2-EHA: 0.0148  2-MEA: 0.0957 | n.r. | Cu-HDO: 0.0101  Cu-Carb.: 0.0396  2-EHA: 27.3341  2-MEA: 144.8385 |
| Beef cattle | Tier 1 | Cu-HDO: 0.0015  Cu-Carb.: 0.0001  2-EHA: 24.1502  2-MEA: 127.8689 | Cu-HDO: 0.0076  Cu-Carb.: 0.0352  2-EHA: 0.0132  2-MEA: 0.0853 | n.r. | Cu-HDO: 0.0090  Cu-Carb.:  0.0353  2-EHA:  24.1635  2-MEA: 128.2107 |
| Dairy cattle | Tier 1 | Cu-HDO: 0.0014  Cu-Carb.: 0.0001  2-EHA: 22.5839  2-MEA: 119.5757 | Cu-HDO: 0.0068  Cu-Carb.: 0.0316  2-EHA: 0.0119  2-MEA: 0.0766 | n.r. | Cu-HDO: 0.0082  Cu-Carb.: 0.0317  2-EHA: 22.5958  2-MEA: 119.7091 |
| Calf cattle | Tier 1 | Cu-HDO: 0.0018  Cu-Carb.: 0.0001  2-EHA: 29.5959  2-MEA: 156.7021 | Cu-HDO: 0.0114  Cu-Carb.: 0.0532  2-EHA: 0.0200  2-MEA: 0.1289 | Cu-HDO: 0.2100  Cu-Carb.: 0.9780  2-EHA: 0.3675 | Cu-HDO: 0.2232  Cu-Carb.: 1.0313  2-EHA: 29.9833  2-MEA: 156.8310 |
| Scenario [6]Horses | Tier 2 | n.r. | n.r. | Cu-HDO: 0.0025  Cu-Carb.: 0.0029  2-EHA: 0.0044 | Cu-HDO: 0.0147  Cu-Carb.: 0.0525  2-EHA: 25.4754  2-MEA: 134.8838 |
| LactatingGoats | Tier 2 | n.r. | n.r. | Cu-HDO: 0.0143  Cu-Carb.: 0.0166  2-EHA: 0.0249 | Cu-HDO: 0.0334  Cu-Carb.: 0.0953  2-EHA: 37.2607  2-MEA: 197.1873 |
| Slaughter goats | Tier 2 | n.r. | n.r. | Cu-HDO: 0.0767  Cu-Carb.: 0.0893  2-EHA: 0.1343 | Cu-HDO: 0.1103  Cu-Carb.: 0.2306  2-EHA: 54.8258  2-MEA: 289.6380 |
| Fattening pig | Tier 2 | n.r. | n.r. | n.r. | Cu-HDO: 0.0138  Cu-Carb.: 0.0551  2-EHA: 33.1680  2-MEA: 175.6263 |
| Breeding pig | Tier 2 | n.r. | n.r. | n.r. | Cu-HDO: 0.0101  Cu-Carb.: 0.0396  2-EHA: 27.3341  2-MEA: 144.8385 |
| Beef cattle | Tier 2 | n.r. | n.r. | n.r. | Cu-HDO: 0.0090  Cu-Carb.:  0.0353  2-EHA:  24.1635  2-MEA: 128.2107 |
| Dairy cattle | Tier 2 | n.r. | n.r. | n.r. | Cu-HDO: 0.0082  Cu-Carb.: 0.0317  2-EHA: 22.5958  2-MEA: 119.7091 |
| Calf cattle | Tier 2 | n.r. | n.r. | Cu-HDO: 0.2100  Cu-Carb.: 0.2445  2-EHA: 0.3675 | Cu-HDO: 0.2232  Cu-Carb.: 0.2978  2-EHA: 29.9833  2-MEA: 156.8310 |
| Scenario [6]Horses | Tier 3 | 2-EHA: 0.0040  2-MEA: 0.0019 | n.r. | n.r. | 2-EHA: 0.0296  2-MEA: 0.1219 |
| LactatingGoats | Tier 3 | 2-EHA: 0.0058  2-MEA: 0.0028 | n.r. | n.r. | 2-EHA: 0.0603  2-MEA: 0.1933 |
| Slaughter goat |  | 2-EHA: 0.0085  2-MEA: 0.0042 | n.r. | n.r. | 2-EHA: 0.1958  2-MEA: 0.3460 |
| Fattening pig | Tier 3 | 2-EHA: 0.0052  2-MEA: 0.0025 | n.r. | n.r. | 2-EHA: 0.0259  2-MEA: 0.1358 |
| Breeding pig | Tier 3 | 2-EHA: 0.0043  2-MEA: 0.0021 | n.r. | n.r. | 2-EHA: 0.0191  2-MEA: 0.0978 |
| Beef cattle | Tier 3 | 2-EHA: 0.0038  2-MEA: 0.0018 | n.r. | n.r. | 2-EHA: 0.0170  2-MEA: 0.0872 |
| Dairy cattle | Tier 3 | 2-EHA: 0.0035  2-MEA: 0.0017 | n.r. | n.r. | 2-EHA: 0.0154  2-MEA: 0.0783 |
| Calf cattle | Tier 3 | 2-EHA: 0.0046  2-MEA: 0.0023 | n.r. | n.r. | 2-EHA: 0.3921  2-MEA: 0.1311 |

n.r. not relevant

***Further information and considerations on scenario [6]***

**Considerations on Tier 3 (inhalation exposure):**

Tier 1 inhalation exposure assessment can be estimated as very rough and conservative, as a daily exposure of 24 hours on basis of the saturated vapour concentration (SVC) with no ventilation was considered. As this rough approach in Tier 1 already showed acceptable exposure levels for the active substances but resulted in unacceptable risk for humans/livestock concerning 2-EHA and 2-MEA, AT CA proceeded with Tier 3 calculations as studies are available and additional exposure assessments become inevitable.

Therefore in Tier 3 workplace exposure measurements (XXXXXXXXX 2018) and air concentration measurements performed in test rooms loaded with treated wood (XXXXXXXXX 2002) were be used to refine the calculations for exposure assessment.

Concerning 2-EHA (XXXXXXXXX 2002):

The report presents indoor air concentration measurement of 2-EHA with Wolmanit CX-S treated timber. Please cf. to the confidential annex chapter 3.6.7. for detailed information of composition of this product and for read-across.

For the purpose of the study, untreated pinewood was impregnated via vacuum pressure treatment and afterwards placed in a measuring room, which can be regarded as a normal room in a residential building with a door and a double window. In order to simulate worst case conditions a very high area of impregnated wood/room volume ratio of 0.2 m2/m3 was chosen. Samples for the measurements were taken in a period of two weeks; the first samples were taken the day after impregnation and then 4, 8 and 15 days after. The results can therefore be read across and considered as worst-case. The air concentrations of all samples were below the detection limit of 0.037 mg/m³. Thus for inhalation exposure calculation this value was used.

Concerning 2-MEA (XXXXXXXXX 2018):

The workplace air concentration measurements have been performed at various places in a pressure impregnation plant. Amongst these, there was also the stabilization room where the treated wood is stored for drying, which can be considered as worst-case compared to the exposure of completely dried wood in indoor rooms as the treated wood is still freshly impregnated. The measured concentration of 2-MEA in the stabilisation hall was 0.018 mg/m³. This value was used for inhalation exposure calculation.

The wood preservative used for measurement of 2-MEA is Wolmanit CX-8 which is not part of the current authorisation. Anyway, its composition is known by the AT CA. Please cf. to chapter 3.6.6. for detailed information of composition of this product and for read-across.

**Conclusion and WCCE calculation**

The trigger value of 0.004 mg/kg bw/day was exceeded for all active substances for all species.

Therefore WCCE (worst case consumer exposure) calculation, that considers residues of the substance that occur as a result of authorised use was performed:

For Cu-HDO oral absorption is 100% (Austria, 2013). For basic copper carbonate oral absorption of 36% for humans and 25% for animals were determined (France, 2011). Based on the homeostatic regulation process of copper, bioaccumulation and biomagnification are considered as not applicable for copper according to the AR (France, 2011).

Results from a toxicokinetic study in rats show that 2-EHA is rapidly and extensively absorbed after oral administration with 90% and 70% oral and dermal absorption. In mice and rats, 2-EHA showed a preferential distribution in kidneys, liver and blood. Available data indicate that 2-EHA undergoes extensive metabolism and exhibited a rapid elimination in rats after oral, intravenous and dermal administrations. Excretion occurs predominantly in the urine within the first 24 hours, which is consistent with the rapid excretion of the substance observed in workers exposed by the dermal and inhalation routes (Spain, 2017). Therefore no bioaccumulation is assumed. Because 2-EHA is transferred to pubs (Spain, 2017) exposure via lactation is possible.

Oral absorption for 2-MEA is assumed to be 100% and 2-MEA has a low bioaccumulation potential according to UK (2016).

The worst case consumer exposure (WCCE) was performed assuming residues in milk (lactating goats) and meat (calf for Cu-HDO, Cu-Carb. and 2-EHA and slaughter goat for 2-MEA).

The screeing estimate took into account all possible exposure pathways that would result from use of the biocide (oral, dermal and inhalation, cf. table above). The assumptions about the relative distribution of the substances between the edible tissues of the food basket should be conservative and scientifically plausible (EMA, 2015).

Screening calculation residues in milk: No data are available that would allow quantifying the transfer of the active substances and SoCs into milk, therefore 100% of the external exposure calculation of lactating goats was used for the calculation. Imilk is from the EMA food basket (1.5 L/day or 1.5 kg/day)

WCCE = amount of transfer into milk\*Imilk/bw human

WCCE Cu-HDO: 0.0334 mg/kg bw/d\*1.5 kg/d /60 kg = 0.000835

WCCE Cu-Carb.: 0.0953 mg/kg bw/d\*1.5 kg/d /60 kg = 0.0023825

WCCE 2-EHA: 0.0603 mg/kg bw/d\*1.5 kg/d /60 kg = 0.0015075

WCCE 2-MEA: 0.1933 mg/kg bw/d\*1.5 kg/d /60 kg = 0.0048325

Screening calculation residues in meat: Itissue = daily edible tissue consumption from EMA food basket (0.5 kg/day)

WCCE Cu-HDO: 0.2232 \*0.5 kg/d /60 kg = 0.00186

WCCE Cu-Carb.: 0.2978 \*0.5 kg/d /60 kg = 0.002482

WCCE 2-EHA: 0.3921 \*0.5 kg/d /60 kg = 0.0032675

WCCE 2-MEA: 0.3460 \*0.5 kg/d /60 kg = 0.002883

**Sum of both calculations per substance:**

**WCCE Cu-HDO: 0.002695 mg/kg bw/d**

**WCCE Cu-Carb.: 0.0048645 mg/kg bw/d**

**WCCE 2-EHA: 0.004775 mg/kg bw/d**

**WCCE 2-MEA: 0.0077155 mg/kg bw/d**

**With correction of oral absorption for 2-EHA (90%) and CuCarb.(36%):**

**WCCE Cu-Carb.: 0.001751 mg/kg bw/d**

**WCCE 2-EHA: 0.004298 mg/kg bw/d**

*Estimating transfer of biocidal active substances into foods as a result of professional and/or industrial application(s)*

The trigger values of 0.004 mg/kg bw/day are exceeded for all substances for all species. WCCE calculation: See above.

*Estimating transfer of biocidal active substances into foods as a result of non-professional use*

Not applicable for Wolmanit CX-8WB products. Non-professional use is not foreseen.

***Exposure associated with production, formulation and disposal of the biocidal product***

Occupational exposure during production and formulation of the biocidal product is not assessed under the requirements of the BPR. It is assumed that the production is performed in conformity with national and European occupational safety and health regulations.

In addition, production or formulation of biocidal products are already covered by REACH legislation, where the registrants (manufacturers/importers) of substances are obliged to consider human hazard and exposure and to provide RMMs/exposure scenarios for ensuring safe use (e.g. via SDS in the supply chain). Moreover, it is assumed that industrial production sites are subject to permit for installation. Therefore, it is not considered relevant to perform an additional exposure assessment under the biocide regime.

Moreover, the applicant provided the following information:

*“Wolmanit CX-8FP is produced in a highly automated system thereby minimising exposure. Workers are specifically trained and expected to wear adequate personal protective equipment according to the risk classification and the safety recommendations given in the safety data sheet.*

*The manufacturing of the end product consists in a simple mixing of the different constituents of the product in a mixing tank. The process is automated to the greatest possible extent. After mixing, the product is filled in the appropriate containers and stored. Filling of the transport containers occurs also fully automatically. At least any dermal exposure during filling is exclud-ed. Inhalative exposure is marginally.*

*Exposure calculation considers therefore only inhalative exposure during production / formula-tion of the product. The worst-case calculation is based on the saturated vapour pressure of the active substances.*

*Exposure during disposal is considered to be negligible because any direct exposure to the product is excluded. Emptied containers are given back to the producer for recycling. Dermal exposure is therefore excluded. As a worst-case scenario, inhalative exposure has been con-sidered.”*

***Aggregated exposure***

The methodology how to assess aggregated exposure has not been developed yet. This chapter might be subject to revision at product authorisation renewal stage.

| **Scenarios and values to be used in risk assessment** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenario number** | **Exposed group** | **Tier/PPE** | **Estimated total uptake [mg/kg bw/day]** | | | |
| *Cu-HDO* | *Cu-Carbonate* | *2-EHA* | *2-MEA* |
| *[1]* | *Industrials* | *Tier 2 /*  *gloves, coated overall* | *0.0355* | *0.0337* | *0.1239* | *0.7992* |
| *Tier 3 /*  *gloves, coated overall* | *0.0178* | *0.0172* | *0.0619* | *0.3994* |
| *[1]+[5]* | *Industrials* | *Tier 3 /  gloves, coated overall* | *0.0178* | *0.0172* | *0.0718* | *0.4043* |
| *[2] UC 4 special* | *Professionals (adults)* | *Tier 1 / no PPE* | *0.5997* | *0.5654* | *2.0959* | *13.5164* |
| *Tier 2 / PPE* | *0.0138* | *0.0196* | *0.0450* | *0.2904* |
| *[2] UC 4 normal* | *General Public (adults)* | *Tier 1 / no PPE* | *0.4318* | *0.4071* | *1.5090* | *9.7318* |
| *Tier 2 / no PPE* | *0.0099* | *0.0141* | *0.0324* | *0.2091* |
| *[3]* | *General public (toddler)* | *Tier 1 / no PPE* | *0.1008* | *0.4694* | *0.1764* | *---* |
| *Tier 2 / no PPE* | *0.0254* | *0.0019* | *0.1588* | *---* |
| *[4]* | *General public (toddler)* | *Tier 1 / no PPE* | *2.9030* | *4.8672* | *4.5723* | *32.7629* |
| *Tier 2 / no PPE* | *0.0581* | *0.0973* | *0.0914* | *0.6553* |
| *Tier 3 / no PPE* | *0.0015* | *0.0113* | *0.0914* | *0.6553* |
| *[3]+[4]+[5]* | *General public (toddler)* | *Tier 2+3 / no PPE* | *0.0269* | *0.0132* | *0.2798* | *0.6697* |
| *[5]* | *General public (toddler)* | *Tier 1* | *n.r.* | *n.r.* | *189.4135* | *1002.0289* |
| *Tier 3* | *n.r.* | *n.r.* | *0.0296* | *0.0144* |
|  |
| *[5]* | *General Public (adult)* | *Tier 3* | *n.r.* | *n.r.* | *0.0099* | *0.0048* |
| *[6]* | *Livestock exposure* | *Tier 1 horse* | *0.0147* | *0.0612* | *25.4754* | *134.8838* |
| *Tier 1 lactating goat* | *0.0334* | *0.1451* | *37.2607* | *197.1873* |
| *Tier 1 slaughter goats* | *0.1103* | *0.4986* | *54.8258* | *289.6380* |
| *Tier 1 fattening pig* | *0.0138* | *0.0551* | *33.1680* | *175.6263* |
| *Tier 1 breeding pig* | *0.0101* | *0.0396* | *27.3341* | *144.8385* |
| *Tier 1 beef cattle* | *0.0090* | *0.0353* | *24.1635* | *128.2107* |
| *Tier 1 dairy cattle* | *0.0082* | *0.0317* | *22.5958* | *119.7091* |
| *Tier 1 calf cattle* | *0.2232* | *1.0313* | *29.9833* | *156.8310* |
| *Tier 2 horse* | *0.0147* | *0.0525* | *25.4754* | *134.8838* |
| *Tier 2 lactating goat* | *0.0334* | *0.0953* | *37.2607* | *197.1873* |
| *Tier 2 slaughter goats* | *0.1103* | *0.2306* | *54.8258* | *289.6380* |
| *Tier 2 fattening pig* | *0.0138* | *0.0551* | *33.1680* | *175.6263* |
| *Tier 2 breeding pig* | *0.0101* | *0.0396* | *27.3341* | *144.8385* |
| *Tier 2 beef cattle* | *0.0090* | *0.0353* | *24.1635* | *128.2107* |
| *Tier 2 dairy cattle* | *0.0082* | *0.0317* | *22.5958* | *119.7091* |
|  |  | *Tier 2 calf cattle* | *0.0132* | *0.0533* | *29.6158* | *156.8310* |
|  |  | *Tier 3 horse* | *0.0147* | *0.0525* | *0.0269* | *0.1219* |
| *Tier 3 lactating goat* | *0.0334* | *0.0953* | *0.0603* | *0.1933* |
| *Tier 3 slaughter goats* | *0.1103* | *0.2306* | *0.1958* | *0.3460* |
| *Tier 3 fattening pig* | *0.0138* | *0.0551* | *0.0259* | *0.1358* |
| *Tier 3 breeding pig* | *0.0101* | *0.0396* | *0.0191* | *0.0978* |
| *Tier 3 beef cattle* | *0.0090* | *0.0353* | *0.0170* | *0.0872* |
| *[6]* | *Livestock exposure* | *Tier 3 dairy cattle* | *0.0082* | *0.0317* | *0.0154* | *0.0783* |
|  |  | *Tier 3 calf cattle* | *0.2232* | *0.2978* | *0.3921* | *0.1311* |

#### Risk characterisation for human health

##### Risk characterisation for local effects

The products of the Wolmanit CX-8WB\_family are regarded to cause burns to the skin (and bear therefore a risk for severe eye damage). A NOAEC was not defined for these effects. Therefore, adequate personal protective equipment has to be used in order to mitigate this risk for primary exposure situations. According to the hazard categorisation of local effects, this classification of the undiluted products corresponds to the hazard category high (ECHA 2017b). A qualitiative risk assessment for potential local effects is provided below.

Exposure to products of the Wolmanit CX-8WB\_family will appear in practice only to the in use dilution. Exposure during mixing and loading operations is considered negligible as automated dilution by pumping transfer means exposure would be very low in scenario 1. The degree of dilution depends on the use classes, but is limited to a maximum concentration of 5.21 % in water. This maximum application solution is relevant in practice only for special applications of the product like impregnation of poles. For all other uses application solutions have lower concentrations of the products.The expected local effects of the application solutions of products of the Wolmanit CX-8WB\_family are refined by considering that the corrosive properties of the products are likely to be mainly based on a few substances and that the content of these substances is below 3% of the in-use dilution (cf. confidential annex). This value is below the classification limit for skin corrosion and eye damage. Consequently, the maximum Wolmanit CX-8WB\_family application solution for special applications is likely to rather cause irritant effects for skin and eyes.

An overview of the concentration of the application or in-use solutions and classification relevant substances of the products of the Wolmanit CX-8WB\_family (based on highest concentrations of the ranges of co-formulants, please see also confidential annex) and the resulting classification and hazard categorisation is given in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Product** | **Use class** | **Application solution** | **Concentrations of substances relevant for local effects in the application solution** | |
| Wolmanit CX-8WB\_family | 4 (special) | 5.21% | ≥1% - ≤3% | skin irrit 2  eye irrit 2 |
| 4 (normal) | 1.82% - 3.75% | ≤1% - ≤3% | no class -skin irrit 2  no class- eye irrit 2 |
| 3 | 1.08% -1.5% | ≤1% | No class |

Dermal transfer measurements from treatment plants are available providing a local exposure estimate of 0.2 mg product/cm² (see chapter 2.2.6.2, Further information and considerations on scenario [1]). This represents a relatively low amount, if compared e.g. with the testing requirements in OECD TG 404 (dermal irritation test), where an application rate of 83 mg/cm² is recommended (500 mg/6 cm²). This might be considered as indication that the risk for local irritation effects from exposure to treated surfaces is low. However no NOAEC or AEC is available for local dermal effects (or eye effects from hand to eye transfer) from repeated exposure to the product. A qualitative risk assessment for local effects from treated wood is provided in the table below.

| **Hazard** | | | **Exposure** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Hazard Category** | **effects in terms of C&L** | **Who is exposed?** | | **Tasks, uses, processes** | **Potential exposure route** | **frequency and duration of potential exposure** | **Potential degree of exposure** | **Relevant RMM & PPE** | **Conclusion on risk** |
| high | Skin Corr.1B (H314)  Eye Dam. 1 (H318)  Corrosive to the respiratory tract (EUH071)  H335 | Industrial worker | | Exposure during mixing and loading operations is considered to be negligible as automated dilution by pumping transfer | Skin  Eye  RT (respiratory tract) | Few minutes per day or less | -- | Technical and organisational RMM for work with high hazard category, including, high ventilation, automated dosing device and use of appropriate PPE | No exposure expected since technical and organisational RMM adequate for the high hazard category are achievable:  + short duration of potential exposure  + practically closed system  + use of PPE |
| low | Skin irrit. 2  (H315)    Eye Irrit. 2 (H319) | Industrial worker | | - Intermittent manual handling of water-wet wood and associated equipment (human exposure scenario 1)  - Cleaning of the treatment chamber | Skin  Eye  RT | Daily; varying between 20 minutes and 3 hours per day  1 time per year | -- | Adequate technical and organisational RMM are achievable:   * Minimization of manual phases * Minimisation of splashes and spills * Good ventilation expected within industrial applications * Regular cleaning of equipment and work area;   + Use of appropriate PPE (coverall, face shield, boots, chemical resistant gloves)  +Training for staff on good practice.   * Good standard of personal hygiene | Acceptable:   * acceptable duration of potential exposure * reversible effects * installed RMM at place * trained workers * use of appropriate PPE * Cleaning of the treatment chamber and pressure treatment of wood shall not be performed by the same operator on the same day. |
| low | Skin irrit. 2  (H315)    Eye Irrit. 2 (H319) | Professionals | | Dermal contact from sawing and sanding dry treated wood (human exposure scenario 2) | Skin  Eye (from hand to eye transfer) | May be daily,  for several hours/day dermal contact with dry treated wood per day | 0.2 mg/cm² skin | - use of gloves by professionals expected to protect for mechanical injury | * relevant for treated wood at the highest application rate for UC3, UC4 and special application * inside contamination of gloves cannot be excluded   nevertheless use appears acceptable since:   * reversible effects * low exposure expected in terms of mg/cm2 due to contact with usually dry wood |
| low | Skin irrit. 2  (H315)    Eye Irrit. 2 (H319) | General public | | Dermal contact with dry, treated wood (human exposure scenario 2, 4) | Skin  Eye (from hand to eye transfer) | Maybe daily,  unlikely more than 1 hour dermal contact with dry treated wood per day, except for short term work of general public cutting and sanding treated wood  Use of treated wood according to the authorised use (cf section 2.1.4) | 0.2 mg/cm² skin | - no RMM possible for treated wood (in service) | * relevant for treated wood at the highest application rate for UC3 and UC4 * contact with weathered (wet) outdoor wood cannot be excluded * daily dermal contact for more than 1 hour unlikely except for general public cutting and sanding treated wood e.g. for horticulture and playground equipment   - for cutting and sanding treated wood gloves by non-professionals likely to protect for mechanical injury   * If gloves were used: inside contamination of gloves cannot be excluded   Nevertheless use appears acceptable since:   * reversible effects * low exposure expected in terms of mg/cm2 |

**Conclusion**

On the basis of the overview of potential exposure and RMM provided in the table above it is concluded that the risk for local corrosive/irritant effects to skin, eye or respiratory tract is acceptably low. In addition adequate P-phrases including P280 are proposed (cf. chapter 2.1.3).

##### Risk characterisation for systemic effects

**Reference values to be used in Risk Characterisation**

**Cu-HDO (Austria, 2013)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Reference** | **Study** | **NOAEL (LOAEL)** | **AF** | **Correction for oral absorption** | **Value** |
| AEL\_short-term | Rabbit developmental toxicity study | Maternal NOAEL = 10 mg/kg  Developmental NOAEL = 10 mg/kg | 100 | - | 0.1 mg/kg bw/d |
| AEL\_medium-term | Rabbit developmental toxicity study | 300 | - | 0.033 mg/kg bw/d |
| AEL\_long-term | Rabbit developmental toxicity study | 300 | - | 0.033 mg/kg bw/d |
| ARfD | not relevant | | | | |
| ADI | not relevant | | | | |

**Basic copper carbonate (France, 2011)**

For basic copper carbonate, the toxicologically relevant moiety for systemic toxicity is the Cu2+ ion, which is released to a different degree from all the copper compounds. No repeated dose toxicity studies were available for basic copper carbonate during active substance evaluation. Therefore read-across for systemic toxicity endpoints to copper sulphate data and other more soluble copper compounds were proposed representing a worst-case for the determination of the systemic toxicity of relatively insoluble copper compounds (RAC, 2014). However, RAC noted that differences in solubility and other physico-chemical properties may potentially impact the toxicity of the various copper compounds (RAC, 2014).

The short term and long term AELs for basic copper carbonate were calculated for Cu2+ (based on read-across to copper sulphate) and were 0.082 and 0.041 mg/kg bw/d, respectively. For basic copper carbonate oral absorption of 36% for humans and 25% for animals were determined (France, 2011).

The current evaluation for basic copper carbonate was based on the active substance and a correction concerning the molecular weight (221.1 for basic copper carbonate to 2\*63.5 for Cu2+) was applied. This step did not affect the risk characterisation ratios despite dermal absorption value was set for copper.

| **Reference** | **Study** | **NOAEL (LOAEL)** | **AF** | **Correction for oral absorption** | **Value** (mg/kg bw/day) | |
| --- | --- | --- | --- | --- | --- | --- |
| **Referring to Cu** | **Referring to Cu-Carb.** |
| AEL\_short-term | 90-day oral rat study with copper sulphate | 16.3 mg Cu/kg bw/d  NOAELsystemic = 4.1 mg Cu/kg bw/d | 50 | 25% | 0.082 | 0.143 |
| AEL\_medium-term | 50 | 25% | 0.082 | 0.143 |
| AEL\_long-term | 100 | 25% | 0.041 | 0.071 |
| ARfD | Not applicable | | | | | |
| ADI | As no food risk assessment was deemed necessary because of the negligible exposure through food, no ADI was derived. An ADI value of 0.15 mg Cu/kg bw/d is nevertheless available in the literature (EFSA, 2018) | | | | | |
| AEC | Although basic copper carbonate induced local effects (eye irritation) no local AEC was derived as far as no local effect was detected in the absence of systemic effects. | | | | | |

**2-Ethylhexanoic acid**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference/Source** | **Route of expsoure** | **Study** | **NOAEL (LOAEL)** | **AF** | | **Value** | | |
| **Worker** | **Consumer** | **Worker** | **Consumer** | |
| DNEL\_long-term  (Spain, 2017 and submitted SDS) | Inhalation | developmental toxicity / teratogenicity | 176.21 mg/m3 | 12.5 | 25 | 14 mg/m³ | | 3.5 mg/m³ |
| Dermal | developmental toxicity / teratogenicity | 100 mg/kg bw/day | 50 | 100 | 2 mg/kg  bw /day | | 1 mg/kg  bw/day |
| Oral | developmental toxicity / teratogenicity | 100 mg/kg bw/day | - | 100 | - | | 1 mg/kg  bw/day |

According to the Substance Evaluation Report compiled by Spain (2017) the extent of oral absorption can be set by 90% (Spain, 2017).

**2-Aminoethanol**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Reference** | **Route of expsoure** | **Study/Source** | **NOAEL (LOAEL)** | **AF** | | **Value** | |
| **Worker** | **Consumer** | **Worker** | **Consumer** |
| DNEL\_long-term | Inhalation | IOELV: 8-hour TWA | 13 ppm | 5 | 10 | 2.5 mg/m³ or 0.416 mg/kg bw/day[[1]](#footnote-2) | 0.5 mg/m³ (UK, 2016b) or 0.166 mg/kg bw/day[[2]](#footnote-3) |
| DNEL\_long-term | Inhalation | Source: SDS submitted by the applicant | | | | 3.3 mg/m3 | 2 mg/m3 |
| DNEL\_long-term | Dermal | Source: SDS submitted by the applicant | | | | 1 mg/kg | 0.24 mg/kg |
| DNEL\_long-term | Oral | Source: SDS submitted by the applicant | | | | - | 3.75 mg/kg |
| DNEL\_long-term | Dermal | Based on a two-generation reproduction study in rats, NOAEL: 300 mg/kg bw/d, AF 200 (UK, 2016) | | | | - | 1.5 mg/kg bw/d |
| DNEL\_long-term | Oral | Based on a two-generation reproduction study in rats, NOAEL: 300 mg/kg bw/d, AF 200 (UK, 2016) | | | | - | 1.5 mg/kg bw/d |

For 2-MEA (2-aminoethanol) IOELVs of 2.5 mg/m3 (8-hour TWA) and 7.6 mg/m3 (15-minute TWA) STEL have been established for under the 2nd IOELV Directive (2006/15/EC). The Scientific Committee on Occupational Exposure Limits (SCOEL) used a LOAEC of 5 ppm (13 mg/m3) from an inhalation study in rats, dogs and guinea pigs based on the critical effects of irritation and behavioural changes (lethargy after two to three weeks of exposure). This LOAEC was very close to the NOAEC of 10 mg/m3 from the 28-day inhalation study included in the registration dossier (UK, 2016b). Therefore the IOELV was used for worker risk assessment and the DNELlong-term derived by UK (2016b) was used for consumers for the inhalation route. For the dermal route the DNELlong-term provided in the SDS was used as default. For hand-to-mouth transfer the DNELlong-term oral from UK (2016) was used as more conservative estimate compared to the DNEL quoated in the SDS.

**Maximum residue limits or equivalent**

Based on the use of treated wood (no direct contact with food or feed) and the exposure estimates for livestock no MRL setting is necessary. However, for copper carbonate the European Medicine Agency (EMA) published in 2016 an European public MRL assessment report (EPMAR) for all food producing species. The conclusion of this evaluation is that the establishment of MRL values for copper carbonate is not needed for the protection of the con-sumer. The substance can thus be included in the list of substances approved for use in all food-producing species with a ‘No MRL required’ classification (EMA, 2016).

**Specific reference value for groundwater**

Reference is made to the respective assessment reports of the active substances Cu-HDO (Austria, 2013) and basic copper carbonate (France, 2011).

**Scenario 1: Risk for industrial users from vacuum pressure treatment / oscillating pressure process for SoCs**

The Guidance on the Biocidal Products Regulation, Volume III Human Health - Part B Risk Assessment (ECHA, 2017b), suggests that “as there is little experience of applying mixture RA methodology at present, it has been proposed that for the time being a combined risk assessment should only be applied to multiple (2 or more) active substances and not to SoCs. When sufficient experience has been gained, the combined risk assessment methodology could be extended to include SoCs.” However the guidance on SoCs futher specifies that “regardless of band, for SoCs classified for the same endpoint, the potential exists that they act additively with other SoCs and/or with the active substance(s) and that a combined risk assessment would be required.” Thus, a combined risk assessment on all SoCs and active substances was performed.

Scenario 1 takes into account exposure of professionals within vacuum-pressure preservative plants. Exposure to the product as such must be avoided due to the corrosive properties of the product. The treatment process is automated, but dermal contamination with the in use solution may occur through direct contact with the surface of treated timber and through contact with ancillary equipment and contaminated process plant. Since the model provides only exposure values underneath gloves, no tier 1 assessment is presented. For tier 2 assessment the use of safety shoes, gloves, boots and coated coveralls were considered as RMM. Tier 3 assessment includes measured exposure data combined with modelled exposure data.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier** | **AEL long term or DNEL long term** | | | | **Estimated total uptake [mg/kg bw/d]** | | | | **Estimated uptake / AEL (HQ)** | | | | **HI (Σ HQ)** | **Acceptable** |
| **[mg/kg bw/d]** | | | |
| Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA |  | **(yes / no)** |
| 1 industrial vaccuum pressure application | 2 / gloves, coated overall | 0.033 | 0.071 | 2 | 1 | 0.036 | 0.034 | 0.124 | 0.799 | 1.08 | 0.48 | 0.06 | 0.80 | 2.42 | No |
| 3 /gloves. coated overall: measured data combined with modelled data | 0.033 | 0.071 | 2 | 1 | 0.018 | 0.017 | 0.062 | 0.399 | 0.54 | 0.24 | 0.03 | 0.40 | 1.21 | No |

**Combined scenario 1 and 5: The risk chracterisation combines exposure arising from tier 3 industrial application and indoor volatilised residues for workers.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenarios** | **AEL long term or DNEL long term** | | | | **Estimated total uptake [mg/kg bw/d]** | | | | **Estimated uptake / AEL (HQ)** | | | | | **HI (Σ HQ)** | | **Acceptable** |
| **[mg/kg bw/d]** | | | |
| Cu-HDO | Cu-Carbonate | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA |  | | **(yes / no)** | |
| 1+5/Industrial | 0.033 | 0.071 | 2 | 1 | 0.018 | 0.017 | 0.072 | 0.404 | 0.54 | 0.24 | 0.04 | 0.40 | 1.22 | | No | |

Based on the hazard index of >1 further refinement of the mixture risk assessment approach is necessary. According to ECHA (2017b), the next tier includes the following refinement:

- Tier 3A: Combined exposure assessment by grouping the substances with common target organ/mode of action (with the non refined AEL of each substance).

Therefor as a next step, a compilation of target organ(s)/mode of action(s) for each substance is listed in the table below including the effects relevant for the point of departure (PoD). Substances are than grouped related to their common target organ(s)/mode of action(s). For each group of target organ, HQ are summarized for each substance and subsequent HI are calculated.

Taking a conservative approach for the refinement Cu-HDO, basic copper carbonate and 2-EHA ware considered for liver toxicity, despite 2-EHA showed less or adaptive liver responses (from the provided data it was not clear if these effects were considered adverse). The second group relates to reproductive toxicity including 2-EHA, 2-MEA and Cu-HDO.

The guidance defines a next step in the refinement in each group for which the risk is not acceptable:

- Tier 3B: Determination of specific AELs for each identified target organ/mode of action and each substance on the basis of the data used for the European assessment of each active substance or data available for SoC (ECHA, 2017b).

**Comparison of target organs and point of departures for active substances and SoCs used for risk characterisation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Substance** | **Point of Departure (PoD)/study type/species** | **PoD (organs and organ systems for systemic toxicity, MoA** | **Additional target organs observed at higher doses** | **Remarks** |
| CU-HDO | Maternal NOAEL 10 mg/kg  Developmental NOAEL 10 mg/kg  PNDT study, rabbit | NOAEL was based on the primary effect of reduced food consumption (temporarily to 20% of control in the high dose and to 60% of the control in medium dose) with subsequent maternal and fetal effects (reduced body weight gain, post-implantation loss, skeletal variations and retardations) | Liver (histopathological changes, necrosis), kidney (histopathological changes), GI (Austria, 2013) | RAC concluded on STOT RE 2 (liver)[[3]](#footnote-4)  Cu-HDO is not classified for developmental toxicity |
| Basic copper carbonate | NOAELsystemic 4.1 mg Cu/kg bw/d  90-day Repeated dose toxicity, rat | NOAEL was based on forestomach and kidney damages. | Oral, rat: target organs of copper were the liver (inflammation), kidneys (histopathological changes) and forestomach (hyperplasia and hyperkeratosis), with some evidence of haematological changes (RAC 2014). | RAC concluded on no STOT RE classification[[4]](#footnote-5) |
| 2-EHA | NOAEL 100 mg/kg bw/d, PNDT study, rats | NOAEL based on reduced skeletal ossification, reduction of foetal weight, skeletal variations, (clubfoot); MoA not fully elucidated, but modulation of Zn metabolism shown (Spain, 2017). | Fatty acid metabolism (cholesterol) and liver hypertrophy | -- |
| 2-MEA | NOAEL 300 mg/kg bw/d  2-generation study, rat  NOAEL 500 mg/kg/d for developmental,  PNDT, rats | Reduced epididymal and prostate weight (UK, 2016)  For endpoints on fertility and development an AF of 100 were applied (UK, 2016) | Reproduction: reduced number of implantation sites, some evidence of decreased sperm head count in cauda epididymidis. | UK (2016):  General population DNEL dermal fertility: 300/100 = 3 mg/kg/d  General population DNEL dermal – developmental toxicity = 500 / 100 = 5 mg/kg/d |

**Scenario 1: Mixture risk characterisation liver toxicity: Cu-HDO, basic copper carbonate, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Tier** | **AEL long term or DNEL long term [mg/kg bw/d]** | | | **Estimated total uptake [mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable** (yes / no) |
| **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** |
| 2 / gloves, coated overall | 0.033 | 0.071 | 2 | 0.023 | 0.034 | 0.1239 | 0.70 | 0.48 | 0.06 | 1.24 | No |
| 3 /gloves. coated overall: measured data combined with modelled data | 0.033 | 0.071 | 2 | 0.0178 | 0.017 | 0.0617 | 0.54 | 0.24 | 0.03 | 0.81 | Yes |

**Scenario 1: Mixture risk characterisation reproduction: Cu-HDO, 2-MEA, 2-EHA**

| **Tier** | **AEL long term or DNEL long term [mg/kg bw/d]** | | | **Estimated total uptake [mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable** (yes / no) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cu-HDO** | **2-MEA** | **2-EHA** | **Cu-HDO** | **2-MEA** | **2-EHA** | **Cu-HDO** | **2-MEA** | **2-EHA** |
| 2 / gloves, coated overall | 0.03 | 1.00 | 2.00 | 0.02 | 0.80 | 0.12 | 0.70 | 0.80 | 0.06 | 1.56 | No |
| 3 /gloves, coated overall: measured data combined with modelled data | 0.03 | 1.00 | 2.00 | 0.018 | 0.399 | 0.062 | 0.54 | 0.40 | 0.03 | 0.97 | Yes |

**Scenario 1+5: Mixture risk characterisation liver toxicity: Cu-HDO, basic copper carbonate, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenarios** | **AELlong term or DNEL long term [mg/kg bw/d]** | | | **Estimated total uptake [mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable (yes / no)** |
| **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** |
| 1+5 /Industrial | 0.033 | 0.071 | 2 | 0.018 | 0.017 | 0.072 | 0.54 | 0.24 | 0.05 | 0.82 | Yes |

**Scenario 1+5: Mixture risk characterisation reproduction: Cu-HDO, 2-MEA, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenarios** | **AELlong term or DNELlong term [mg/kg bw/d]** | | | **Estimated total uptake [mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable (yes / no)** |
| **Cu-HDO** | **2-MEA** | **2-EHA** | **Cu-HDO** | **2-MEA** | **2-EHA** | **Cu-HDO** | **2-MEA** | **2-EHA** |
| 1+5 /Industrial | 0.033 | 1 | 2 | 0.018 | 0.404 | 0.072 | 0.54 | 0.40 | 0.03 | 0.98 | Yes |

**Conclusion**

The risk from systemic exposure during the application of the biocidal product (i.e. primary exposure) for industrial users from vacuum pressure treatment is acceptable for mixture risk assessment for active biocidal substances and SoCs. Hazard Quotient (HQ) and hazard index (HI) for tier 3 in the refined mixture risk characterisation are below 1. Also for the combined scenario, 1 and 5 including volatilised indoor residues to the chemical body burden of workers gave acceptable risks for combined exposure to the mixture.

The secondary exposure scenarios considered in the risk assessment are presented in the tables below.

**Scenario 2: Risk for professionals and general public from sanding/sawing of treated wood for active substances**

The realistic worst case is based on the assumption that a wooden post is sanded by an adult worker without protective equipment (special application transmission poles). It is assumed that the wood is completely dry at this stage. For tier 2 assessment, a transfer coefficient (dislogable residues) of 2% was taken into consideration. The higher treatment concentrations (special application) for transmission poles will not be sanded or sawn by the general public.

In addition also exposure (through inhalation and dermal contact) from treated wood (use class 4) for the general public was calculated. Infrequent occurrence of this work representing more an acute exposure situation, however as conservative estimate the chronic AELs and DNELs were used.

**Scenario 2: Risk for professionals**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier** | **AEL long term or DNEL long term** | | | | **Estimated total uptake**  **[mg/kg bw/d]** | | | | **Estimated uptake / AEL (HQ)** | | | | **HI (Σ HQ)** | **Acceptable**  **(yes / no)** |
| **[mg/kg bw/d]** | | | |
| Cu-HDO | Cu-Carbo. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA |
| 2 Sanding/sawing of treated wood | 1 / no PPE | 0.033 | 0.071 | 1 | 1 | 0.5997 | 0.565 | 2.095 | 13.516 | 18.17 | 7.96 | 2.10 | 13.52 | 41.74 | No |
| 2 / no PPE | 0.033 | 0.071 | 1 | 1 | 0.0138 | 0.0196 | 0.045 | 0.2904 | 0.42 | 0,28 | 0.05 | 0.29 | 1.03 | No |

The risk from systemic exposure during contact with treated wood (i.e. secondary exposure) for professionals is acceptable for the individual compounds. Hazard quotients (HQ) are below 1, however based on the high estimated exposure of 2-MEA (vapour pressure 20 Pa!) the hazard index value (HI) indicate an unaccaptle risk for tier 2 estimations. While the default assumption is that no PPE (gloves are worn) it is very likely that professionals wear gloves during work. Based on HI >1 a refinement and grouping of the substances with common target organ/mode of action was performed.

**Scenario 2 - Professionals: Mixture risk characterisation liver toxicity: Cu-HDO, basic copper carbonate, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **AEL long term or DNEL long term**  **[mg/kg bw/d]** | | | **Estimated total uptake**  **[mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable (yes / no)** |
| Cu-HDO | Cu-Carb. | 2-EHA | Cu-HDO | Cu-Carb. | 2-EHA | Cu-HDO | Cu-Carb. | 2-EHA |
| 2/ no PPE | 0.033 | 0.143 | 1 | 0.0138 | 0.0196 | 0 | 0.42 | 0.14 | 0.00 | 0.56 | Yes |

**Scenario 2 - Professionals: Mixture risk characterisation reproduction: Cu-HDO, 2-MEA, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **AEL long term or DNEL long term**  **[mg/kg bw/d]** | | | **Estimated total uptake**  **[mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable (yes / no)** |
| Cu-HDO | 2-MEA | 2-EHA | Cu-HDO | 2-MEA | 2-EHA | Cu-HDO | 2-MEA | 2-EHA |
| 2/ no PPE | 0.033 | 1 | 1 | 0.0138 | 0.2904 | 0.045 | 0.42 | 0.29 | 0.05 | 0.75 | Yes |

**Conclusion**

The risk from systemic exposure during contact with treated wood (i.e. secondary exposure) for professionals is acceptable. Hazard quotient (HQ) and hazard index values are below 1 for active biocidal substances and for substances of concern.

**Scenario 2: Risk for the general public (DIY, Do-It-Yourself)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier** | **AEL long term or DNEL long term** | | | | **Estimated total uptake**  **[mg/kg bw/d]** | | | | **Estimated uptake / AEL (HQ)** | | | | **HI (Σ HQ)** | **Acceptable**  **(yes / no)** |
| **[mg/kg bw/d]** | | | |
| Cu-HDO | Cu-Carbo. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA |
| 2 Sanding/sawing of treated wood | 1 / no PPE | 0.033 | 0.071 | 1 | 0.24 | 0.43 | 0.40 | 1.51 | 9.72 | 13.05 | 5.65 | 1.51 | 40.49 | 60.69 | No |
| 2 / no PPE | 0.033 | 0.071 | 1 | 0.24 | 0.01 | 0.01 | 0.03 | 0,21 | 0.30 | 0.20 | 0.032 | 0.87 | 1.40 | No |

The risk from systemic exposure during contact with treated wood (i.e. secondary exposure) for the general public is acceptable for the individual compounds. Hazard quotients (HQ) are below 1, however the hazard index value (HI) indicate an unaccaptle risk for tier 2 estimations. Based on HI >1 a refinement and grouping of the substances with common target organ/mode of action was performed. The DNEL for 2-MEA for dermal exposure for the general public is 0.24 mg/kg bw/d. For the refinement in tier 3B the DNEL long-term dermal for fertility and development was derived with 3 mg/kg bw/d and 5 mg/kg bw/d, respectively (UK, 2016). In this assessment also the DNEL of the registrants were given with 3.75 mg/kg bw/d starting from the NOAEL of 300 mg/kg/d from the two-generation reproduction study (UK, 2016). Therefore as a health based reference value for 2-MEA in the mixture risk assessment a DNEL of 3 mg/kg bw/d is used.

**Scenario 2 - DIY: Mixture risk characterisation liver toxicity: Cu-HDO, basic copper carbonate, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **AEL long term or DNEL long term [mg/kg bw/d]** | | | **Estimated total uptake [mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable (yes / no)** |
| Cu-HDO | Cu-Carb. | 2-EHA | Cu-HDO | Cu-Carb. | 2-EHA | Cu-HDO | Cu-Carb. | 2-EHA |
| 2/ no PPE | 0.033 | 0.071 | 1 | 0.0099 | 0.0141 | 0.0324 | 0.30 | 0.20 | 0.03 | 0.53 | Yes |

**Scenario 2 - DIY: Mixture risk characterisation reproduction: Cu-HDO, 2-MEA, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **AEL long term or DNEL long term [mg/kg bw/d]** | | | **Estimated total uptake [mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Accaptable (yes / no)** |
| Cu-HDO | 2-MEA | 2-EHA | Cu-HDO | 2-MEA | 2-EHA | Cu-HDO | 2-MEA | 2-EHA |
| 2/ no PPE | 0.033 | 3 | 1 | 0.0099 | 0.2091 | 0.0324 | 0.30 | 0.07 | 0.03 | 0.40 | Yes |

**Conclusion**

The risk from systemic exposure during contact with treated wood (i.e. secondary exposure) for the general public is acceptable. Hazard quotient (HQ) and hazard index values are below 1 for active biocidal substances and for substances of concern.

**Scenario 3: Risk for toddlers mouthing a treated wood chips (secondary exposure)**

For mouthing exposure it was assumed that a toddler picks up and chews a wood off-cut. Within tier 1 assessment the highest treatment rate was taken into consideration (22.5 kg/m3 (3.75% application solution) corresponding to UC4, low likelihood of exposure). Within tier 2 assessment the extraction is considered limited by water solubility of the substance and amount of salvia produced by toddler per day and mouthing exposure of a very conservative 5 hour. Tier 2 assessment is unrealistic considering the low likelihood of unattended toddlers close to working places and raw surface of wood and bad taste.

**Scenario 4: Toddler playing on treated wood structures for active substances**

For exposure via treated playground structures standard skin surface exposure assumptions were considered in tier 1. As a worst case it is assumed that all of the contamination of the infant’s hand is ingested during mouthing behavior for a.s. and substances of concern, 2-EHA and 2-MEA. For tier 2 a transfer coefficient for dislogable residues of 2% was considered, tier 3 relied on measured data for that active substances.

**Scenario 5: Inhalation of volatilised residues indoors**

Chronic inhalation exposure can occur from treated wood installed indoors.

For the active substances Cu-HDO and basic copper carbonate long-term exposure to volatilised residues is neglected for adults, infants and children based on HEEG Opinion 13 (cf. Chapter 2.2.6.2).

As a worst case, secondary exposure of a toddler by inhalation of volatilised residues indoors - released in the living area of a domestic house for 24 hours- were calculated for 2-EHA and 2-MEA. Tier 3 relied on measured exposure data.

**Combined scenario:** For risks of combined exposure of scenario 3, 4 and 5 the short term AEL for Cu-HDO and basic copper carbonate was used because the combination of the exposure scenarios is likely to occur on an intermittent/acute exposure basis.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier** | **AEL/DNEL** short term (sceanrio 3,5 and combined scenario 3+4+5) or **AEL/** | | | | **Estimated total uptake**  **[mg/kg bw/d]** | | | | **Estimated uptake / AEL (HQ)** | | | | **HI (Σ HQ)** | **Acceptable**  (yes / no) |
| **DNEL** long term (sceanrio 4)  **[mg/kg bw/d]** | | | |
| Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA | Cu-HDO | Cu-Carb. | 2-EHA | 2-MEA |  |  |
| 3 Mouthing wood chips | 1 / no PPE | 0.1 | 0.143 | 1.0 | 0.24 | 0.504 | 2.347 | 0.176 | n.r. | 5.040 | 16.414 | 0.176 | n.r. | 21.63 | No |
| 2 / no PPE | 0.1 | 0.143 | 1.0 | 0.24 | 0.025 | 0.002 | 0.159 | n.r. | 0.254 | 0.013 | 0.159 | n.r. | 0.43 | yes |
| 4 Playing on treated wood structures | 1 / no PPE | 0.033 | 0.071 | 1.0 | 1.5 | 2.903 | 4.867 | 4.573 | 32.763 | 87.97 | 68.55 | 4.57 | 21.84 | 182.94 | No |
| 2 / no PPE | 0.033 | 0.071 | 1.0 | 1.5 | 0.058 | 0.097 | 0.091 | 0.655 | 1.76 | 1.37 | 0.09 | 0.44 | 3.66 | No |
| 3 / no PPE | 0.033 | 0.071 | 1.0 | 1.5 | 0.0015 | 0.011 | 0.091 | 0.655 | 0.05 | 0.16 | 0.09 | 0.44 | 0.73 | yes |
| 5 Inhalation of volatilised residues | 1 / no PPE | n.r. | n.r. | 1.0 | 0.17 | n.r. | n.r. | 189.4 | 1002.0 | n.r. | n.r. | 189.4 | 6036.3 | 6225.73 | No |
| 3 / no PPE | n.r. | n.r. | 1.0 | 0.17 | n.r. | n.r. | 0.03 | 0.014 | n.r. | n.r. | 0.030 | 0.087 | 0.12 | yes |
| 3 + 4 + 5 | 2+3 / no PPE | 0.1 | 0.143 | 1 | 1.5 | 0.027 | 0.013 | 0.2798 | 0.670 | 0.27 | 0.09 | 0.28 | 0.45 | 1.09 | No |

n.r. …. not relevant

**Conclusion**

For the secondary exposure scenarios toddlers picking up and mouthing a piece of treated wood and children (toddlers) playing on treated wood structures risks are acceptable at tier 3 level, all HQ and HI values are ≤1. For the secondary exposure scenario inhalation to volatilised residues indoors for toddlers, covering also adults and children an acceptable risk at tier 3 for 2-EHA and 2-MEA was calculated.

The combined sceanrio 3, 4 and 5 calculation resulted in a slight exceedance of the hazard index suggesting aprobable risk by combined exposure and effects. However it is quite unlikely the the combined scenario represents a realistic worst case based on the fact that each scenario is based on worst case (e.g. 5 hour mouthing on a wood chip). A refinement of the mixture risk assessment was performed for the different groups ob substances.

**Scenario 3+4+5: Mixture risk characterisation liver toxicity: Cu-HDO, basic copper carbonate, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **AEL short term or DNEL long term [mg/kg bw/d]** | | | **Estimated total uptake [mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable (yes / no)** |
| Cu-HDO | Cu-Carb. | 2-EHA | Cu-HDO | Cu-Carb. | 2-EHA | Cu-HDO | Cu-Carb. | 2-EHA |
| 3+4+5 | 0.1 | 0.143 | 1 | 0.027 | 0.013 | 0.280 | 0.27 | 0.09 | 0.28 | 0.64 | Yes |

**Scenario 3+4+5: Mixture risk characterisation reproduction: Cu-HDO, 2-MEA, 2-EHA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **AEL short term or DNEL long term [mg/kg bw/d]** | | | **Estimated total uptake [mg/kg bw/d]** | | | **Estimated uptake / AEL (HQ)** | | | **HI (Σ HQ)** | **Acceptable (yes / no)** |
| Cu-HDO | 2-MEA | 2-EHA | Cu-HDO | 2-MEA | 2-EHA | Cu-HDO | 2-MEA | 2-EHA |
| 3+4+5 | 0.1 | 1.5 | 1 | 0.027 | 0.670 | 0.280 | 0.269 | 0.447 | 0.28 | 0.995 | Yes |

**Conclusion**

The mixture risk for the combined scenario 3+4+5 from systemic exposure is acceptable. Hazard index values are below 1 for active biocidal substances and for substances of concern.

**Risk for consumers via residues in food**

The products of the Wolmanit CX-8WB\_family must not be used for treatment of wood that may come in contact with food or feed. A risk for consumers via residues in food is thus excluded.

External exposure estimates in livestock are calculated in chapter 2.2.6.2.

For the active substances Cu-HDO ,basic copper carbonate as well as for 2-EHA and 2-MEA the values are above the trigger of 0.004 mg/as/kg bw/d (cf. chapter 2.2.6.2, scenario 6).

Therefore, worst case consumer exposures were calculated. The worst case consumer exposure (WCCE) was performed assuming residues in milk (lactating goats) and meat (calf for Cu-HDO, basic copper carbonate and 2-EHA) and slaughter goat for 2-MEA. No correction for oral absorption was considered.

The ECHA (2017b) guidance states: “.. an estimation of the worst case consumer exposure (WCCE) is undertaken and compared to the acceptable daily intake (ADI). If the WCCE is lower than 30% of the ADI, and in case where there is no particular concern in relation to the toxicity of the active substance, then an MRL evaluation may not be required.”

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **ADI or AEL/DNEL oral, long term**  **[mg/kg bw/d]** | | | | **WCCE [mg/kg bw/d]** | | | | **% ADI/AEL/DNEL** | | | |
| Cu-HDO | Cu | 2-EHA | 2-MEA | Cu-HDO | Cu in Cu-Carb. | 2-EHA | 2-MEA | Cu-HDO | Cu in Cu-Carb. | 2-EHA | 2-MEA |
| 6 WCCE milk+meat | 0.033 | 0.15 | 1 | 1.5 | 0.0027 | 0.0028[[5]](#footnote-6) | 0.0048 | 0.0077 | 8.2 | 1.9 | 0.5 | 0.5 |

As a worst case the AELlong term was used for Cu-HDO. If the ADI for copper is applied residues for Cu-HDO would reach 1.8% as a rough estimate (if corrected for molecular weight: 0.0027\*63.5/349.9 WCCE would even be lower). Concerning copper carbonate residues are also very low. In addition the European Medicine Agency (EMA) published in 2016 an European public MRL assessment report (EPMAR) for all food producing species. The conclusion of this evaluation is that the establishment of MRL values for copper carbonate is not needed for the protection of the consumer (EMA, 2016).

Concerning the residues of 2-EHA and 2-MEA less than 1% of the DNEL derived from long term studies were reached indicating a high margin of safety. The exposure calculation relied on very conservative default values and clearly represent an overestimation.

In conclusion the risk for consumers via residues of the active substances Cu-HDO, basic copper carbonate, 2-EHA and 2-MEA in food is considered to be of low concern.

#### Risk assessment for animal health

The treated wood structural timber for is intended for indoor and outdoor use, in particular for timber used in horticulture and landscape gardening, posts, fences, palisades and wood paving. Therefore, potential exposure to livestock can be envisaged from the use on e.g. fences and chewing on wood used for paddocks.

The risk assessment for animal health includes the active substances and a quantitative exposure and risk characterisation of 2-EHA and 2-MEA.

Polyethyleneimine and n-heptanoic acid were identified as SoCs based on their local effects in the Wolmanit CX-8WB family (banding scheme B and A). However, concentrations of these two substances in the in-use dilutions are very low and below the threshold for skin sensitisation or skin irritation/corrosion. Thus, a qualitative evaluation or a local risk assessment for animals is not necessary.

**Scenario 6: Livestock exposure of active substances**

The harmonised AEL values for the active substances Cu-HDO and basic copper carbonate (derived from the AEL for Cu+ corrected for molecular weigth) and the dermal DNEL values for 2-EHA and 2-MEA were adjusted by a factor of 10, as there is no intra-species human variability to be taken into account. An intraspecies AF considering the heterogeneity of sensitivity in the human population for animal risk assessment is not necessary because the intraspecies variability of humans is generally assumed to be larger as compared to that of experimental animals (ECETOC, 2010).

However based on the uncertainties concerning the assessment factor also margin of exposures were calculated. The comparison of the exposure and the toxicity level is calculated as: MoE = NOAELsystemic / exposure.

**AEL/DNEL approach**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier** | **AEL long term [mg/kg bw/d]** | | **Estimated total uptake [mg/kg bw/d]** | | **HQ** | | **Acceptable** |
| Cu-HDO | Cu-carbonate | Cu-HDO | Cu-carbonate | Cu-HDO | Cu-carbonate | (yes/no) |
| **horse** | 1 | 0.33 | 0.71 | 0.015 | 0.053 | 0.04 | 0.07 | Yes |
| **lactating goat** | 1 | 0.33 | 0.71 | 0.033 | 0.095 | 0.10 | 0.13 | Yes |
| **slaughter goat** | 1 | 0.33 | 0.71 | 0.110 | 0.231 | 0.33 | 0.32 | Yes |
| **fattening pig** | 1 | 0.33 | 0.71 | 0.014 | 0.055 | 0.04 | 0.08 | Yes |
| **breeding pig** | 1 | 0.33 | 0.71 | 0.010 | 0.040 | 0.03 | 0.06 | Yes |
| **beef cattle** | 1 | 0.33 | 0.71 | 0.009 | 0.035 | 0.03 | 0.05 | Yes |
| **dairy cattle** | 1 | 0.33 | 0.71 | 0.008 | 0.032 | 0.02 | 0.04 | Yes |
| **calf** | 1 | 0.33 | 0.71 | 0.223 | 0.298 | 0.68 | 0.42 | Yes |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier** | **DNELlong term [mg/kg bw/d]** | | **Estimated total uptake [mg/kg bw/d]** | | **HQ** | | **Acceptable** |
| 2-EHA | 2-MEA | 2-EHA | 2-MEA | 2-EHA | 2-MEA | (yes/no) |
| **horse** | 3 | 10 | 2.4 | 0.027 | 0.122 | 0.00 | 0.05 | Yes |
| **lactating goat** | 3 | 10 | 2.4 | 0.060 | 0.193 | 0.01 | 0.08 | Yes |
| **slaughter goat** | 3 | 10 | 2.4 | 0.196 | 0.346 | 0.02 | 0.14 | Yes |
| **fattening pig** | 3 | 10 | 2.4 | 0.026 | 0.136 | 0.00 | 0.06 | Yes |
| **breeding pig** | 3 | 10 | 2.4 | 0.019 | 0.098 | 0.00 | 0.04 | Yes |
| **beef cattle** | 3 | 10 | 2.4 | 0.017 | 0.087 | 0.00 | 0.04 | Yes |
| **dairy cattle** | 3 | 10 | 2.4 | 0.015 | 0.078 | 0.00 | 0.03 | Yes |
| **calf** | 3 | 10 | 2.4 | 0.392 | 0.131 | 0.04 | 0.05 | Yes |

**MOE approach**

|  |  | **NOAELlong term [mg/kg bw/d]** | | **Estimated total uptake [mg/kg bw/d]** | | **MOE** | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Tier** | Cu-HDO | Cu-carbonate | Cu-HDO | Cu-carbonate | Cu-HDO | Cu-carbonate |
| **horse** | 1 | 10 | 28.27 | 0.015 | 0.053 | 680 | 538 |
| **lactating goat** | 1 | 10 | 28.27 | 0.033 | 0.095 | 299 | 297 |
| **slaughter goat** | 1 | 10 | 28.27 | 0.110 | 0.231 | 91 | 123 |
| **fattening pig** | 1 | 10 | 28.27 | 0.014 | 0.055 | 725 | 513 |
| **breeding pig** | 1 | 10 | 28.27 | 0.010 | 0.040 | 990 | 714 |
| **beef cattle** | 1 | 10 | 28.27 | 0.009 | 0.035 | 1111 | 801 |
| **dairy cattle** | 1 | 10 | 28.27 | 0.008 | 0.032 | 1220 | 892 |
| **calf** | 1 | 10 | 28.27 | 0.223 | 0.298 | 45 | 95 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **NOAELlong term [mg/kg bw/d]** | | **Estimated total uptake [mg/kg bw/d]** | | **MOE** | |
| **Scenario** | **Tier** | 2-EHA | 2-MEA | 2-EHA | 2-MEA | 2-EHA | 2-MEA |
| **horse** | 3 | 100 | 300 | 0.027 | 0.122 | 3717 | 2461 |
| **lactating goat** | 3 | 100 | 300 | 0.060 | 0.193 | 1658 | 1552 |
| **slaughter goat** | 3 | 100 | 300 | 0.196 | 0.346 | 511 | 867 |
| **fattening pig** | 3 | 100 | 300 | 0.026 | 0.136 | 3861 | 2209 |
| **breeding pig** | 3 | 100 | 300 | 0.019 | 0.098 | 5236 | 3067 |
| **beef cattle** | 3 | 100 | 300 | 0.017 | 0.087 | 5882 | 3440 |
| **dairy cattle** | 3 | 100 | 300 | 0.015 | 0.078 | 6494 | 3831 |
| **calf** | 3 | 100 | 300 | 0.392 | 0.131 | 255 | 2288 |

**Conclusion**

Risk characterisation that followed the AEL/DNEL approach (adjusted for intraspecies variability) resulted in acceptable risks for animal health. The HQ values of the biocidal active substances Cu-HDO, basic copper carbonate and the SoCs 2-EHA and 2-MEA are below 1.

Concerning the margin of exposure approach calculations for the SoCs 2-EHA and 2-MEA resulted in high MOE >250 and are considered to be protective. For the active substances the majority of scenarios also indicates a high MOE above or slightly below 100 with the exception of the MOE for Cu-HDO in scenario 6 – calf of 45. However based on the very conservative assumptions and overestimation of the exposure calculations for this scenario (cf. section 2.2.6.2.6) risks for animal health are acceptable.

### **Risk assessment for the environment**

#### Effects assessment on the environment

The active substances Cu-HDO (Austria, 2013) and basic copper carbonate (France, 2011) were evaluated according to the Regulation (EU) No 528/2012 for its use as wood preservatives (PT 8). Final Competent Authority reports as agreed by the EU Member States and the European Commission are available, to which the applicant has access via Letter of Access. Besides the active substances the biocidal product contains 2-Aminoethanol and Polyethyleneimine as substances of concern with respect to environmental hazards. 2-Aminoethanol was included into the quantitative assessment. A qualitative assessment to Polyethyleneimine is provided in the confidential annex of this document. The PNECs for 2-Aminoethanol(MEA) are based on the information that is publicly available on the REACH registered substance database. The following PNECs were used for the environmental risk assessment:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Used PNECs in the environmental risk assessment** | | | | |
| **Compartment** | **Cu-HDO** | **Basic copper carbonate** | **2-Aminoethanol** | **Unit** |
| STP | 0.09 | 0.23 | 100 | mg/L |
| Freshwater | 5.6E-03 | 7.8E-03 | 7.0E-02 | mg/L |
| Sediment | 5.17a | 18.9 | 7.7E-02a | mg/kgwwt |
| Soil | 0.255 | 40.35 | 1.14 | mg/kgwwt |

acalculated via EPM method and not used in the risk assessment

Secondary poisoning

The risk of accumulation of Cu-HDO in the aquatic and terrestrial food chain can be regarded as negligible since the calculated BCF values in fish with 32.36 and earthworms with 5.6 are very low (Austria, 2013). Furthermore the log KOW of Cu-HDO which is <3 does not indicate any bioaccumulation potential of the substance (ECHA, 2017c).

Based on the information presented in the Assessment Report for basic copper carbonate the potential for bioaccumulation and biomagnification is considered as not applicable (France 2011).

Based on the information available for 2-Aminoethanol on the REACH registered substance database the potential for bioaccumulation and biomagnification is considered as not applicable.

***Information relating to the ecotoxicity of the biocidal product which is sufficient to enable a decision to be made concerning the classification of the product is required***

The eco-toxicological effects of the Wolmanit CX-8WB\_family consisting of Wolmanit CX-8WB / Wolmanit CX-8M and Wolmanit CX-8F, are driven by the active substances Cu-HDO and basic copper carbonate for which valid data is available (France, 2011 and Austria, 2013). Co-formulants, which are contained in the biodical product, are not likely to alter the environmental fate or ecotoxicological profile of the active substances.

For the active substance Cu-HDO no harmonised classification was found in the C&L Inventory. In a RAC Opinion (ECHA, 2018b) a classification for Cu-HDO was agreed with Aquatic Acute 1, M=1 and Aquatic Chronic 1, M=1, based on the C&L proposed by AT CA.

The active substance basic copper carbonate has a harmonised classification with Aquatic Acute 1 (M=10) and Aquatic Chronic 1 without a separate specification of an M-factor (9th ATP to Reg. (EC) No 1272/2008). According to a RAC opinion (ECHA, 2014a) the active substance basic copper carbonate has to be classified as Aquatic Acute 1 (M=10) and Aquatic Chronic 1 (M= 10).

New acute and/or chronic toxicity studies for the Wolmanit CX-8WB\_family were not performed. The applicant submitted aquatic ecotoxicity studies with the representative product (Wolmanit CX-LP-15172), which were already submitted in the dossier for active substance approval of Cu-HDO (Austria, 2013). These studies were not used for the purpose of classification of the products Wolmanit CX-8WB / Wolmanit CX-8M and Wolmanit CX-8F, since the bridging principles laid down in Reg. (EC) No 1272/2008 do not apply. Based on these principles the concentrations of Cu-HDO and basic copper carbonate in Wolmanit CX LP-15172 compared to Wolmanit CX-8WB\_family are out of the permitted variation of the initial concentration (ECHA 2017c).

Based on the content of the active substances Cu-HDO (2.8% w/w) and basic copper-carbonate (13.04% w/w) the biocidal products Wolmanit CX-8WB- / Wolmanit CX-8M and Wolmanit CX-8F have to be classified with Aquatic Acute 1, H400 and Aquatic Chronic 1, H410. Hence, the products have to be labelled with the hazard statement H410 Harmful to aquatic life with long lasting effects (H400 may be omitted) and the precautionary statements P273 Avoid release to the environment and P391 Collect spillage.

***Further Ecotoxicological studies***

At product authorisation stage, the applicant submitted ecotoxicological studies with a product (Wolmanit CX-LP-15172), which were already submitted in context of the evaluation of the active substance Cu-HDO (Austria, 2013). The studies could not be used for C&L purposes, neither for the risk assessment due to the reasons explained above (see chapter 2.2.7.1 Effect assessment on the environment). Regarding details of the studies see the table below.

| **Summary table for aquatic/terrestrial toxicity with Wolmanit CX-LP 15172** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Guideline / Test method / GLP status / reliability** | **Species** | **End point** | **Exposure** | | **Results [mg/L]** | | | **Reference** |
| Design | Duration | LC / EC0 | LC / EC50 | LC / EC100 |
| Acute toxicity test/OECD 203/ GLP/ Reliability: 2 | Zebrafish (*Brachydanio rerio*) | Mortality | static | 96h | 0.6 | 0.9 | 1.8 | B 9.2.1.1 |
| Acute immobilisation test/ OECD 202/ GLP/ Reliability: 2 | *Daphnia magna* | Immobilisation | static | 48h | 0.056 | 0.31 | 0.56 | B 9.2.1.2 |
| Growth inhibition test/ OECD 201/ GLP/ Reliability: 2 | *Selenastrum capricornutum* | Growth and biomass inhibition | static | 72h | 0.087 | 0.166 | 0.224 | B 9.2.1.3 |
| Activated sludge respiration inhibition test/ OECD 209/ GLP/ Reliability: 1 | Activated sludge | Oxygen measurement / Respiration inhibition | - | 180 min | 21 | 45 | 96 | B 9.2.1.5 |
| EPA OPPTS 850.4250 & 850.4225 / GLP/ Reliability: 1 | *Oryza sativa L.* | Emergence, growth, morphological changes, fresh and dry weight | - | 14 days | >3 kg/ha | - | - | B 9.2.2.3 |

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Aquatic/terrestrial toxicity** | |
| Conclusion | The studies were not used for classification purposes neither for the risk characterisation nor for the mixture toxicity assessment. |

***Effects on any other specific, non-target organisms (flora and fauna) believed to be at risk (ADS)***

Experimental testing was performed by the applicant to assess the environmental impact of treated wood in contact with soil and water.

In two field studies, the effect of treated timber were monitored in two relevant local exposure scenarios. The fence post and the jetty in lake scenario were used for the soil (Maier, 2013a) and water/sediment (Maier, 2013b) compartment.

Soil field test:

The soil exposure of Wolmanit CX-8 was measured in a field trial with treated palisades. Wolmanit CX-8 is similar to the Wolmanit CX-8WB Family and contains the additional active ingredient boric acid. Therefore, a study using Wolmanit CX-8 can be used for the Wolmanit CX-8WB Family. The aim of the study is the determination of the total content of the active ingredients in the receiving soil compartment at different dates (please refer chapter 2.2.8.2 Exposure Assessment; Monitoring data). Additionally the surrounding plant growth was monitored during the 27 months exposure period and after 35 months of exposure. No adverse effects on growth of the plants surrounding the treated posts were observed.

Water/Sediment Field test

The field monitoring study was performed to assess the environmental impact of

Wolmanit CX-8 freshly treated timber in contact with fresh water. Wolmanit CX-8 is similar to the Wolmanit CX-8WB Family and contains the additional active ingredient boric acid. Therefore, a study using Wolmanit CX-8 can be used for the Wolmanit CX-8WB Family. A jetty scenario, which is proposed by the OECD emission scenario document for fresh water, was built up in a quarry pond and the aquatic environment was monitored under natural weather conditions over a period of approx. 2 years (please refer chapter 2.2.8.2 Exposure Assessment; Monitoring data). After one year, the growth of water plants at stones and poles was monitored. Green algae were observed at all six poles in contact with water at the water/air contact zone. Considering the vegetation around the jetty, an impact on the aquatic plants of the quarry pond was not observed in the aqueous environment of the jetty.

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Effect on specific, non target organisms** | |
| Conclusion | The results of the field monitoring studies were in a similar range as the results from the scenarios calculated. However, the application rate used in the field tests was lower than the application rate used for the predicted environmental concentrations. Therefore, the study results were not used for the further assessment. |

***Supervised trials to assess risks to non-target organisms under field conditions***

There was no new data submitted, neither for the active substances nor for the biocidal products.

***Studies on acceptance by ingestion of the biocidal product by any non-target organisms thought to be at risk***

There was no new data submitted, neither for the active substances nor for the biocidal products.

***Secondary ecological effect e.g. when a large proportion of a specific habitat type is treated (ADS)***

There was no new data submitted, neither for the active substances nor for the biocidal products.

***Foreseeable routes of entry into the environment on the basis of the use envisaged***

Please refer to section “Fate and distribution in exposed environmental compartments”.

***Further studies on fate and behaviour in the environment (ADS)***

There was no new data submitted, neither for the active substances nor for the biocidal products.

***Leaching behaviour (ADS)***

Two different studies have been carried out to support the application of the Wolmanit CX-8WB family by vacuum pressure treatment to wood that will be available for use up to use class 4. For UC 3 a semi-field study (XXXXXXXXX 2015) was carried out with reference to NTBuild 509 methodology. For UC 4 a laboratory study (XXXXXXXXX 2014) was carried out following the study protocol according to OECD Test No. 313 (OECD 2007).

These studies according to standard protocols were performed with formulations different from the formulations of the Wolmanit CX-8WB family. The OECD 313 study was conducted using Wolmanit CX-8, the NTBuild study using Wolmanit CX-10.

The full composition of the product family and the compositions of tested formulations are provided in the confidential annex.

The products of the Wolmanit CX-8WB family contain the same amount of active ingredients in comparison to Wolmanit CX-8. In the product Wolmanit CX-10, the concentration of each active ingredient is a factor 1.25 higher than in the products of the Wolmanit CX-8 WB family. With respect to the lower active substances content of the Wolmanit CX-8WB family formulations in comparison to the Wolmanit CX-10 and Wolmanit CX-8 formulations the results of the leaching tests are expected to represent worst case results for Wolmanit CX-8WB (alternative marketing name Wolmanit CX-8M) and Wolmanit CX-8F.

During the 2nd EU leaching workshop for wood preservatives, held in Varese, Italy on 12th June 2013, it was agreed that leaching studies according to standard protocols, available for one formulation can be transferred to a similar formulation, if based on test results from EN 84 studies for example, it can be shown that the leaching behaviours of both formulations are similar.

The applicant has undertaken a study (XXXXXXXXX 2015c) to confirm that the leaching behaviour of all Wolmanit CX products are similar in order to be able to transfer the OECD 313 study and NTBuild study carried out with Wolmanit CX-8 and Wolmanit CX-10 to all other product family members. In this study the leaching behaviour of the different products of the Wolmanit CX-10 family, Wolmanit CX-8WB family and Wolmanit CX-8FP are compared according to EN 84. Further details on this study can be found the confidential annex of this document.

Use class 3: Wood exposed to weather, but not directly in contact with water or soil

According to the 2nd leaching workshop for PT 8, the NTBuild 509 semi-field study is the most preferred leaching study protocol. This study protocol allows the determination of realistic worst case emission values for time 1 (30 days) and time 2 (365 days), whereas only the long term emission time 3 must be extrapolated to 20 years (40 years for special applications) for vacuum pressure application.

A study was undertaken with pine sapwood blocks treated with 1.79% Wolmanit CX-10 solution (diluent: water) to an average retention rate of 12.82 kg/m3 of product, which isn´t equal to the maximum proposed product retention rate for UC 3. Where the applicant supplies leaching data from a lower leaching application rate, the approach agreed at the first and second leaching workshop is: “If the application rate is less than 2 times the maximum application rate, linear extrapolation can be used.”

Therefore, the provided leaching test can be used for the whole concentration range in the different use classes.

*Leaching rates used for risk assessment*

Mean cumulative leaching data for both active substances and the metabolite copper are presented within the below table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Average cumulative loss (mg/m²) for Copper and Cu-HDO** | | | | | |
| **Test duradion**  **[days]** | **Cumulated**  **precipitation**  **[mm]** | **Cumulated loss of a.s.** | | | |
| **Copper** | | **Cu-HDO** | |
| **[mg/m²]** | **[%]** | **[mg/m²]** | **[%]** |
| 38 | 59 | 29.94 | 0.12 | 3.10 | 0.04 |
| 70 | 124 | 139.65 | 0.67 | 18.16 | 0.25 |
| 177 | 239 | 186.64 | 0.89 | 25.92 | 0.35 |
| 310 | 479 | 196.64 | 0.94 | 26.06 | 0.36 |
| 365 | 543 | 197.23 | 0.94 | 26.06 | 0.36 |

After the first 30 days 59 mm of rainfall were observed which correspond to the assumption of the average rainfall quite well. During the last both rainfall events an increase of < 0,5 % is observed only. An plateau emission is reached for the active ingredients after this timepoint. Therefore, no significant effect is expected by average rainfall correction. Hence, the values of the daily emission were used for extrapolation.

The emission rate is calculated based on a polynomial regression of second order, which has been proposed in the ESD for wood preservatives (OECD 2013a) to the following equation:

Log10Flux(t) = a + b x log10(t) + c x log10(t)2

Once the parameter a, b and c are determined, the experimental Flux(t)=f(t) curve can be calculated.

The calculation of Q\*leach,time can be done by summation of daily FLUX(t) for the time period considered for assessment. Fitting with a polynomial regression of second order will not take into account the saturation term, that occurs, when time approaches 0. However, it is possible to calculate the total quantity leached starting from time zero of the leaching experiment by adding to the Q\*leach,time, calculated according to the below equation, the quantity experimentally determined during the first day of the experiment Qleach,0−1. In this case the equation will read:

The polynomial regression of second order determines the following parameters of the fit function for Copper and Cu-HDO which are summarized in the below table:

|  |  |  |
| --- | --- | --- |
| **Summary of polynominal fit parameter** | | |
| **Parameter** | **Copper** | **Cu-HDO** |
| A | -8.3807 | -14.768 |
| B | 10.543 | 17.305 |
| C | -3.1619 | -5.17 |
| Corr. coefficient r² | 0.9786 | 0.9992 |

The parameters are well confirmed by the above mentioned correlation coefficients.

Based on these fit parameters the leached cumulative amount Q\* is extrapolated for time 3, which corresponds to 20 years (40 years for special applications). The measured leached amount Q\* of Copper is 20.83 mg/m² after 30 days and 215.2 mg/m² after 365 days. The extrapolated leached amount Q\* is 215.7 mg/m² after 7300 and 14600 days. The measured leached amount Q\* of Cu-HDO is 2.45 mg/m² after 30 days and 26.1 mg/m² after 365 days. The extrapolated leached amount Q\* of Cu-HDO is 32.2 mg/m² after 7300 and 14600 days.

The emission is corrected to the requested worst case retention of the Wolmanit CX-8WB family for each use class, which is 13.81 kg/m³ in UC 3, corresponding to the maximum retention including the protection against termites. For UC 4, the retention has been set at 22.5 kg/m³ for normal use and at 31.25 kg/m³ for special applications such as transmission poles for example.

| **Emission rates for time 1,2 and time 3 for UC 3 in different scenarios** | | | |
| --- | --- | --- | --- |
|  | **Time period** | **Cumulated Cu-HDO emission Q**  **(mg/m²)** | **Total Cu emission Q**  **(mg/m²)** |
| NTBuild 509 study,  retention 12.82 kg/m³ | 30 days | 2.45 | 20.83 |
| 365 days | 26.1 | 215.2 |
| 7300 days | 32.2 | 215.7 |
| Wolmanit CX-8WB product Family,  maximum retention UC3 13.81 kg/m³ a | 30 days | 2.64 | 22.44 |
| 365 days | 28.1 | 231.82 |
| 7300 days | 34.69 | 232.36 |
| Wolmanit CX-8WB product Family,  maximum retention UC4 22.5 kg/m³ a | 30 days | 4.30 | 36.56 |
| 365 days | 45.81 | 377.69 |
| 7300 days | 56.52 | 406.86 |
| Wolmanit CX-8 WB product Family, max. retention storage area 31.25 kg/m³ b | 30 days | 11.94 | 101.56 |
| 365 days | 127.24 | 1049.14 |
| 7300 days | 156.98 | 1051.58 |

a As the application rate used in the leaching test is less than 2 times the maximum application rate of the product, emission rates were adapted to the requested retentions by linear extrapolation. This is in line with the approach agreed during the 1st leaching working shop (EC 2005)

b The maximum application rate for special applications is 2.43 times the application rate used in the leaching test. If the application rate is between 2 and 10 times lower than the maximum application rate linear extrapolation and an additional assessment factor shall be applied (EC 2005). As a precautionary measure, an assessment factor of 2 has been applied to the extrapolated data to account for differences between the applied concentration in the leaching test and the intended maximum retention rates. The factor of 2 has been chosen as the deviation from the cut of level is small.

Use class 4: Wood directly in contact with soil or water

For UC4 timbers, intended for use outdoors in direct contact with soil or water, a study was carried out in accordance with the OECD protocol for hazard class 4 environments. The test involved timber specimens (pine sapwood blocks) pre-treated to a loading of 19.91 kg/m³ are fully and continuously immersed in water for 29 days, with periodic exchange and analysis of the leachate for the active substances. Water will be exchanged after 6 hours, 1, 2, 4, 8, 15, 22 and 29 days. As the average retention rate of product used in this study was less the maximum proposed product retention rate for UC4 timbers, adjustment of the leach rate data was necessary. Where the applicant supplies leaching data from a lower leaching application rate, the approach agreed at the first and second leaching workshop is: “If the application rate is less than 2 times the maximum application rate, linear extrapolation can be used.”

Therefore, the provided leaching test can be used for the whole concentration range in the different UC4.

*Leaching rates used for risk assessment*

Mean cumulative leaching data for both active substances and the metabolite copper are presented within the below table.

| **Average cumulative loss (mg/m²) for Copper and Cu-HDO** | | |
| --- | --- | --- |
| **Sample point** | **Cumulated loss of a.s.** | |
| **Copper**  **[mg/m²]** | **Cu-HDO**  **[mg/m²]** |
| 6h | 89.3 | 55.9 |
| 12h | 118.5 | 132.4 |
| 2d | 130.9 | 146.3 |
| 4d | 148.9 | 165.6 |
| 8d | 186.4 | 190.7 |
| 15d | 235.7 | 211.6 |
| 22d | 260.5 | 226.2 |
| 29d | 271.5 | 240.4 |

The emission rate is calculated based on a polynomial regression of second order that has been proposed in the ESD for wood preservatives (OECD 2013a) to the following equation:

Log10Flux(t) = a + b x log10(t) + c x log10(t)2

Once the parameter a, b and c are determined, the experimental Flux(t)=f(t) curve can be calculated.

The calculation of Q\*leach,time can be done by summation of daily FLUX(t) for the time period considered for assessment. Fitting with a polynomial regression of second order will not take into account the saturation term, that occurs, when time approaches 0. However, it is possible to calculate the total quantity leached starting from time zero of the leaching experiment by adding to the Q\*leach,time, calculated according to the below equation, the quantity experimentally determined during the first day of the experiment Qleach,0−1. In this case equation will read:

The polynomial regression of second order determines the following parameters of the fit function for Copper and Cu-HDO which are summarized in the below table:

|  |  |  |
| --- | --- | --- |
| **Summary of polynominal fit parameter** | | |
| **Parameter** | **Copper** | **Cu-HDO** |
| A | 1.3658 | 1.2962 |
| B | -0.5511 | -0.6783 |
| C | -0.1107 | -0.0432 |
| Corr. coefficient r² | 0.8772 | 0.9893 |

Based on these fit parameters the leached cumulative amount Q\* is calculated for different time points. The calculated leached amount Q\* of Copper is 278.5 mg/m², 439 mg/m² and 575 mg/m² after 30, 365 and 7300 days. The calculated leached amount Q\* of Cu-HDO is 199.8 mg/m², 345.6 mg/m² and 571.7 mg/m² after 30, 365 and 7300 days.

The emission is corrected to the requested worst case retention of the Wolmanit CX-8WB for use class 4, which is 22.5 kg/m³ for normal use and at 31.25 kg/m³ for special applications such as transmission poles for example.

| **Emission rates for time 1,2 and time 3 for UC 4 in different scenarios** | | | |
| --- | --- | --- | --- |
|  | **Time period** | **Cumulated Cu-HDO emission Q**  **(mg/m²)** | **Total Cu emission Q**  **(mg/m²)** |
| OECD 313 study,  retention 19.91 kg/m3 | 30 days | 199.8 | 278.5 |
| 365 days | 345.6 | 439 |
| 7300 days | 571.7 | 575 |
| Wolmanit CX-8 WB product Family, maximum retention UC4 22.5 kg/m³ a | 30 days | 225.8 | 314.7 |
| 365 days | 390.6 | 496.1 |
| 7300 days | 646.1 | 649.8 |
| Wolmanit CX-8 WB product Family,  max. retention special application 31.25 kg/m³ a | 30 days | 313.6 | 437.1 |
| 365 days | 542.4 | 689.0 |
| 7300 days | 897.3 | 902.5 |
| 14600 daysb | 982.1 | 930.4 |

a As the application rate used in the leaching test is less than 2 times the maximum application rate of the product, emission rates were adapted to the requested retentions by linear extrapolation. This is in line with the approach agreed during the 1st leaching working shop (EC 2005)

b Increased service life time for UC4 special applications.

***Testing for distribution and dissipation in soil (ADS)***

There was no new data submitted, neither for the active substances nor for the biocidal products.

***Testing for distribution and dissipation in water and sediment (ADS)***

There was no new data submitted, neither for the active substances nor for the biocidal products.

***Testing for distribution and dissipation in air (ADS)***

There was no new data submitted, neither for the active substances nor for the biocidal products.

***If the biocidal product is to be sprayed near to surface waters then an overspray study may be required to assess risks to aquatic organisms or plants under field conditions (ADS)***

No data is available and is not required, as the biocidal product is not intended to be sprayed near to surface waters.

***If the biocidal product is to be sprayed outside or if potential for large scale formation of dust is given then data on overspray behaviour may be required to assess risks to bees and non-target arthropods under field conditions (ADS)***

There was no new data submitted, neither for the active substances nor for the biocidal products.

#### Exposure assessment

The products of the Wolmanit CX-8WB Family are water-based products containing copper (as basic copper carbonate) and Cu-HDO used as wood preservatives (PT 8) against fungi and insects, including termites. The products are intended for industrial use only as a preventive treatment by vacuum pressure application intended for use in use class 1-4. In UC 4a distinction is made between retention rates for ‘normal use’ and special use such as transmission poles. UC 4b special application in contact to fresh water is not considered. Environmental exposure is expected in UC 3 and 4 only.

**General information**

| Assessed PT | PT 8 |
| --- | --- |
| Assessed scenarios | Scenario [1]: Product application and storage phase  Scenario [2a]: Wood in service, house for UC 3  Scenario [2b]: Wood in service, noise barrier for UC 3  Scenario [2c]: Wood in service: bridge over pond for UC 3  Scenario [3a]: Transmission pole for UC 4, special applicationa  Scenario [4a]: Jetty in lake for UC 4  Scenario [4b]: Sheet piling for UC 4 |
| ESD(s) used | ESD for PT 8: Revised Emission Scenario Document for Wood Preservatives (OECD 2013) |
| Approach | Average consumption |
| Distribution in the environment | Calculated in EUSES 2.1.2 based on TGD 2003 calculations |
| Groundwater simulation | PEARL 4.4.4. |
| Confidential Annexes | -- |
| Life cycle steps assessed | Production: No  Formulation: No  Use: Yes  Service life: Yes |
| Remarks | -- |

a For UC4a special application with increased retention rate has been requested, which is used in practice only for example for the impregnation of transmission poles.

***Emission estimation***

For the environmental risk assessment, the relevant compartments for emissions have to be defined and an assessment of the potential residues in each area of importance has to be conducted. Emission Scenario Documents (ESDs) have been prepared for a number of product types.

The emission estimation for the Wolmanit CX-8WB Family is based on the recommendations of the OECD emission scenario document “Revised Emission Scenario Document for Wood Preservatives” (OECD 2013a).

Environmental exposure during production and formulation of the biocidal product is not assessed under the requirements of the BPR. These life cycle steps are already covered by REACH legislation, where the registrants (manufacturers/importers) of substances are obliged to consider environmental hazard and exposure and to provide RMMs/exposure scenarios for ensuring safe use (e.g. via SDS in the supply chain). Moreover, it is assumed that industrial production sites are subject to permit for installation. Therefore, it is not considered relevant to perform an additional exposure assessment under the biocide regime.

**Assessed Scenarios**

Emissions to the environment can occur during industrial timber treatment and the service life of the treated timber.

Generally, no emission of Copper and Cu-HDO from wood in service is expected in situations where wood or wood-based products are under cover, protected from the weather and are not exposed to wetting (even where high environmental humidity leads to occasional but not persistent wetting). In situations where wood or wood-based products are not covered and in contact with the ground, either continually exposed to the weather or subject to frequent wetting, or in contact with water, emissions to soil and water are possible and subject of the following scenarios.

| **Relevant emission scenarios for use of the Wolmanit CX-8WB Family** | |
| --- | --- |
| **Main exposure scenario** | **Subcategory** |
| **Emission estimation for industrial timber treatment** | |
| **Scenario [1]:**  Emission scenario for vacuum pressure and double vacuum | 1. Product application 2. Storage of treated wood prior to shipping (including removal processes in the receiving environmental compartment - soil) |
| **Emission estimation for treated wood in service** | |
| **Scenario [2]:**  Emission scenario for UC 3 | 1. House scenario including removal processes 2. Noise barrier scenario including removal processes 3. Bridge over pond scenario including removal processes |
| **Scenario [3]:**  Emission scenario for UC 4a | 1. Transmission pole, special application |
| **Scenario [4]:**  Emission scenario for UC 4b | 1. Jetty in lake 2. Sheet piling |

Scenario [1]

Concerning the vacuum pressure scenario, the primary receiving compartments are considered to be local air and facility drain or soil and surface water for treatment process or storage of treated wood prior to shipping, respectively.

Scenario [2a]

Concerning the house scenario, the primary receiving compartment is considered to be soil via rain run-off. In urban areas product residues from outdoor use might also be emitted to the sewer due to rainfall. Concerning the applicability of the city scenario as a representative for the STP for wood applied in an urban environment above pavements the applicant stated:

“*A city scenario has been described by the ECHA working group in the document “Leaching from paints, plasters, and fillers applied in urban areas”; revised November 2015, for paints and coatings (PT 7). This document should also be applicable for PT 8-PT 10.*

*The document describes a city scenario and possible emission from biocides due to leaching from houses to a standard STP. For PT 8 biocidal products, some significant defaults/factors are not defined in the latest document version and should be agreed and validated before calculations are possible for European applications, e.g.:*

* *The number of treated wooden houses should be defined (the number should be significantly lower than the assumed 4000 houses for paints).*
* *The amount of treated wood surface per house with contact to rain water.*
* *The time period of leaching and the leaching rate. If an averaged time period is defined, the emission value from leaching studies could be applied. Currently no proposal is given for PT 8 products within the ECHA working group document.*
* *The emission is an indirect emission via leachates. The expected low concentration of active substances within the leaching water is further diluted by rainfall. The dilution factors of the leachates should be defined.*
* *The low mobility of active ingredients for PT 8 should be taken into account for a realistic worst case assessment. Currently no proposal is available in the document.*
* *The degradation behavior of the active substances should be taken into account. No proposal is currently available in the ECHA working group document.*

*Currently the proposal of the city scenario is not included in the revised OECD ESD for wood preservatives, which was updated from OECD expert group end of 2013. The document of the working group itself was published end of 2015, which time span is too short to implement it in the approval process of Wolmanit CX products without validation. It should be kept in mind that the application for approval of Wolmanit CX was submitted on August, 1st 2015.*

*Moreover the current risk assessment of Wolmanit CX as a Use class 3 and 4 wood preservative considers the environmental risk to surface water in different scenarios. The environmental risk for the STP and the subsequent surface water is calculated within the “industrial application” and the “noise barrier” scenario. The environmental risk for surface water is also considered in “the bridge over pond”, the “Jetty in lake” and the “sheet piling” scenario. Therefore the risk to the surface water as receiving compartment is well addressed within the original application of Wolmanit CX. A more detailed consideration is currently not possible.”*

Emissions to the air are considered negligible from environmental point of view. The house scenario is considered as the worst case wood in service scenario for the soil compartment under UC 3 conditions. Therefore, the fence scenario is not assessed separately.

Scenario [2b]

Concerning the noise barrier scenario, it is assumed that the leachate resulting from the rainfall either ends up directly in the adjacent soil in a proportion of 30% or is collected in the gutter and sewer (70%), and finally enters a municipal sewage treatment plant (STP). Emissions to the air are considered negligible from the environmental point of view. The noise barrier scenario is considered as the most critical wood in service scenario for the STP under UC 3 conditions.

Scenario [2c]

Concerning the bridge over pond scenario, it is assumed that the leachate of the bridge resulting from the rainfall ends up directly in the adjacent water body. Emissions to the air are considered negligible from the environmental point of view. The bridge over pond scenario is considered as the most critical wood in service scenario for freshwater under UC 3 conditions.

Scenario [3a]

Concerning the transmission pole, it is assumed that the emission from the treated wood to soil is a result of rainfall for the above soil part and permanent contact with the soil water phase for the below ground part. The transmission pole scenario is considered as the worst case wood in service scenario for the soil compartment under UC 4 conditions. Therefore, the fence post scenario is not assessed separately.

The use class “UC 4 special” specifically targets treated timber with applications having an increased service life time (e.g. transmission poles). For the intended use class “UC 4 special” a service life of 40 years was assessed.

Scenario [4a]

Concerning the jetty in a lake, it is assumed that the emission from the treated jetty describe the emission in a static water body e.g. a lake or pond. Emissions from the treated wood to surface water are a result of rainfall for the above water part (planks) and the poles in permanent contact with the water. The jetty in a lake scenario is considered as the worst case with respect to the wood surface area under UC 4b conditions.

Scenario [4b]

The scenario describes a sheet piling of poles in a small streaming waterway. It is assumed that the total surface of the poles is in contact with water even if this may result in an overestimation of the emission since only approximately 50% of the poles are permanently exposed to water. The sheet piling scenario represents a worst case because of the wood being mainly exposed under water.

**Assessed Substances:**

The product contains two biocidal active substances, i.e. Cu-HDO and basic copper carbonate. Both substances were decomposed to Cu, identified as a relevant metabolite in water, sediment and soil.

Besides the active substances the biocidal product contains 2-Aminoethanol and Polyethyleneimine as substances of concern with respect to environmental hazards. 2-Aminoethanol was included into the quantitative assessment. A qualitative assessment to Polyethyleneimine is provided in the confidential annex of this document. The AT CA considers the contribution of Polyehtyleneimine to the overall toxicity of the biocidal product family Wolmanit CX-8WB to be minor. Hence, the risk assessment is carried out on the basis of maximum total concentrations of copper (from basic copper carbonate and Cu-HDO), the maximum concentrations of Cu-HDO and the maximum concentrations of 2-Aminoethanol.

**Assessed Service Life**

During the Arona Leaching Workshop in June 2005 (EC 2005), it was agreed that a long-term assessment of in-service uses of wood should be carried out. For vacuum pressure treatments an assessment of cumulative leaching from treated wood in-service over a 20 year period was proposed. Hence, the assessment times are 30 days (TIME 1) for short term consideration and 20 years for the longer time period (TIME 2). At the follow-up leaching workshop in Varese (held 12th of June 2013), the Environment Working Group has agreed to implement a further TIME 2 value of 365 days (ECHA, 2014b) if a risk for the initial assessment period of 30 days is identified.

Hence, the environmental behaviour of the active substances from the Wolmanit CX-8WB Family was assessed for the use as a wood preservative for TIME 1 (30 days), TIME 2 (365 days) and for a long-term exposure TIME 3 (20 years) corresponding to the service life time.

The use class “UC 4 special” specifically targets treated timber with applications having an increased service life time (e.g. transmission poles). In accordance with the use intended by the applicant, for “UC 4 special” applications a service life of 40 years was assessed.

**Calculations for Scenario [1]&[2]&[2]&[3]&[4]**

Treatment of wood is concluded via vacuum pressure / oscillating pressure process treatment by industrial users. The worst-case use rate of the Wolmanit CX-8WB Family is 13.81kg/m³ in UC 3, corresponding to the maximum retention including the protection against termites. For UC 4, the worst-case use rate has been set to 22.5 kg/m³ for normal use and at 31.25 kg/m³ for special applications such as transmission poles for example.

A summary of leaching behaviour of the active substances in the biocidal Product from treated wood is presented in chapter EFFECTS ASSESSMENT ON THE ENVIRONMENT subchapter Leaching behaviour.

All Input parameters used for calculating the local emission are described in annex 3.2 of this document.

A short summary of the values which have been indicated as “Set values” in the emission scenarios or default values to be selected from a list are summarised here:

| **Input parameters for calculating the local emission** | | | | |
| --- | --- | --- | --- | --- |
| **Input** | | **Value** | | **Unit** |
|  | **Symlol** | **Total**  **copper** | **Cu-HDO** |  |
| Volume of wood treated per day - product application | VOLUMEwood-treated | 30 | | m3.d-1 |
| Quantity of a substance applied per m3 of wood | Qai | 2.5 | 0.875 | kg.m-3 |
| Fraction released to facility drain - product application | Ffacilitydrain | 0.003 | | [-] |
| Fraction released to air - product application | Fair | 0.001 | | [-] |
| Surface area of the storage place | AREAstorage | 525 | | m2 |
| Duration of an intermediate assessment period not dependent of the service life | TIME2 | 365 | | d |
| Duration of a longer assessment period (service life) | TIME3 | 7300 | | d |
| Duration of an increased assessment period for special applications | TIME3special application | 14600 | | d |

Calculations for local emission to relevant environmental compartments

The calculations and used parameters are described in annex 3.2 of this document. A short summary of the resulting local emissions is presented here:

| **Resulting local emission to relevant environmental compartments** | | | |
| --- | --- | --- | --- |
| **Compartment** | **Local emission ElocalCompartment** | | |
| **Symbol** | **Total copper** | **Cu-HDO** |
| **Scenario [1]: Industrial application and storage phase** | | | |
| Local emission rate to air [kg.d-1] | Elocalair | 7.50E-02 | 2.63E-02 |
| Local emission rate to facility drain  [kg.d-1] | Elocalfacilitydrain | 2.25E-01 | 7.88E-02 |
| Average daily release onto soil per m2 of storage area [kg.m-2.d-1] | Elocalsoil | 3.72E-05 | 4.38E-06 |
| Local emission rate in surface water resulting from leaching from stored treated wood due to rain run-off, over the initial assessment period [kg.d-1] | Elocalsurfcewater | 9.78E-03 | 1.15E-03 |
| **Scenario [2a]: House scenario UC3** | | | |
| Average daily emission due to leaching over the initial assessment period  [mg.d-1] | Esoil,leach,TIME1 | 93.5 | 11.0 |
| Average daily emission due to leaching over the intermediate assessment period [mg.d-1] | Esoil,leach,TIME2 | 79.4 | 9.63 |
| Average daily emission due to leaching over a longer duration [mg.d-1] | Esoil,leach,TIME3 | 3.98 | 5.94E-01 |
| **Scenario [2b]: Noise barrier UC3** | | | |
| Average daily emission due to leaching over the initial assessment period  [mg.d-1] | Esoil,leach,TIME1 | 673 | 79.2 |
| Average daily emission due to leaching over the intermediate assessment period [mg.d-1] | Esoil,leach,TIME2 | 572 | 69.3 |
| Average daily emission due to leaching over a longer duration [mg.d-1] | Esoil,leach,TIME3 | 28.6 | 4.28 |
| Local daily emission rate to the STP following leaching from treated wood during the initial assessment period [mg.d-1] | ESTP,TIME1 | 1571 | 185 |
| Local daily emission rate to the STP following leaching from treated wood during the intermediate assessment period [mg.d-1] | ESTP,TIME2 | 1334 | 162 |
| Local daily emission rate to the STP following leaching from treated wood during the longer assessment period[mg.d-1] | ESTP,TIME3 | 66.8 | 9.98 |
| **Scenario [2c]: Bridge over pond UC3** | | | |
| Average daily emission due to leaching over the initial assessment period  [mg.d-1] | Ewater,leach,TIME1 | 7.48 | 8.80E-01 |
| Average daily emission due to leaching over the intermediate assessment period [mg.d-1] | Ewater,leach,TIME2 | 6.35 | 7.70E-01 |
| Average daily emission due to leaching over a longer duration [mg.d-1] | Ewater,leach,TIME3 | 3.18E-01 | 4.75E-02 |
| **Scenario [3a]: Transmission pole UC4 – special application** | | | |
| Average daily emission due to leaching over the initial assessment period  [mg.d-1] | Esoil,leach,TIME1 | 41.7 | 18.7 |
| Average daily emission due to leaching over the intermediate assessment period [mg.d-1] | Esoil,leach,TIME2 | 18.9 | 4.27 |
| Average daily emission due to leaching over a longer duration [mg.d-1] | Esoil,leach,TIME3 | 9.91E-01 | 3.13E-01 |
| Average daily emission due to leaching over an increased assessment period for special applications [mg.d-1] | Esoil,leach,TIME3 special application | 4.98E-01 | 1.65E-01 |
| **Scenario [4a]: Jetty in lake UC4** | | | |
| Average daily emission due to leaching over the initial assessment period  [mg.d-1] | Ewater,leach,TIME1 | 125 | 77.6 |
| Average daily emission due to leaching over the intermediate assessment period [mg.d-1] | Ewater,leach,TIME2 | 30.4 | 12.7 |
| Average daily emission due to leaching over a longer duration [mg.d-1] | Ewater,leach,TIME3 | 1.79 | 1.01 |
| **Scenario [4b]: Sheet piling UC4** | | | |
| Average daily emission due to leaching over the initial assessment period  [mg.d-1] | Ewater,leach,TIME1 | 49.4 | 35.5 |
| Average daily emission due to leaching over the intermediate assessment period [mg.d-1] | Ewater,leach,TIME2 | 6.40 | 5.04 |
| Average daily emission due to leaching over a longer duration [mg.d-1] | Ewater,leach,TIME3 | 4.19E-01 | 4.17E-01 |

***Fate and distribution in exposed environmental compartments***

Various phases in the life cycle of a product may cause emissions and environmental exposure. The enclosed Table summarises all receiving environmental compartments that have been identified as potentially exposed during the use of the Wolmanit CX-8WB Family for the different applications.

The routes of entry into the environment are explained in more detail in the before mentioned emission assessment.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Identification of relevant receiving compartments based on the exposure pathway** | | | | | |
| **Scenario** | | **Environmental compartments and groups of organisms exposed** | | | |
| **STP** | **Freshwater1** | **Soil** | **Air** |
| Scenario [1]: Industrial application and storage phase | application | ++ | + | +**3** | ++ |
| storage | - | ++ | ++**2** | - |
| Scenario [2a]: House scenario UC3 | | - | - | ++**2** | - |
| Scenario [2b]: Noise barrier UC3 | | ++ | + | ++**2** | - |
| Scenario [2c]: Bridge over pond UC3 | | - | ++ | - | - |
| Scenario [3a]: Transmission pole UC4 | | - | - | ++**2** | - |
| Scenario [4a]: Jetty in lake UC4 | | - | ++ | - | - |
| Scenario [4b]: Sheet piling UC4 | | - | ++ | - | - |

++ Compartment directly exposed, + Compartment indirectly exposed, - Compartment not exposed

1 Including sediment, 2 Including groundwater via leaching from soil, 3 Including soil and groundwater via STP surplus sludge application

Assessment of direct emission to surface water in urban areas

The current document “The assessment of direct emission to surface water in urban areas (PT 6.2/6.3 and 7-10)” was developed for PT 7 and PT10. According to this document, the environmental release estimation assumes that always a mixed sewer system is present. It is suggested to consider a direct emission due to a storm water event and a separate sewer systems with direct discharge of rainwater.

The applicant justified the non submission of a scenario on direct emissions to surface water via rainfall or storm water events, respectively:

*“The document contains information about the size of STP in Germany and the EU STP bypass scenario from (EU TGD 2003) but no proposal for a detailed PT-8 scenario.*

*For PT 8 biocidal products, some significant defaults/factors should be agreed and validated before calculations are possible for European applications, e.g.:*

* *The amount of treated wood or the total wood surface with contact to rain water should be defined for the considered area.*
* *The time period of leaching and the leaching rate. If an averaged time period is defined, the emission value from leaching studies could be applied. Currently no proposal is given for PT 8 products within the ECHA working group document.*
* *The emission is an indirect emission via leachates. The expected low concentration of active substances within the leaching water is further diluted by rainfall. The dilution factors of the leachates should be defined.*
* *The low mobility of active ingredients for PT 8 should be taken into account for a realistic worst case assessment. Currently no proposal is available in the document.*
* *The degradation behavior of the active substances should be taken into account. No proposal is currently available in the ECHA working group document.*

*Currently the proposal is not included in the revised OECD ESD for wood preservatives, which was updated from OECD expert group end of 2013. The document of the working group itself was published end of 2014, which time span is too short to implement it in the approval process of Wolmanit CX products without validation. It should be kept in mind that the application for approval of Wolmanit CX was submitted on August, 1st 2015.*

*Moreover the current risk assessment of Wolmanit CX as a Use class 3 and 4 wood preservative considers the environmental risk to surface water in different scenarios. The environmental risk for the STP and the subsequent surface water is calculated within the “industrial application” and the “noise barrier” scenario. The environmental risk for surface water is also considered in “the bridge over pond”, the “Jetty in lake” and the “sheet piling” scenario. Therefore the risk to the surface water as receiving compartment is well addressed within the original application of Wolmanit CX. A more detailed consideration is currently not possible.”*

The applicant’s statement is accepted for product authorization of the Wolmanit CX-8WB Family.

| **Input parameters (only set values) for calculating the fate and distribution in the environmenta** | | | |
| --- | --- | --- | --- |
| **Input** | **Total**  **copper** | **Cu-HDO** | **Unit** |
| Molecular weight | n.a. | 349.9 | g/mol |
| Vapour pressure (at 20° C) | <1.00E-05 | < 0.0001 | Pa |
| Water solubility | 100000b  at 20°C | 6.1  at pH=7 and 23°C | mg/L |
| Organic carbon/water partition coefficient (Koc) | 106000 | 30277.4 | L/kg |
| Henry’s Law Constant | n.a. | 0.0057 | Pa/m3/mol |
| Readily biodegradable | not  biodegradable | not biodegradable | -- |
| DT50 for biodegradation in surface water | n.a. | 6.8 | d |
| DT50 for degradation in soil (at 12ºC) | n.a. | 5.7 | d |
| Log Octanol/water partition coefficient (log Kow) | 8.50E-07 | 2.6 | Log 10 |
| BCF fish | n.a. | n.a. | L/kgwet fish |
| BCFearthworm | n.a. | n.a. | -- |
| DT50 degradation, total system  (12°C) | n.a. | 41 | d |

n.a. not available or not applicable (copper)

a Endpoints are taken from the Assessment Reports (PT-8) for basic copper carbonate (France 2011) and Cu-HDO (Austria 2013) and their Lists of Endpoints

b Based on soluble copper iones. Data obtained from VRAR of Copper (ECHA 2008)

The elimination of basic copper carbonate and Cu-HDO in the environment after release to the sewer system was simulated using SimpleTreat module of EUSES 2.1.2. EUSES. Output reports concerning the release pathway via sewage treatment plant (STP) are reported in annex 3.2 of this report. The distribution in the STP is summarised in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculated fate and distribution in the STP** | | | |
| **Compartment** | **Percentage [%]** | | **Remarks** |
| **Baisc copper carbonate** | **Cu-HDO** |
| Air | 1.45E-4 | 1.46E-05 | - |
| Water | 13.9 | 25.9 | - |
| Sludge | 86.1 | 74.1 | - |
| Degraded in STP | 0 | 0 | - |

***Calculated PEC values***

The Predicted Environmental Concentration (PEC) calculations follow the available guidance literature (Revised Emission Scenario Document for Wood Preservatives; OECD 2013a) and Guidance on the Biocidal Products Regulation Volume IV Part B+C (ECHA 2017c).

Emissions of Cu-HDO and total Copper (from basic copper carbonate and Cu-HDO) to the environment were calculated using spreadsheets produced by Royal Haskoning and the ECB on the basis of the OECD emission scenarios for wood preservatives.

The PECs for in the environmental compartments derived in the following sections are calculated taking into account degradation processes and/or dilution (where applicable).

The values presented in the following tables are rounded values from the EXCEL spread sheets. The calculations for the different PECs within EXCEL are always carried out with unrounded values. Distribution after release to the sewer system is calculated using EUSES 2.1.2.

PEC for sewage treatment plant (STP)

The ESD considers direct exposure to STP from the industrial application process and due to rain run-off from a noise barrier.

The distribution after release to the sewer system is calculated using EUSES 2.1.2. and is summarised in the below tables. The calculated daily local emissions of Copper and Cu-HDO are to the STP were used as input parameter (set value) in EUSES 2.1.2.

PEC calculations and used parameters are described in annex 3.2 of this document.

The calculated PECSTP for Cu-HDO and total Copper are presented in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Summary of PECstp for Cu-HDO and total Copper** | | | |
| **SCENARIO** | | **PECstp (mg/L)** | |
| **Total**  **copper** | **Cu-HDO** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 1.56 E-02 | 1.02E-02 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 3** | 1.09E-04 | 2.39E-05 |
| **TIME 2** | 4.68E-05 | 2.09E-05 |
| **TIME 3** | 3.17E-06 | 1.29E-06 |

PEC for surface water

The scenario in the ESD suggests indirect release via sewage treatment plant from the industrial application process and due to rain run-off from a noise barrier.

Direct emissions during service life (Bridge over pond, Jetty in lake or Sheet piling) or storage of treated wood prior shipping by leaching of the active substances due to rainfall is done for TIME 1 (30 days), TIME 2 (365) and TIME 3 (20 years =7300 days). Degradation is taken into account for Cu-HDO. In the case of copper, total concentration in water at the end of the assessment periods are calculated using the EXCEL calculation sheet provided by ECHA.The calculations and used parameters for the storage scenario and the assessment of leaching during service life are described in annex 3.2 of this document.

The calculated PEC values for surface water for Cu-HDO and total Copper are presented in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Summary of PECsw for Cu-HDO and total Copper** | | | |
| **SCENARIO** | | **PECsw (mg/L)** | |
| **Total**  **Copper** | **Cu-HDO** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 1.35E-03 | 9.74E-04 |
| **storage** | 3.77E-04 | 4.43E-05 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 9.42E-06 | 2.28E-06 |
| **TIME 2** | 4.04E-06 | 2.00E-06 |
| **TIME 3** | 2.74E-07 | 1.23E-07 |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 2.24E-04 | 5.94E-06 |
| **TIME 2** | 2.32E-03 | 7.36E-06 |
| **TIME 3** | 2.32E-03 | 4.66E-07 |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 2.34E-04 | 3.28E-05 |
| **TIME 2** | 6.92E-04 | 7.60E-06 |
| **TIME 3** | 8.18E-04 | 6.19E-07 |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | 1.32E-01 | 2.66E-02 |
| **TIME 2** | 1.71E-02 | 3.78E-03 |
| **TIME 3** | 1.12E-03 | 3.13E-04 |

PEC for sediment

In the Assessment Report for Cu-HDO (Austria 2013) the reported PNEC for the sediment was derived using the equilibrium method. So the risk of the sediment compartment is the same as that assessed for surface water. Therefore, the calculation of PECsediment values is not considered for Cu-HDO. For total Copper a solids-water partitioning coefficient for suspended matter value of 30246 L.kg-1 has been applied. The calculations and used parameters for the storage scenario and the assessment of leaching during service life are described in annex 3.2 of this document.

| **Summary of PECsed for total Copper** | | |
| --- | --- | --- |
| **SCENARIO** | | **PECsediment**  **(mg/kgwwt)** |
| **Total copper** |
| **Scenario [1]: Industrial application**  **and storage phase** | **application** | 3.11 |
| **storage** | 2.48 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 0.022 |
| **TIME 2** | 0.0093 |
| **TIME 3** | 0.0006 |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 1.47 |
| **TIME 2** | 15.26 |
| **TIME 3** | 15.26 |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 1.54 |
| **TIME 2** | 4.55 |
| **TIME 3** | 5.38 |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | 868.03 |
| **TIME 2** | 112.45 |
| **TIME 3** | 7.37 |

Calculation formulas for total concentrations in water at the end of assessment periods used in the ECHA sheet takes only dilution into account. Therfore a refined assessment (i.e. including adsorption of Cu on suspended particles) is performed for scenarios suggesting direct release to surfacewater. This applies to sediment bridge over pond, as well as sediment jetty in lake and sediment sheet piling. The calculations and used parameters are described in annex 3.2 of this document.

| **Summary of refined PECsed for total Copper** | | |
| --- | --- | --- |
| **SCENARIO** | | **refined**  **PECsediment**  **(mg/kgwwt)** |
| **Total copper** |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 4,28E-02 |
| **TIME 2** | 4,43E-01 |
| **TIME 3** | 4,43E-01 |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 8,71E-02 |
| **TIME 2** | 2,59E-01 |
| **TIME 3** | 3,05E-01 |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | 596 |
| **TIME 2** | 77,2 |
| **TIME 3** | 5,06 |

PEC for soil

Predicted Environmental Concentrations for Cu-HDO and total Copper in soil are calculated for the Noise barrier, house, transmission pole and the storage scenarios. A 50 cm distance and soil depth from the treated wood is defined as the receiving soil compartment. Degradation is taken into account. The calculations and used parameters are described in annex 3.2 of this document.

The calculated PEC values for soil for the substances Cu-HDO and total Copper are summarised in the table below.

| **Summary of PECsoil for Cu-HDO and total Copper**  **(values include degradation in soil)** | | | |
| --- | --- | --- | --- |
| **SCENARIO** | | **PECsoil (mg/kgwwt)** | |
| **Total**  **copper** | **Cu-HDO** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 3.6 | 2.9E-02 |
| **storage 30 days** | 6.57E-01 | 2.15E-02b |
| **storage 20 years** | 160 |
| **Scenario [2a]: House scenario UC3** | **TIME 1** | 1.27E-01 | 4.03E-03 |
| **TIME 2** | 1.31 | 3.63E-03 |
| **TIME 3** | 6.55E-01a | 2.24E-04 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 4.75E-02 | 1.51E-03 |
| **TIME 2** | 4.91E-01 | 1.36E-03 |
| **TIME 3** | 2.46E-01a | 8.39E-05 |
| **Scenario [3a]: Transmission pole UC4** | **TIME 1** | 2.48E-01 | 3.00E-02 |
| **TIME 2** | 1.36 | 7.04E-03 |
| **TIME 3** | 7.15 E-01a | 5.16E-04 |
| **TIME 3special application** | 7.20 E-01a | 2.73E-04 |

a In order to consider the phenomenon of copper ageing in soil, an ageing factor of 2 was applied on the total copper concentrations in soil for the values calculated over a longer assessment period (TIME 3). This strategy was validated at TMIII08.

b Steady state concentration in soil

PEC for groundwater

Copper has a significant natural background concentration groundwater. For Copper the groundwater value is defined in the European drinking water directive as 2 mg/L Cu, for organic biocides it is 0.1 µg/L. According to the Assessment report of copper carbonate (France 2011) Cu as element is considered to be strongly absorbed and immobile in soil. Therefore, copper is not expected to pose a risk for groundwater contamination, and no special risk assessment for Cu was performed for product approval.

The fate and behaviour for Cu-HDO suggest that it is not expected to reach groundwater since this compound has been shown a low mobility in soil.

However, the models for estimation of concentrations in groundwater as well as the receiving compartment size in some models, were discussed on EU level in several Technical Meetings. As result of these discussions, a separate scenario was prepared for groundwater exposure assessment. The ground water assessment was performed by the applicant with the model FOCUS Pearl 4.4.4 acc. to the ESD (OECD 2013a).

When considering industrial application and use of treated wood, a groundwater assessment is only necessary for the house scenario, which can be considered to be the worst-case for soil exposure, thus covering all other scenarios.

A density of 16 houses per hectare is assumed. Each of the 16 houses is assumed to have an outer wooden area treated with wood preservatives and relevant for leaching of 125 m², resulting in a total (leachable) area of 2000 m² per hectare. The leaching rate of Cu-HDO is measured in a semi-field leaching test. For this wood in service scenario, the daily release can be calculated as follows:

Release (kg/ha/day) = 16 (houses/ha) x 125 (wood surface per house m²) x 34.69 mg Cu-HDO/m² /7300 days = 9.5 mg Cu-HDO /ha day.

These daily average releases are multiplied by 365 days and divided by 4 due to the four times repeated application onto soil. The application dates are 1st of March, 23rd of April, 15th of June and 7th of August. The scenario “grassland” is chosen as ground cover. For modelling the following parameters are used:

|  |  |  |
| --- | --- | --- |
| **Parameter for Cu-HDO** | **Unit** | **Value** |
| Molecular weight | g.mol-1 | 349.9 |
| Saturated vapour pressure | Pa - measured at 50°C and 20°C | 0.0001 |
| Solubility in water | mg.L-1 - measured at 20°C | 6.1 |
| Koc | L.kg-1 | 30277.4 |
| Kom = Koc / 1.724 | L.kg-1 | 17562.3 |
| Half-life (groundwater) | d - measured at 12°C | 41 |
| Henry Law Constant | Pa.m³.mol-1 - measured at 20°C | 0.0057 |
| Freundlich sorption exponent | - | 0.9 |
| Coefficient for uptake by plant | - | 0 |

All values of input parameters of FOCUS Pearl groundwater model, which are not listed in the above table, were set to default values.

The parameter „coefficient for uptake by plants“ is set to zero for a worst case scenario. The data generates a value for the 80th percentile of levels of substance present in groundwater at a depth of 1 m as an annual average in µg/L. In fact, the simulated value is the concentration in pore water in a depth of 1 m and therefore it is the potential concentration in groundwater. Values that exceed the threshold of 0.1 µg/L are unacceptable according to the EU Drinking Water Directive.

Potential groundwater concentrations of Cu-HDO calculated using FOCUS Pearl 4.4.4: Use Class 3, house scenario

| **Scenario** | **Unit** | **Local PECgroundwater**  **house scenario: Use Class 3** |
| --- | --- | --- |
| Chateaudun | µg.L-1 | <0.001 |
| Hamburg | µg.L-1 | <0.001 |
| Kremsmünster | µg.L-1 | <0.001 |
| Jokioinen | µg.L-1 | <0.001 |
| Okehampton | µg.L-1 | <0.001 |
| Porto | µg.L-1 | <0.001 |
| Piacenza | µg.L-1 | <0.001 |
| Sevilla | µg.L-1 | <0.001 |
| Thiva | µg.L-1 | <0.001 |

The FOCUS Pearl simulation outputs for every scenario provided the result namely: “average concentration of Cu-HDO closest to the 80th percentile of 0.000000 µg/L” (<0.000001 µg.L-1). Hence, all values are well below the threshold value of the EU Drinking Water Directive of 0.1 µg/L.

PEC for air

According to the ESD the concentration of the active substances in air is only estimated for industrial preventive treatment. Due to fast degradation and the low vapour pressure (<1x10-4 Pa) of Cu-HDO the air compartment is not considered as relevant.

***Primary and secondary poisoning***

Primary poisoning

In addition to the ‘secondary poisoning’, in some cases primary poisoning (e.g. for rodenticides or insecticides), may take place and needs to be assessed. The product is a wood preservative (Product Type 8) and is applied in liquid form in industrial treatment plants. Therefore, direct uptake of the product is unlikely. In addition for primary poisoning no guidance is given in the ESD for PT 8 (OECD 2013a). PEC values from primary poisoning have therefore not been calculated.

For information on considerations referring to the risks posed to animals from the biocidal product, please also refer to the risk assessment for animal health.

Secondary poisoning:

According to Guidance on the Biocidal Products Regulation Volume IV Environment (ECHA 2017c) the calculation of a possible risk to man via the food chain (PECoralpredator) should be conducted if an substance shows a potential for bio-accumulation, indicated by a log Kow value >3, BCF >100 L/kgwwt or if a substance is highly adsorptive.

Cu-HDO:

The octanol/water partition coefficient for Cu-HDO has been determined with 2.6 which results in very low BCFs in fish and earthworms. The risk of secondary poisoning by ingestion of contaminated food (fish or earthworms) is therefore very limited to non-existent. So this exposure route was not assessed further and no calculations were performed. This is in line with the Assessment report of Cu-HDO (Austria 2013).

Copper:

According to the Assessment report of copper carbonate (France 2011) bioaccumulation and biomagnification phenomenons are considered as not applicable for copper. Therefore, copper is not expected to pose a risk for secondary poisoning, and no special risk assessment for was performed for product approval.

***Risk Assessment of 2-Aminoethanol (2-MEA) for the environment***

A risk assessment was performed for 2-Aminoethanol (2-MEA), which is an important component in the biocidal Wolmanit CX-8WB\_family for PT 8 (wood preservatives), in order to describe possible effects to the environment.

It has been agreed to perform a risk assessment for different exposure scenarios, e.g. the bridge over pond scenario and the noise barrier scenario, which are well known exposure scenarios acc. to the OECD ESD for wood preservatives, (OECD 2013a).

The noise barrier scenario is considered as the most critical wood in service scenario for the STP under UC 3 conditions. The bridge over pond scenario is considered as the most critical wood in service scenario for freshwater under UC 3 conditions. As worst case wood in service scenario for the soil compartment the house (UC 3 conditions) and the transmission pole scenario (UC 4a conditions) are considered.

UC4b conditions, industrial application and storage phase are not considered in the assessment, as risk mitigations for the active substance already cover any risk that might be present for 2-MEA.

Leaching behaviour

A leaching study is required for the determination of the quantitative emission of 2-MEA from treated wood. For UC 3 a semi-field study (XXXXXXXXX 2019b) was carried out with reference to NTBuild 509 methodology.

The study was performed using Wolmanit CX-8WB. Wolmanit CX-8WB contains the lowest amount of 2-MEA in comparison to the other products grouped in the family. The composition of tested formulation and the full composition of the product family are provided in the confidential annex. However, the required emission data of 2-MEA are calculated from the 2-MEA study acc. to NTBuild 509 and are used as a starting point for quantitative assessment for use class 3 .

No leaching study was submitted for use class 4. In the absence of leaching data for the UC4 conditions, the leaching rate was set to 50% from the application rate for short term considerations (30 or 365 days) and 100% from the application rate for the longer time period of the service life.

Use class 3: Wood exposed to weather, but not directly in contact with water or soil

According to the 2nd leaching workshop for PT 8, the NTBuild 509 semi-field study is the most preferred leaching study protocol. This study protocol allows the determination of realistic worst case emission values for time 1 (30 days) and time 2 (365 days), whereas only the long term emission time 3 must be extrapolated to 20 years for vacuum pressure application.

A study was undertaken with pine sapwood blocks treated with 1.27% Wolmanit CX-8WB solution (diluent: water) to an average retention rate of 9.84 kg/m3 of product, which isn´t equal to the maximum proposed product retention rate for UC 3. Where the applicant supplies leaching data from a lower leaching application rate, the approach agreed at the first and second leaching workshop is: “If the application rate is less than 2 times the maximum application rate, linear extrapolation can be used. If the application rate is between 2 and 10 times lower than the maximum application rate linear extrapolation and an additional assessment factor shall be applied”

Therefore, the provided leaching test can be used for the whole concentration range in the different use classes.

*Leaching rates used for risk assessment*

Mean cumulative leaching data for 2-MEA are presented within the below table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Average cumulative loss (mg/m²) for MEA** | | | |
| **Test duration**  **[days]** | **Cumulated**  **precipitation**  **[mm]** | **Cumulated loss of a.s.** | |
| **[mg/m²]** | **[%]** |
| 28 | 51 | <0.02 | <0.00004 |
| 70 | 105 | 283.47 | 0.618 |
| 124 | 194 | 857.99 | 1.870 |
| 262 | 399 | 958.63 | 2.090 |
| 306 | 635 | 983.88 | 2.145 |
| 365 | 740 | 985.54 | 2.148 |

The emission rate is calculated based on a polynomial regression of second order, which has been proposed in the ESD for wood preservatives (OECD 2013a) to the following equation:

Log10Flux(t) = a + b x log10(t) + c x log10(t)2

Once the parameter a, b and c are determined, the experimental Flux(t)=f(t) curve can be calculated.

The calculation of Q\*leach,time can be done by summation of daily FLUX(t) for the time period considered for assessment. Fitting with a polynomial regression of second order will not take into account the saturation term, that occurs, when time approaches 0. However, it is possible to calculate the total quantity leached starting from time zero of the leaching experiment by adding to the Q\*leach,time, calculated according to the below equation, the quantity experimentally determined during the first day of the experiment Qleach,0−1. In this case the equation will read:

The polynomial regression of second order determines the following parameters of the fit function for 2-MEA which are summarized in the below table:

|  |  |
| --- | --- |
| **Summary of polynomial fit parameter** | |
| **Parameter** | **2-MEA** |
| A | -26.068 |
| B | 27.936 |
| C | -7.1949 |
| Corr. coefficient r² | 0.9638 |

The parameters are well confirmed by the above mentioned correlation coefficients.

Based on these fit parameters the leached cumulative amount Q\* is extrapolated for time 3, which corresponds to 20 years.

The measured leached amount Q\* of 2-MEA is 162 mg/m² or 0.35% after 30 days and 932.3 mg/m² or 2.03% after 365 days. The extrapolated leached amount Q\* of 2-MEA is 1204 mg/m² or 2.62% after 7300 days.

The emission is corrected to the requested worst case retention of the Wolmanit CX-8WB family for each use class, which is 13.81 kg/m³ in UC 3, corresponding to the maximum retention including the protection against termites. For UC 4, the retention has been set at 22.5 kg/m³ for normal use and at 31.25 kg/m³ for special applications such as transmission poles for example.

| **Emission rates for time 1,2 and time 3 for UC 3 in different scenarios** | | |
| --- | --- | --- |
|  | **Time period** | **Cumulated 2-MEA emission Q**  **(mg/m²)** |
| NTBuild 509 study,  Wolmanit CX-8WB; retention 9.84 kg/m³ | 30 days | 162 |
| 365 days | 932.3 |
| 7300 days | 1204 |
| Wolmanit CX-8WB product Family,  maximum retention UC3 13.81 kg/m³ a | 30 days | 227.4 |
| 365 days | 1308.4 |
| 7300 days | 1689.7 |
| Wolmanit CX-8WB product Family,  maximum retention UC4 22.5 kg/m³ b | 30 days | 743.1 |
| 365 days | 4276.6 |
| 7300 days | 5523 |
| Wolmanit CX-8 WB product Family, max. retention storage area 31.25 kg/m³ b | 30 days | 1029 |
| 365 days | 5919.7 |
| 7300 days | 7647 |

a As the application rate used in the leaching test is less than 2 times the maximum application rate of the product, emission rates were adapted to the requested retentions by linear extrapolation. This is in line with the approach agreed during the 1st leaching working shop (EC 2005)

b The maximum application rate for special applications is 2.29 - 3.17 times the application rate used in the leaching test. If the application rate is between 2 and 10 times lower than the maximum application rate linear extrapolation and an additional assessment factor shall be applied (EC 2005). As a precautionary measure, an assessment factor of 2 has been applied to the extrapolated data to account for differences between the applied concentration in the leaching test and the intended maximum retention rates. The factor of 2 has been chosen as the deviation from the cut-off level is small.

**Calculated PEC values**

The Predicted Environmental Concentration (PEC) calculations follow the available guidance literature (Revised Emission Scenario Document for Wood Preservatives; OECD 2013a) and Guidance on the Biocidal Products Regulation Volume IV Part B+C (ECHA 2017c).

Emissions of 2-MEA to the environment were calculated using spreadsheets produced by Royal Haskoning and the ECB on the basis of the OECD emission scenarios for wood preservatives.

The PECs for in the environmental compartments derived in the following sections are calculated taking into account degradation processes and/or dilution (where applicable).

The values presented in the following tables are rounded values from the EXCEL spread sheets. The calculations for the different PECs within EXCEL are always carried out with unrounded values.

PEC calculations and used parameters are described in annex 3.2 of this document.

The calculated PECs for 2-MEA are presented in the tables below.

PEC for sewage treatment plant (STP)

The ESD considers direct exposure to STP from the industrial application process and due to rain run-off from a noise barrier. However, industrial application is not considered in the assessment of the substance of concern, as risk mitigations for the active substance already cover any risk that might be present for 2-MEA.

The PECSTP is calculated from the local emission to wastewater from the EXCEL spread sheets and the effluent discharge rate of STP (ESD Equation 35):

|  |  |  |
| --- | --- | --- |
| **Summary of PECstp for 2-MEA** | | |
| **SCENARIO** | | **PECstp (mg/L)** |
| **2-MEA** |
| **Noise barrier UC3** | **TIME 3** | 7.59 E-03 |
| **TIME 2** | 3.77 E-03 |
| **TIME 3** | 2.43 E-04 |

PEC for surface water

As a worst case consideration direct emissions during use class 3 service life are assessed for TIME 1 (30 days), TIME 2 (365) and TIME 3 (20 years =7300 days). An DT50 for biodegradation in surface water of 15 days is taken into account (REACH registered substance data base, dated December 2020).

UC4b conditions, industrial application and storage phase are not considered in the assessment, as risk mitigations for the active substance already cover any risk that might be present for 2-MEA.

|  |  |  |
| --- | --- | --- |
| **Summary of PECsw for 2-MEA** | | |
| **SCENARIO** | | **PECsw (mg/L)** |
| **2-MEA** |
| **Bridge over pond UC3** | **TIME 1** | 7.53E-04 |
| **TIME 2** | 7.30E-04 |
| **TIME 3** | 4.99E-05 |

PEC for sediment

The reported PNEC for the sediment was derived using the equilibrium method. So the risk of the sediment compartment is the same as that assessed for surface water. Therefore, the calculation of PECsediment values is not considered for 2-MEA.

PEC for soil

Predicted Environmental Concentrations for 2-MEA in soil are calculated for use class 3 (noise barrier, house) and use class 4a service life (transmission pole). A 50 cm distance and soil depth from the treated wood is defined as the receiving soil compartment and an DT50 for degradation in soil of 7 days is taken into account (REACH registered substance data base, dated December 2020).

In the absence of leaching data for the UC4 conditions, the leaching rate was set to 50% at TIME1 and TIME 2 (30 or 365 days) and 100% from the application rate at TIME3 of the service life. However, we would like to point out that this overestimates the risk for the transmission pole scenario.

UC4b conditions, industrial application and storage phase are not considered in the assessment, as risk mitigations for the active substance already cover any risk that might be present for 2-MEA.

| **Summary of PECsoil for 2-MEA**  **(values include degradation in soil)** | | |
| --- | --- | --- |
| **SCENARIO** | | **PECsoil (mg/kgwwt)** |
| **2-MEA** |
| **House scenario UC3** | **TIME 1** | 4.11E-01 |
| **TIME 2** | 2.05E-01 |
| **TIME 3** | 1.32E-02 |
| **Noise barrier UC3** | **TIME 1** | 1.54E-01 |
| **TIME 2** | 7.67E-02 |
| **TIME 3** | 4.95E-03 |
| **Transmission pole UC4** | **TIME 1** | 13.2 |
| **TIME 2** | 1.44 |
| **TIME 3** | 1.31E-01 |
| **TIME 3special application** a | 6.56E-02 |

a The use class “UC 4 special application” specifically targets treated timber with applications having an increased service life time (e.g. transmission poles). For the intended use class a service up to 40 years is to be expected.

PEC for groundwater

The ground water assessment is performed with the model FOCUS Pearl 4.4.4 acc. to the OECD ESD (OECD 2013a) for wood preservatives 2013.

When considering the use of treated wood in service, a groundwater assessment is only necessary for the house scenario, which can be considered to be worst-case for soil exposure, thus covering all other scenarios.

The following assumptions are considered appropriate for the assessment of groundwater exposure resulting from leaching from timber cladded houses treated with wood preservatives:

The dose to be applied in PEARL is derived by multiplying the amount leached per house with 365 days and 16 houses/hectare. A correction factor of E-06 is necessary to covert to kg/ha.

The leaching rate of MEA is measured in a semi-field leaching test. For the calculation of the annual leaching, the service life (i.e. 20-years’ service life period) is used as basis and approach 2 of TAB entry A3 (Equations to be used for PEC calculation for wood and other preservatives applied outdoors) is applied. Therefore, the daily release can be calculated as follows:

Release (kg/ha/day) = 16 (houses/ha) x 125 (wood surface per house m²) x 380,6 mg 2-MEA/m² /7300 days = 104,27 mg 2-MEA/ha day =1,04E-04 2-MEA kg/ha per day

These daily average releases are multiplied by 365 days and divided by 10 due to 10 times repeated application onto soil. The application dates are first of each month except July and August. The scenario “grassland” is chosen as ground cover. For modelling the following parameters are used:

|  |  |  |
| --- | --- | --- |
| **Parameter for Cu-HDO** | **Unit** | **Value** |
| Molecular weight | g.mol-1 | 61.08 |
| Saturated vapour pressure | Pa | 50 |
| Solubility in water | g.L-1 | 1000 |
| Koc | L.kg-1 | 15 |
| Kom = Koc / 1.724 | L.kg-1 | 8.7 |
| Half-life (groundwater) | d | 7 |
| Henry Law Constant | Pa.m³.mol-1 calculated | 0.00305 |
| Freundlich sorption exponent | - | 1 |
| Coefficient for uptake by plant | - | 0 |

All values of input parameters of FOCUS Pearl groundwater model which are not listed in the above table were set to default values. The parameter „coefficient for uptake by plants“ is set to zero for a worst-case scenario. The data generates a value for the 80th percentile of levels of substance present in groundwater at a depth of 1 m as an annual average in μg/L. In fact, the simulated value is the concentration in pore water in a depth of 1 m and therefore it is the potential concentration in groundwater.

The detailed calculations are included in Annex 3.2. A short summary of the resulting groundwater concentrations is presented here:

| **Potential groundwater concentrations of 2-MEA calculated using FOCUS**  **Pearl 4.4.4: 16 houses per ha scenario** | | |
| --- | --- | --- |
| **Scenario** | **Unit** | **Local PECgroundwater**  **house scenario: Use Class 3** |
| Chateaudun | µg.L-1 | 0.001782 |
| Hamburg | µg.L-1 | 0.030830 |
| Kremsmünster | µg.L-1 | 0.057447 |
| Jokioinen | µg.L-1 | 0.006103 |
| Okehampton | µg.L-1 | 0.017454 |
| Porto | µg.L-1 | 0.017650 |
| Piacenza | µg.L-1 | 0.018197 |
| Sevilla | µg.L-1 | 0.003925 |
| Thiva | µg.L-1 | 0.001950 |

The FOCUS Pearl simulation outputs for every scenario the “average concentration” of 2-MEA. Hence, all values for all nine scenarios are below (at least a factor of 16.8) the threshold value of the EU Drinking Water Directive of 0.1 μg/L.

***Monitoring data***

Experimental testing was performed by the applicant to assess the environmental impact of treated wood in contact with soil and water.

In two field studies, the effect of treated timber were monitored in two relevant local exposure scenarios. The jetty in lake and the fence post scenario were used for the soil (XXXXXXXXX 2013a) and water/sediment (XXXXXXXXX 2013b) compartment.

Soil field test:

The soil exposure of Wolmanit CX-8 was measured in a field trial with treated palisades. Wolmanit CX-8 is similar to the Wolmanit CX-8WB Family and contains the additional active ingredient boric acid. Therefore, a study using Wolmanit CX-8 can be used for the Wolmanit CX-8WB Family. The measured retention is 12.5 kg/m³ Wolmanit CX-8 for the palisades, reflecting the recommended product retention for use class 3.

The aim of the study is the determination of the total content of the active ingredients in the receiving soil compartment at different dates. Therefore, a container setup (three test containers, one post per container) was used as receiving soil compartment to simulate the 50 cm distance around the pole. Moreover, the spatial distribution of the active ingredients was monitored. For that purpose a special soil sampler (depth 1 m, diameter 16 mm) has been driven into the soil in order to reach the required depths of sampling (0-20 cm, 20-40 cm, 40-60 cm, 60-80 cm and 80-100 cm). Samples were taken at different distances around the palisade (at 5, 20 and 40 cm distance).

The sampling was repeated at four different dates to determine the time dependent change of the environmental impact. At each sampling day two diagonally opposite drillings were performed for each distance and container and the samples of each depth and distance were pooled to minimize natural fluctuation and disturbances of the soil content.

In this way, during the study duration of 27 months and a rainfall of 1824 mm, the distribution of the active ingredients in different soil distances and depths were monitored. From these data the averaged content for each active ingredient in the soil adjacent to treated posts was calculated for the four sampling time points.

The posts were installed on July 2009. A summary of time dependent concentrations of the active ingredients in the soil is given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Summary of averaged concentrations of the active ingredients Cu, B and Cu-HDO** **in the soil adjacent to treated posts** | | | |
| Average Container 1-3 | Total copper  (mg/kgdwt) | Boron  (mg/kgdwt) | Cu-HDO  (mg/kgdwt) |
| First sampling, August 2009 | 17.34 | 0.97 | <0.064 |
| Second sampling, November 2009 | 23.65 | 1.22 | <0.064 |
| Third sampling, August 2010 | 14.88 | 1.21 | <0.09 |
| Fourth sampling, October 2011 | 9.31 | 0.94 | <0.064 |

Test results must be compared with the natural background content of Copper and Boron, which was measured before start of the field test.

The averaged concentration of the active ingredient Copper and Boron for the 50 cm compartment reached a maximum during the second sampling date (corresponding to an emission duration of approx. 4 months).

The maximum observed Cu concentration for the 0 - 50 cm compartment was 23.64 mg/kg dwt including a background concentration of 18.68 mg/kg dwt at the sampling date 2.

The maximum observed B concentration for the 0-50 cm compartment was 1.19 mg/kg dwt including a background concentration of 0.29 mg/kg dwt at the sampling event 2.

The averaged concentration of the active ingredient Cu-HDO did not show a significant increase for the 0-50 cm compartment and was given by the limit of detection of the used analytical method during the study duration.

Additionally to the monitoring of the time dependent concentration of active ingredients in soil a plant growth of the soil compartment around the posts was monitored after three years of exposure (please refer to chapter 2.2.8.1 Effects assessment on the environment; Effects on any other specific, non-target organisms (flora and fauna) believed to be at risk).

Water/sediment field test:

The field monitoring study was performed to assess the environmental impact of Wolmanit CX-8 freshly treated timber in contact with fresh water. Wolmanit CX-8 is similar to the Wolmanit CX-8WB Family and contains the additional active ingredient boric acid. Therefore, a study using Wolmanit CX-8 can be used for the Wolmanit CX-8WB Family. The measured retention is 10.7 kg/m³ Wolmanit CX-8 for the palisades, which is somewhat lower than the recommended product retention for use class 3 and thus does not meet the recommended use class 4 retention.

There are only a limited number of scenarios wherein treated timber is in direct contact with water. The OECD emission scenario document of wood preservatives suggested a jetty scenario for the direct fresh water contact (use class 4 B).

For this reason, a jetty scenario which is proposed by the OECD emission scenario document for fresh water, was built up in a quarry pond and the aquatic environment was monitored under natural weather conditions over a period of approx. 2 years.

The area of the weathered jetty surface corresponds to 50 m². The surface of the poles is 13.2 m². An overall amount of 1.27 m³ wood is used for the jetty. The quarry pond collects the indirect emission from the jetty. The quarry pond has a diameter of approx. 100 m and an averaged depth of approx. 7 m. Therefore the overall water content is approx. 55000 m3 water.

The water and sediment compartment was monitored for the used biocides Copper, Cu-HDO and Boron.

Due to the ubiquitous presence of Copper and Boron, the natural background signal was monitored before and after the installation of the jetty.

The observed aqueous concentration of the biocides in the quarry pond fluctuates between 0.59 – 2.29 μg/L total Cu, (including the measured background Cu content of 1.46 μg/L), 11.8 – 34.42 μg/L B (including the natural background B content of 27.4 μg/L) and <1.7 – 2.4 μg/L Cu-HDO (taken into account a LoD of 1.7 μg/L).

The analytical results are randomly distributed around the background signal or the LoD of the used analytical method.

During the two years monitoring period no significant contamination, increase or accumulation of the biocides could be detected in the ambient water. The natural fluctuation during the season appears more relevant for the content of the natural biocides. However, this natural fluctuation could not be corrected, because a local area around the jetty was monitored only.

For the sediment compartment all measurements are below or similar to the limit of quantification or detection of the used analytical methods. Therefore for worst case considerations the monitored concentrations are given by the LoQ of the used method. The total Copper content is 0.7 -0.71 mg/kg, the Boron content is 0.11 mg/kg and the Cu-HDO content is < 0.064 mg/kg.

An increase or an enrichment of the biocide concentration in the local sediment compartment around the jetty is not observed.

Additionally to the monitoring of the time dependent concentration of active ingredients in the aquatic compartment the growth of water plants and algae in the water compartment in close neighbourhood to the jetty was monitored after one year of exposure (please refer to chapter 2.2.8.1 Effects assessment on the environment; Effects on any other specific, non-target organisms (flora and fauna) believed to be at risk).

#### Risk characterisation

Copper background concentrations

The risk assessment was carried out for the active substances Cu-HDO and for the total copper concentration (from basic copper carbonate and Cu-HDO) taking into account the natural/pristine and the regional background concentration of copper. The agreed natural/pristine and the regional background concentration of copper were added separately to the calculated PECs for total copper, which is in line with the CAR for basic copper carbonate (France, 2011).

|  |  |  |  |
| --- | --- | --- | --- |
| Compartment | Natural/pristine background concentration | Regional background concentration | Unit |
| Surface water | 8.8E-04 | 2.9E-03 | mg/L |
| Ground water | 8.8E-04 | 2.9E-03 | mg/L |
| Soil | 12  10.6 | 24.4  21.6 | mg/kgdwt  mg/kgwwt |
| Sediment | 21  4.56 | 67.5  14.7 | mg/kgdwt  mg/kgwwt |

**Atmosphere**

Due to the low volatility of the active substances Cu-HDO and basic copper carbonate (low vapour pressure), local air concentrations are considered to be insignificant. Biotic effects in the air compartment are not expected to pose a risk to the atmosphere.

**Sewage treatment plant (STP)**

STP is a directly exposed compartment for Scenario [1], Industrial application and scenario [2b] Noise barrier.

|  |  |  |  |
| --- | --- | --- | --- |
| **Summary table on PEC/PNECvaluesfor total copper and Cu-HDO for STP** | | | |
| **SCENARIO** | | **PECstp/PNECstp** | |
| **Total copper** | **Cu-HDO** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 6.87E-02 | 0.113 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 3** | 4.74E-04 | 2.66E-04 |
| **TIME 2** | 2.03E-04 | 2.32E-04 |
| **TIME 3** | 1.38E-05 | 1.43E-05 |

Conclusion:

The calculated risk ratios for the STP are <1 indicating an acceptable risk for microorganisms.

**Aquatic compartment**

For total copper, the pristine/natural and regional background concentrations were added to the calculated PEC values (France, 2011) (see table below).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Summary table on calculated PECvaluesfor total copper, total copper including pristine/natural and regional background concentrations for the surface water** | | | | |
| **SCENARIO** | | **PECsw [mg/L]** | | |
| **PEC total**  **copper** | **PEC total**  **copper + pristine BG** | **PEC total**  **copper + regional BG** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 1.35E-03 | 2.23E-03 | 4.25E-03 |
| **storage** | 3.77E-04 | 1.26E-03 | 3.28E-03 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 9.42E-06 | 8.89E-04 | 2.91E-03 |
| **TIME 2** | 4.04E-06 | 8.84E-04 | 2.90E-03 |
| **TIME 3** | 2.74E-07 | 8.80E-04 | 2.90E-03 |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 2.24E-04 | 1.10E-03 | 3.12E-03 |
| **TIME 2** | 2.32E-03 | 3.20E-03 | 5.22E-03 |
| **TIME 3** | 2.32E-03 | 3.20E-03 | 5.22E-03 |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 2.34E-04 | 1.11E-03 | 3.13E-03 |
| **TIME 2** | 6.92E-04 | 1.57E-03 | 3.59E-03 |
| **TIME 3** | 8.18E-04 | 1.70E-03 | 3.72E-03 |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | 0.132 | 0.133 | 0.135 |
| **TIME 2** | 1.71E-02 | 1.80E-02 | 2.00E-02 |
| **TIME 3** | 1.12E-03 | 2.00E-03 | 4.02E-03 |

For the scenarios [1] Storage, [2c] Bridge over pond, [4a] Jetty in Lake and [4b] Sheet piling the risk ratios for direct emissions of total copper and Cu-HDO to surface water were calculated. For the scenarios [1] Industrial Application and [2b] Noise barrier the risk ratios indirect release from the STP to surface water of total copper and Cu-HDO were calculated.

In the following table, PEC/PNEC values are summarised.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Summary table on PEC/PNECvaluesfor total copper, total copper including pristine/natural background concentration, total Copper including regional background concentration and Cu-HDO for the surface water** | | | | | |
| **SCENARIO** | | **PECsw/PNECsw** | | | |
| **Total**  **copper** | **Total**  **copper + pristine BG** | **Total**  **copper + regional BG** | **Cu-HDO** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 0.173 | 0.286 | 0.545 | 0.174 |
| **storage phase** | 4.83E-02 | 0.161 | 0.420 | 7.91E-03 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 1.21E-03 | 0.114 | 0.373 | 4.07E-04 |
| **TIME 2** | 5.18E-04 | 0.113 | 0.372 | 3.57E-04 |
| **TIME 3** | 3.51E-05 | 0.113 | 0.372 | 2.20E-05 |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 2.87E-02 | 0.142 | 0.401 | 1.06E-03 |
| **TIME 2** | 0.297 | 0.410 | 0.669 | 1.31E-03 |
| **TIME 3** | 0.297 | 0.410 | 0.669 | 8.32E-05 |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 3.00E-02 | 0.143 | 0.402 | 5.86E-03 |
| **TIME 2** | 8.87E-02 | 0.202 | 0.461 | 1.36E-03 |
| **TIME 3** | 0.105 | 0.218 | 0.477 | 1.11E-04 |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | **16.9** | **17.0** | **17.3** | **4.75** |
| **TIME 2** | **2.19** | **2.31** | **2.56** | 0.675 |
| **TIME 3** | 0.144 | 0.256 | 0.515 | 5.59E-02 |

Conclusion:

The PEC/PNEC ratios are >1 for scenario [4b] Sheet pilling for direct exposure to surface water at TIME 1 (30 days) for both active substances and at TIME 2 (365 days) for total copper indicating unacceptable risk for aquatic organisms. However, TIME 1 is not a representative time scale for vacuum pressure treated wood, which is in use for more than 10 years. In order to reduce the identified risks to an acceptable level the following RMM is proposed:

*“Treated timber must not be placed or used directly in water bodies”*.

All other calculated risk ratios are <1 indicating an acceptable risk for aquatic organisms.

**Sediment compartment**

The pristine/natural and regional background concentrations of copper were added to the calculated PECs for total copper which is in line with the assessment report for basic copper carbonate (France, 2011)(see table below).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Summary table on calculated PECvaluesfor total copper, total copper including pristine/natural and regional background concentration for the sediment** | | | | |
| **SCENARIO** | | **PECsed [mg/kgwwt]** | | |
| **PEC total**  **copper** | **PEC total**  **copper + pristine BG** | **PEC total**  **copper + regional BG** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 3.11 | 7.67 | 17.8 |
| **storage** | 2.48 | 7.04 | 17.2 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 2.20E-02 | 4.58 | 14.7 |
| **TIME 2** | 9.30E-03 | 4.57 | 14.7 |
| **TIME 3** | 6.00E-04 | 4.56 | 14.7 |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 1.47 | 6.03 | 16.2 |
| **TIME 2** | 15.3 | 19.8 | 30.0 |
| **TIME 3** | 15.3 | 19.8 | 30.0 |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 1.54 | 6.10 | 16.2 |
| **TIME 2** | 4.55 | 9.11 | 19.3 |
| **TIME 3** | 5.38 | 9.94 | 20.1 |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | 868 | 873 | 883 |
| **TIME 2** | 112 | 117 | 127 |
| **TIME 3** | 7.37 | 11.9 | 22.1 |

For the scenarios [1] Storage, [2c] Bridge over Pond, [4a] Jetty in Lake and [4b] Sheet piling the risk for direct exposure of the active substance total copper to the sediment compartment was calculated. For scenarios [1] Industrial Application and [2b] Noise barrier the risk for indirect exposure to the sediment for total copper was calculated.

In the assessment report for Cu-HDO (Austria, 2013) the PECs and the PNECs for the sediment compartment were calculated according to the equilibrium partitionating method (EPM). Thus the risk ratios for the sediment compartment for this active substance are identical to the ratios for the surface water compartment.

In the following table, PEC/PNEC values are summarised.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Summary table on calculated PEC/PNECvaluesfor total copper, total copper including pristine/natural and regional background concentration for the sediment** | | | | |
| **SCENARIO** | | **PECsed/PNECsed** | | |
| **Total**  **copper** | **Total**  **copper + pristine BG** | **Total**  **copper + regional BG** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 0.165 | 0.711 | **1.25** |
| **storage** | 0.131 | 0.372 | 0.909 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 1.16E-03 | 0.242 | 0.779 |
| **TIME 2** | 4.92E-04 | 0.242 | 0.778 |
| **TIME 3** | 3.17E-05 | 0.241 | 0.778 |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 7.78E-02 | 0.319 | 0.856 |
| **TIME 2** | 0.807 | **1.05** | **1.59** |
| **TIME 3** | 0.807 | **1.05** | **1.59** |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 8.15E-02 | 0.323 | 0.859 |
| **TIME 2** | 0.24 | 0.482 | **1.02** |
| **TIME 3** | 0.285 | 0.526 | **1.06** |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | **45.9** | **46.2** | **46.7** |
| **TIME 2** | **5.95** | **6.19** | **6.73** |
| **TIME 3** | 0.390 | 0.631 | **1.17** |

A refined assessment (i.e. including adsorption of Cu on suspended particles) was performed for scenarios suggesting direct release to surfacewater.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Summary table on refined calculated PEC values for total copper, total copper including pristine/natural and regional background concentration for the sediment** | | | | |
| **SCENARIO** | | **PECsed [mg/kgwwt]** | | |
| **PEC total**  **copper** | **PEC total**  **copper + pristine BG** | **PEC total**  **copper + regional BG** |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 0.043 | 4.60 | 14.7 |
| **TIME 2** | 0.443 | 5.00 | 15.1 |
| **TIME 3** | 0.443 | 5.00 | 15.1 |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 0.087 | 4.65 | 14.8 |
| **TIME 2** | 0.259 | 4.82 | 15.0 |
| **TIME 3** | 0.305 | 4.87 | 15.0 |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | 596 | 601 | 611 |
| **TIME 2** | 77.2 | 81.8 | 91.9 |
| **TIME 3** | 5.06 | 9.62 | 19.8 |

In the following table, PEC/PNEC values are summarised.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Summary table on refined calculated PEC/PNECvaluesfor total copper, total copper including pristine/natural and regional background concentration for the sediment** | | | | |
| **SCENARIO** | | **PECsed/PNECsed** | | |
| **Total**  **copper** | **Total**  **copper + pristine BG** | **Total**  **copper + regional BG** |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 0.002 | 0.244 | 0.780 |
| **TIME 2** | 0.023 | 0.265 | 0.801 |
| **TIME 3** | 0.023 | 0.265 | 0.801 |
| **Scenario [4a]: Jetty in lake UC4** | **TIME 1** | 0.005 | 0.246 | 0.782 |
| **TIME 2** | 0.014 | 0.255 | 0.791 |
| **TIME 3** | 0.016 | 0.257 | 0.794 |
| **Scenario [4b]: Sheet piling UC4** | **TIME 1** | **31.5** | **31.8** | **32.3** |
| **TIME 2** | **4.09** | **4.32** | **4.86** |
| **TIME 3** | 0.268 | 0.509 | **1.05** |

Conclusion:

The calculated risk ratio for scenario [1] Industrial application for total copper taking into account the natural background concentration indicates an unacceptable risk for the sediment compartment. In order to reduce the risk ratio to an acceptable level the following RMMs are proposed:

*“To protect organisms living in water, it is not permitted to discharge spills and residues containing the product to surface water or the sewer”.*

*“All industrial application processes must be carried out within an area situated on impermeable hard standing with bunding to prevent run-off and a recovery system in place (e.g. sump)”.*

Hence the identified risk for scenario [1] Industrial application can be reduced to an acceptable level.

For scenario [4b] Sheet piling the direct exposure to the sediment at TIME 1 (30 days) and TIME 2 (365 days) for total copper and total copper including the pristine background concentration lead to PEC/PNEC ratios >1 indicating unacceptable risks. Considering the regional background concentration of total copper, TIME 1, 2 and 3 lead to PEC/PNEC ratios >1 indicating unacceptable risks. In order to reduce the identified risks to an acceptable level the following RMM is proposed:

*“Treated timber must not be placed or used directly in water bodies”* covers also the sediment compartment. Hence the identified risks for scenario [4b] can be reduced to an acceptable level. This RMM must be also labelled on treated wood.

All other calculated risk ratios are <1 indicating an acceptable risk for aquatic organisms.

**Terrestrial compartment**

For total copper the pristine and the regional background concentration were added to the calculated PEC values (France, 2011) (see table below).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Summary table on calculated PEC values for total copper, total copper including pristine/natural and regional background concentration for the soil** | | | | |
| **SCENARIO** | | **PECs [mg/kgwwt]** | | |
| **PEC total**  **copper** | **PEC total**  **copper + pristine BG** | **PEC total**  **copper + regional BG** |
| **Scenario [1]: Industrial application and storage phase** | **application** | 3.6 | 14.2 | 25.2 |
| **storage 30 days** | 0.657 | 11.3 | 22.3 |
| **storage 20 years** | 160 | 171 | 182 |
| **Scenario [2a]: House scenario UC3** | **TIME 1** | 0.127 | 10.7 | 21.7 |
| **TIME 2** | 1.31 | 11.9 | 22.9 |
| **TIME 3** | 0.655a | 11.3 | 22.3 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 4.75E-02 | 10.7 | 21.7 |
| **TIME 2** | 0.491 | 11.1 | 22.1 |
| **TIME 3** | 0.246a | 10.9 | 21.9 |
| **Scenario [3a]: Transmission pole UC4** | **TIME 1** | 0.248 | 10.9 | 21.9 |
| **TIME 2** | 1.36 | 12.0 | 23.0 |
| **TIME 3** | 0.715a | 11.3 | 22.3 |
| **TIME 3special application** | 0.720a | 11.3 | 22.3 |

a In order to consider the phenomenon of copper ageing in soil, an ageing factor of 2 was applied on the total copper concentrations in soil for the values calculated over a longer assessment period (TIME 3). This strategy was validated at TMIII08.

For the scenarios [1] Storage Phase, [2a] House scenario, [2b] Noise Barrier, [2c] Bridge over pond and [3a] Transmission pole the risk of direct emissions of total copper and Cu-HDO to the soil compartment were calculated. For the scenario [1] Industrial application the risk of the indirect emissions of total copper and Cu-HDO via sludge application to the soil was assessed.

In the following table, PEC/PNEC values are summarised.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Summary table on calculated PEC/PNEC values for total copper, total copper including pristine/natural and regional background concentration for the terrestrial compartment** | | | | | |
| **SCENARIO** | | **PEC/PNEC** | | | |
| **Total copper** | **Total copper + pristine BG** | **Total copper + regional BG** | **Cu-HDO** |
|  |  |  |
| **Scenario [1]: Industrial application and storage phase** | **APPLICATION** | 8.92E-02 | 0.352 | 0.625 | 0.114 |
| **storage**  **30 days** | 1.63E-02 | 0.279 | 0.552 | 8.43E-02 |
| **storage**  **20 years** | **3.97** | **4.23** | **4.50** |
| **Scenario [2a]: House scenario UC3** | **TIME 1** | 3.15E-03 | 0.266 | 0.538 | 1.58E-02 |
| **TIME 2** | 3.25E-02 | 0.295 | 0.568 | 1.42E-02 |
| **TIME 3** | 1.62E-02 | 0.279 | 0.552 | 8.78E-04 |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 1.18E-03 | 0.264 | 0.536 | 5.92E-03 |
| **TIME 2** | 1.22E-02 | 0.275 | 0.547 | 5.33E-03 |
| **TIME 3** | 6.10E-03 | 0.269 | 0.541 | 3.29E-04 |
| **Scenario [3a]: Transmission pole UC4 special application** | **TIME 1** | 6.15E-03 | 0.269 | 0.541 | 0.118 |
| **TIME 2** | 3.37E-02 | 0.296 | 0.569 | 2.76E-02 |
| **TIME 3** | 1.77E-02 | 0.280 | 0.553 | 2.02E-03 |
| **TIME 3special application** | 1.78E-02 | 0.281 | 0.553 | 1.07E-03 |

Conclusion:

The calculated risk ratios for total copper, total copper including the pristine and the regional background concentrations in scenario [1] storage after 20 years are >1 indicating unacceptable risk for terrestrial organisms. To reduce the identified risks to an acceptable level the following RMM is proposed:

“Freshly treated timber must be stored after treatment under shelter or on impermeable hard standing, or both, to prevent direct losses to soil, sewer or water, and that any losses of the product, including any contaminated water/soil must be collected for reuse or disposal in accordance with local/national/international requirements.”

All other calculated risk ratios are <1 indicating an acceptable risk for terrestrial organisms.

**Groundwater**

The calculated PEC values for the different European scenarios for the active substances Cu-HDO are well below the trigger for biocides of 0.1 µg/L. This leads to the assumption that there is acceptable risk for groundwater. According to the Assessment report of copper carbonate (France, 2011) Cu as element is considered to be strongly absorbed and immobile in soil. Therefore, copper is not expected to pose a risk for groundwater contamination, and no special risk assessment for Cu was performed for product approval.

***Risk characterisation of 2-Aminoethanol (2-MEA) for the environment***

The risk assessment was carried out for all relevant compartments and scenarios where no risks were identified or RMMs were set previously for the active substances.

**Atmosphere**

Due to the information available for 2-Aminoethanol on the REACH registered substance data base, local air concentrations are considered to be insignificant. Biotic effects in the air compartment are not expected to pose a risk to the atmosphere.

**Sewage treatment plant (STP)**

For the scenario Noise Barrier UC3, the risk ratios for direct emissions of 2-Aminoethanol to surface water were calculated

In the following table, PEC/PNEC values are summarised.

|  |  |  |
| --- | --- | --- |
| **Summary table on PEC/PNECvaluesfor 2-Aminoethanol for STP** | | |
| **SCENARIO** | | **PECstp/PNECstp** |
| **Scenario: Noise barrier UC3** | **TIME 3** | 7.59E-05 |
| **TIME 2** | 3.77E-05 |
| **TIME 3** | 2.43E-06 |

Conclusion:

The calculated risk ratios for the STP are <1 indicating an acceptable risk for microorganisms.

**Aquatic compartment**

For the scenario “Bridge over pond” the risk ratios for direct emissions of 2-Aminoethanol to surface water were calculated.

In the following table, PEC/PNEC values are summarised.

|  |  |  |
| --- | --- | --- |
| **Summary table on PEC/PNECvaluesfor for 2-Aminoethanol for the surface water** | | |
| **SCENARIO** | | **PECsw/PNECsw** |
| **Scenario: Bridge over pond UC3** | **TIME 1** | 1.08E-02 |
| **TIME 2** | 1.04E-02 |
| **TIME 3** | 7.13E-04 |

Conclusion:

The PEC/PNEC ratios are <1 indicating an acceptable risk for aquatic organisms.

**Sediment compartment**

The PECs and the PNECs for the sediment compartment were calculated according to the equilibrium partitionating method (EPM). Thus the risk ratios for the sediment compartment for 2-Aminoethanol are identical to the ratios for the surface water compartment.

Conclusion:

The PEC/PNEC ratios are <1 indicating an acceptable risk for aquatic organisms.

**Terrestrial compartment**

For the UC3 scenarios (House scenario and Noise Barrier) and the UC4 scenario (Transmission pole) the risks of direct emissions of 2-Aminoethanol to the soil compartment were calculated.

In the following table, PEC/PNEC values are summarised.

|  |  |  |
| --- | --- | --- |
| **Summary table on calculated PEC/PNEC values for 2-Aminoethanol for the terrestrial compartment** | | |
| **SCENARIO** | | **PEC/PNEC** |
| **Scenario: House scenario UC3** | **TIME 1** | 0.361 |
| **TIME 2** | 0.180 |
| **TIME 3** | 1.16E-02 |
| **Scenario: Noise barrier UC3** | **TIME 1** | 0.135 |
| **TIME 2** | 6.73E-02 |
| **TIME 3** | 4.34E-03 |
| **Scenario: Transmission pole UC4special applicationa** | **TIME 1** | **11.6** |
| **TIME 2** | **1.26** |
| **TIME 3** | 0.115 |
| **TIME 3special application** | 5.75E-03 |

a The use class “UC 4 special application” specifically targets treated timber with applications having an increased service life time (e.g. transmission poles). For the intended use class a service up to 40 years is to be expected.

Conclusion:

Acceptable risk ratios for the UC 3 scenarios for the soil compartment were identified.

The calculated risk ratios for Time 1 and Time 2 in Scenario: Transmission pole UC 4special application are >1 indicating unacceptable risks for terrestrial organisms.   
TIME 1 is not a representative time scale for vacuum pressure treated wood, which is in use for more than 20 years. After the 2nd leaching workshop for PT 8, it was agreed to perform a risk assessment for the new TIME 2 (1 year). However, for wood in service, TIME 3 is the relevant time point for decision making, as service life is the main driver for risk assessment.

Considering TIME 3, 20 and 40 years, acceptable risk ratios for Scenario Transmission pole UC 4 special application were identified.

**Groundwater**

The calculated PEC values for the different European scenarios for the substance of concern 2-Aminoethanol are below the trigger for biocides of 0.1 µg/L. This leads to the assumption that there is acceptable risk for groundwater.

**Primary and secondary poisoning**

Primary poisoning

A direct uptake of the product is very unlikely. Therefore, PEC/PNEC ratios for primary poisoning were not calculated.

Secondary poisoning

Cu-HDO:

The octanol/water partition coefficient for Cu-HDO has been determined with 2.6 which results in very low BCFs in fish and earthworms. The risk of secondary poisoning by ingestion of contaminated food (fish or earthworms) is therefore very limited to non-existent. So this exposure route was not assessed further and no calculations were performed. This is in line with the Assessment report of Cu-HDO (Austria, 2013).

Copper:

According to the Assessment report of copper carbonate (France, 2011) bioaccumulation and biomagnification phenomenons are considered as not applicable for copper. Therefore, copper is not expected to pose a risk for secondary poisoning, and no special risk assessment was performed for product approval.

Conclusion:

Summarising the risk characterisation, the risk of Cu-HDO and copper for birds and mammals via primary or secondary poisoning is acceptable.

**Mixture toxicity**

Following the Guidance Volume IV Environment (Part B+C) (ECHA, 2017) a mixture toxicity assessment is required. The required data and the necessity of a mixture toxicity assessment are described in the following screening steps. The decision of concerned environmental compartments are chosen based on the decision logic of the case study “Wood preservative” described in the Guidance Volume IV Environment (Part B+C-Appendix 12), (ECHA, 2017).

Screening steps

Screening Step 1: Identification of the concerned environmental compartments

According to the intended use of the product and the applied RMMs exposures a mixture toxicity assessment to the following scenarios is necessary:

STP-[2b] Noise Barrier

Freshwater -[2c] Bridge over Pond

Sediment-[2c] Bridge over Pond

Soil-[2a] House scenario

Soil-[2b] Noise barrier

Soil-[3a] Transmission pole

Screening Step 2: Identification of relevant substances

The two active substances and the SoC 2-Aminoethanol were identified to be evaluated for the mixture toxicity assessment.

Screening Step 3: Screen on synergistic interactions

The applicant stated that there are no synergistic effects between the active substances and the co-formulants contained in the biocidal product family Wolmanit CX-8WB.

|  |  |
| --- | --- |
| **Screening step** | |
|  | Significant exposure of environmental compartments? Y |
|  | Number of relevant substances >1? Y |
|  | Indication for synergistic effects for the product or its constituents in the literature? N |
|  | Conclusion:  An assessment of mixture toxicity has to be performed for the biocidal product according to the criteria defined in the Guidance Volume IV Environment (Part B+C) (ECHA, 2017), since Screening Step 1 and 2 are answered with “Yes”. The environmental mixture toxicity assessment is based on two active substances and the substance of concern 2-Aminoethanol. |

*Tiered approach*

As Tier 1 approach PEC/PNEC summation of both active substances for all concerned compartments was performed.

**Tier 1. PEC/PNEC summation**

|  |  |  |
| --- | --- | --- |
| Tier 1 | | |
| RQ product | Acceptable risk for the environment? (Y/N) | Y |

|  |  |  |
| --- | --- | --- |
| **Summary table PEC/PNECvaluesfor total copper, Cu-HDO and 2-Aminoethanol for STP** | | |
| **SCENARIO** | | **PEC/PNEC summation** |
| **Scenario [2b]: Noise barrier UC3** | **TIME 1** | 8.16E-04 |
| **TIME 2** | 4.73E-04 |
| **TIME 3** | 3.05E-05 |

Conclusion: Acceptable cumulative risks for the STP were identified.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PEC/PNEC summationfor total copper, Cu-HDO and 2-Aminoethanol for surface water** | | | | |
| **SCENARIO** | | **Total**  **(without copper background)** | **Total**  **(with copper**  **pristine background concentration)** | **Total**  **(with copper regional background concentration)** |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 4.05E-02 | 0.154 | 0.413 |
| **TIME 2** | 0.309 | 0.422 | 0.681 |
| **TIME 3** | 0.298 | 0.411 | 0.670 |

Conclusion: Acceptable cumulative risks for the surface water were identified.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PEC/PNEC summationfor total copper, Cu-HDO and 2-Aminoethanol for sediment** | | | | |
| **SCENARIO** | | **Total**  **(without copper background)** | **Total**  **(with copper**  **pristine background concentration)** | **Total**  **(with copper regional background concentration)** |
| **Scenario [2c]: Bridge over pond UC3** | **TIME 1** | 1.38E-02 | 0.256 | 0.792 |
| **TIME 2** | 3.47E-02 | 0.277 | 0.813 |
| **TIME 3** | 2.38E-02 | 0.266 | 0.802 |

Conclusion: Acceptable cumulative risks for the sediment were identified.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PEC/PNEC summationfor total copper, Cu-HDO and 2-Aminoethanol for soil** | | | | |
| **SCENARIO** | | **Total**  **(without copper background)** | **Total**  **(with copper**  **Pristine background concentration)** | **Total**  **(with copper regional background concentration)** |
| **Scenario [2a]: House scenario UC3** | **TIME 1** | 0.38 | 0.64 | 0.91 |
| **TIME 2** | 0.23 | 0.49 | 0.76 |
| **TIME 3** | 2.87E-02 | 0.29 | 0.56 |
| **Scenario [2b]: Noise barrier UC3 (via STP)** | **TIME 1** | 0.14 | 0.41 | 0.68 |
| **TIME 2** | 8.48E-02 | 0.35 | 0.62 |
| **TIME 3** | 0.01 | 0.27 | 0.55 |
| **Scenario [3a]: Transmission pole UC4special applictation** | **TIME 1** | **11.7** | **11.9** | **12.2** |
| **TIME 2** | **1.32** | **1.59** | **1.86** |
| **TIME 3** | 0.13 | 0.40 | 0.67 |
| **TIME 3special application**a | 2.46E-02 | 0.29 | 0.56 |

a The use class “UC 4 special application” specifically targets treated timber with applications having an increased service life time (e.g. transmission poles). For the intended use class a service up to 40 years is to be expected.

Conclusion:

Acceptable cumulative risks for Scenario [2a] and [2b] for the soil compartment were identified.

The calculated cumulative risks for Time 1 and Time 2 in Scenario [3a] Transmission pole UC 4 special application are >1 indicating unacceptable risk for terrestrial organisms.   
TIME 1 is not a representative time scale for vacuum pressure treated wood, which is in use for more than 20 years. After the 2nd leaching workshop for PT 8, it was agreed to perform a risk assessment for the new TIME 2 (1 year). However, for wood in service, TIME 3 is the relevant time point for decision making, as service life is the main driver for risk assessment.

Considering TIME 3, 20 and 40 years, acceptable cumulative risks for Scenario [3a] Transmission pole UC 4 special application were identified.

***Aggregated exposure (combined for relevant emmission sources)***

At the time of preparation of this PAR, no EU agreed guidance was available on how to perform a full aggregated exposure assessment. Therefore, no assessment has been performed at this stage. This chapter of the PAR has to be reassessed once an agreed guidance has been made available. This could take place at active substance renewal stage or at product authorisation stage, depending on when such guidance becomes available.

Conclusion:

Not applicable

|  |
| --- |
| **Overall conclusion on the risk assessment for the environment of the product** |
| Active substances:  Risk ratios were calculated for the direct emissions to STP, direct and indirect exposure to surface water, sediment and soil for total copper (including background concentration) and Cu-HDO.  For the STP the risk ratios are <1 indicating acceptable risk. The calculated groundwater concentrations for total Copper (including background concentrations) and Cu-HDO are <0.1 µg/L.  For the surface water risks were identified for total copper and Cu-HDO (Scenario 4b-sheet piling).  For the sediment compartment, risks were identified for total copper (Scenario 1-application and Scenario 4b-Sheet piling). Risk ratios for the sediment compartment for Cu-HDO are identical to the ratios for the surface water compartment.  In order to reduce the identified risks for the aquatic compartment the following RMMs are proposed:  “Treated timber must not be placed or used directly in water bodies".  “To protect organisms living in water, it is not permitted to discharge spills and residues containing the product to surface water or the sewer”.  “All industrial application processes must be carried out within an area situated on impermeable hard standing with bunding to prevent run-off and a recovery system in place (e.g. sump)”.  For the soil compartment, risks were identified for total copper (Scenario 1-Storage 20 years) and Cu-HDO (Scenario 1- Storage 20 years).  In order to reduce the identified risks for the terrestric compartment the following RMMs are proposed:  “Freshly treated timber must be stored after treatment under shelter or on impermeable hard standing, or both, to prevent direct losses to soil, sewer or water, and that any losses of the product, including any contaminated water/soil must be collected for reuse or disposal in accordance with local/national/international requirements.”  All other calculated risk ratios were <1 indicating an acceptable risk for the soil compartment.  Field tests:  The results of the field monitoring studies were in a similar range as the results from the calculated scenarios calculated. However, the application rate used in the field tests was lower than the application rate used for the predicted environmental concentrations. Therefore, the study results were not used for the further assessment  Substance of concern:  2-Aminoethanol  Under consideration of previously restricted applications and set RMMs the adverse effects of the SoC 2-Aminoethanol were quantitatively evaluated.  Risk ratios below 1, indicating acceptable risks, were calculated for the STP and the surface water compartment.  In addition, identified risks for the soil compartment are considered to be acceptable.  This is further confirmed by applying approach 2 of TAB entry A3 (Equations to be used for PEC calculation for wood and other preservatives applied outdoors) which results in a risk ratio < 1 for Time 2. The PEC/PNEC was then 0.14  (PEC 0.15 mg/kgwwt).  The calculated PEC values for the different European scenarios for the substance of concern 2-Aminoethanol are below the trigger for biocides of 0.1 µg/L. This leads to the assumption that there is acceptable risk for groundwater.  Polyethyleneimine:  A qualitative assessment to Polyethyleneimine is provided in the confidential annex of this document. Considering the set RMMs for the active substances, no unacceptable risks are expected for polyethyleneimine.  Mixture Toxicity:  A Tier 1 mixture toxicity assessment (PEC/PNEC summation) was performed for total copper (including background concentrations), Cu-HDO and 2-Aminoethanol. Acceptable cumulative risks for the STP, surface water, sediment and soil were identified for the concerned scenarios.  Conclusion:  The intended use of Wolmanit CX-8WB\_family leads to acceptable risk for all exposed environmental compartments including mixture toxicity for the two active substances (basic copper carbonate and Cu-HDO) and the SoCs (2-Aminoethanol and Polyethyleneimine) if the recommended risk mitigation measures are followed. |

### **Measures to protect man, animals and the environment**

RECOMMENDED METHODS AND PRECAUTIONS CONCERNING FIRE:

Suitable extinguishing media: Sprayed water, foam, CO2 extinguishing powder or sand

In case of fire, the following combustion products can be released: CO2/CO. H2O and N2/NOx.

Advice for firefighters:

Run-off water from fire-fighting must not be discharged into drains or enter surface water.

In fire-fighting operations, rescue and clearing work under effect of combustion and smoulder gases fire fighters shall wear full protective clothing including self-contained breathing apparatus.

POSSIBILITY OF DESTRUCTION OR DECONTAMINATION FOLLOWING RELEASE

Possibility of destruction or decontamination following release in or on the following: (a) air, (b) water, including drinking water, (c) soil:

1. air

The vapour pressure of the active substances is very low. Furthermore, VoC chamber tests have shown that Cu-HDO and basic copper carbonate do not emit from treated wood to the air; a release of the a.s. into the air is therefore not to be expected.

1. water

The copper based active ingredients can be eliminated by abiotic processes, e.g. adsorption on activated sludge. Contaminated fluids shall be incinerated in a licensed incineration.

1. soil

For large amounts, like spillage, pump off product. For small amounts, pick up with suitable absorbent e.g. sand, sawdust or general-purpose binder. Destroy unwanted amounts of the product by combustion in a licensed incinerator. Contaminated fluid shall be incinerated. In the event of a significant accidental release, contaminated soil should be disposed of according to local and national regulations.

OTHER MEASURES TO PROTECT MAN, ANIMALS, AND THE ENVIRONMENT

See section 2.1.5 (General Directions for use)

### **Assessment of a combination of biocidal products**

Not applicable. The products of the Wolmanit CX-8WB\_family are not intended to be authorised for the use with other biocidal products.

### **Comparative assessment**

No comparative assessment required.

### **ED assessment**

**Assessment of endocrine (ED) properties of the biocidal product family Wolmanit CX-8WB**

The active substances basic copper carbonate and Cu-HDO have not been assessed according to the new ED-criteria under Regulation (EU) 2017/2100, because this should be done at the renewal stage of the active substances.

**Assessment of endocrine properties relating to the co-formulants in the biocidal product**

The assessment of co-formulants was performed before a harmonised approach was developed by the coordination group in 2019 following a similar, national approach.

Regarding ED indications of the co-formulants contained in the biocidal product the C&L Inventory and the submitted SDS were screened for CMR and/or STOT RE classifications.

None of the co-formulants are listed in the ED assessment list[[6]](#footnote-7) or SVHC list[[7]](#footnote-8). For none of the individual ingredients of the Wolmanit products a concern for endocrine disrupting potential is mentioned in the Public Activities Coordination Tool (PACT)[[8]](#footnote-9). In addition the co-formulants were screened by the applicant by QSAR analyses with respect to the oestrogen and androgen receptor binding profile via OECD QSAR toolbox (v.4.2) and the OASIS time proiler (v.2.27). No alert for endocrine activity was observed. In addition the Danish QSAR database was used to screen the co-formulants on endocrine activity. No hits or alerts were retrieved. Furthermore the co-formulants were screened by the applicant via the “US EPA’s Endocrine Disrupting Screening Program for the 21st century[[9]](#footnote-10)”. None of the results triggered an alert for endocrine activity.

The co-formulant **2-Ethylhexanoic acid** (2-EHA) acid has an existing harmonised classification with Repr. 2, H361d. The substance was subject to Substance evaluation under REACH. Initial concerns regarding fertility and neurodevelopmental toxicity led to the request of an extended one-generation reproductive toxicity study (EOGRTS) in a substance evaluation decision issued on 26 February 2014. The results of this study showed a NOAEL for parental effects at 250 mg/kg bw/d, based on the effects on body weights, food consumption, kidney and liver weights and kidney pathology observed in animals of the highest dose (800 mg/kg bw/d). The NOAEL for fertility and reproductive effects, developmental neurotoxicity and immunotoxicity effects was established at 800 mg/kg bw/d (no adverse effects according to Spain, 2017). However, increases in relative testes weight were seen in cohort 1A and cohort 1B in the highest dose group. Males in cohort 1B reported also these increases in testes weight already in the mid dose group in addition to increases in relative cauda epididymis weight (but sperm parameters not affected) in the high-dose group (accompanied by significant decreases in terminal body weights).

Increases of the anogenital distance (AGD) in F1 (but not F2) males on PND 4 as well as increases of the mean length of the longest oestrus cycles in F0 and oestrus cycle length in F1 females (but within historical control data) were reported in the same study.

According to Spain (2017) teratogenicity effects (NOAEL of 100 mg/kg bw/d) in terms of reduction of foetal weight and skeletal variations at doses which did not cause visible maternal toxicity were reported. In addition, clubfoot was observed at all dose levels, although the incidence was not statistically significant at 100 mg/kg bw/d in a non-GLP developmental toxicity study, equivalent or similar to OECD 414 (Pennanen et al., 1992 cited in Spain, 2017). Clear signs of selective developmental toxicity and teratogenicity related to external (adactyly, tail malformations) and skeletal malformations (vertebral column, sternum, ribs, femur) and skeletal and overall variations and retardations were also observed in the unnamed report from 1997, study on the prenatal toxicity of 2-ethylhexyl-2-ethylhexanoate where 2-EHA was used as positive control at a dose of 600 mg/kg bw/d in rats from GD 6 to 15. These results fit well to the above findings according to Spain (2017) and the effects upon development observed in rats are the basis for the current classification of 2-EHA as toxic for reproduction, category 2 (H361d: suspected of damaging the unborn child).

Several mechanistic studies investigate the role of 2-EHA on maternal or fetal Zn metabolism. While the developmental toxicity of 2-EHA may be modulated, in part, by its influence on maternal-embryonic Zn metabolism, other mechanisms cannot be excluded (Spain, 2017).

The co-formulant **2-aminoethanol** (2-MEA) was also evaluated under REACH with the initial concerns regarding human helath related to suspected sensitisation and carcinogenicity[[10]](#footnote-11). The conclusion document noted no need for regulatory follow-up action (UK, 2016a).

In the substance evaluation report an oral two generation reproduction toxicity study dated 1994 according to OECD 416 with 2-MEA HCl in compliance with GLP was provided. In the highest dose group of 1000 mg/kg bw/d statistically significantly decreased absolute and relative weight of epididymides and cauda epididymides in F0 and F1 males Crl:WI (Han) rats were detected. In addition in parental animals prostate weight and the number of homogenization resistant caudal epididymal sperm was slightly, but significantly, decreased in F0 males. No histomorphological evidence of testicular toxicity was observed in the study (UK, 2016b; OECD, 2013b[[11]](#footnote-12)). Body weight reductions at termination were within 1% to 3% compared to controls for F0 and F1 males.

Females at this dose had decreased numbers of implants and increased resorption rates resulting in smaller litters associated with indications of systemic toxicity (OECD, 2013b).

2-MEA was also subject to 882 in vitro tests in Toxcast with 13 positive assays[[12]](#footnote-13), one of them responsive to the endogenous human aryl hydrocarbon receptor (ATG\_Ahr\_CIS\_dn), however the assay was not developed or optimized to detect loss of signal. In addition the plot indicated activation at very low concentrations only, so the data should be interpreted with caution.

**Conclusion**

Based on the consistency of effects on male reproductive organs in F0 and F1 male rats in a valid two-generation reproductive toxicity study (dated before 2001) EAS mediated endocrine activity of 2-aminoethanol cannot be excluded. The eCA AT considered that there are indications of ED properties of the co-formulant 2-aminoethanol and consequently further assessment will be needed. While there are some uncertainties concerning the mode of action for 2-EHA for developmental effects the provided evidence is not sufficient to flag 2-EHA for potential ED properties.

# Annexes

## List of studies for the biocidal product family

| **Section No. in IUCLID** | **Author(s)** | **Year** | **Title** | **Testing Company** | **Report No.** | **GLP Study (Yes/No)** | **Data Protection Claimed (Yes/No)** | **Data Owner** | **Test  formulation** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3.1; 3.2 | XXXXXXXXX | 2014a | Odour, physical state and pH - Wolmanit CX-8WB | BASF Wolman GmbH | 14-WD-005 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.1; 3.2 | XXXXXXXXX | 2014b | Odour, physical state and pH-value of Wolmanit CX-8F | BASF Wolman GmbH | 14-WD-002 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.2 | XXXXXXXXX | 2020a | Alkalinity of Wolmanit CX-8WB | BASF Wolman GmbH | 20-WD-020 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.2 | XXXXXXXXX | 2020b | Alkalinity of Wolmanit CX-8F | BASF Wolman GmbH | 20-WD-021 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.3 | XXXXXXXXX | 2014c | Density of Wolmanit CX-8WB | BASF Wolman GmbH | 14-WD-023 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.3 | XXXXXXXXX | 2014d | Density of Wolmanit CX-8F | BASF Wolman GmbH | 14-WD-020 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.4.1 | XXXXXXXXX | 2014e | Accelerated storage test by heating of Wolmanit CX-8WB | BASF Wolman GmbH | 14-WD-035 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.4.1 | XXXXXXXXX | 2015a | Accelerated storage test by heating of Wolmanit CX-8WB | BASF Wolman GmbH | 14-WD-035 (Revision 1) | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.4.1 | XXXXXXXXX | 2014f | Stability of Wolmanit CX-8WB | BASF Wolman GmbH | 14-WD-062 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.4.1 | XXXXXXXXX | 2015b | Stability of Wolmanit CX-8WB | BASF Wolman GmbH | 15-WD-100 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.4.1 | XXXXXXXXX | 2014g | Accelerated storage test by heating of Wolmanit CX-8F | BASF Wolman GmbH | 14\_WD-032 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.4.1 | XXXXXXXXX | 2015c | Accelerated storage test by heating of Wolmanit CX-8F | BASF Wolman GmbH | 14\_WD-032 (Revision 1) | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.4.1 | XXXXXXXXX | 2014h | Stability of Wolmanit CX-8F | BASF Wolman GmbH | 14-WD-059 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.4.1 | XXXXXXXXX | 2015d | Stability of Wolmanit CX-8F | BASF Wolman GmbH | 15-WD-097 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.5 | XXXXXXXXX | 2014a | Determination of the persistence of foaming of Wolmanit CX-8WB | BASF Wolman GmbH | 14-WD-029-R0 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.5 | XXXXXXXXX | 2014b | Determination of the persistence of foaming of Wolmanit CX-8F | BASF Wolman GmbH | 14-WD-026-R0 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.5 | XXXXXXXXX | 2014c | Dilution stability of Wolmanit CX-WB | BASF Wolman GmbH | 14-WD-074 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.5 | XXXXXXXXX | 2014d | Dilution stability of Wolmanit CX-8F | BASF Wolman GmbH | 14-WD-071 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.8 | XXXXXXXXX | 2015a | Determination of the surface tension of Wolmanit CX-8WB | BioChem | 14 50 40 696 E | Yes | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.8 | XXXXXXXXX | 2015b | Determination of the surface tension of Wolmanit CX-8F | BioChem | 14 50 40 696 B | Yes | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 3.9 | XXXXXXXXX | 2014i | Viscosity of Wolmanit CX-8WB | BASF Wolman GmbH | 14-WD-011 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 3.9 | XXXXXXXXX | 2014j | Viscosity of Wolmanit CX-8F | BASF Wolman GmbH | 14-WD-008 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 4.1; 4.6; 4.17.1 | XXXXXXXXX | 2003 | Safety characteristics according to directive 92/69/EC, annex A9-A17 | BASF SE | SIK-Nr. 03/2303 | Yes | Yes | BASF Wolman GmbH | Wolmanit CX-10 („old“) |
| 4.16 | XXXXXXXXX | 2014e | Corrosivity to metal of Wolmanit CX-8WB | BASF Wolman GmbH | 14-WD-068-RO | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 4.16 | XXXXXXXXX | 2014f | Corrosivity to metal of Wolmanit CX-8F | BASF Wolman GmbH | 14-WD-065 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 4.16 | XXXXXXXXX | 2015a | Corrosivity to metal of Wolmanit CX-8WB | BASF Wolman GmbH | 15-WD-106-R0 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 4.16 | XXXXXXXXX | 2015b | Corrosivity to metal of Wolmanit CX-8F | BASF Wolman GmbH | 15-WD-103-R0 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 4.16 | XXXXXXXXX | 2021a | Corrosivity to metal of Wolmanit CX-8WB | BASF Wolman GmbH | 21-WR-003 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 4.16 | XXXXXXXXX | 2021b | Corrosivity to metal of Wolmanit CX-8F | BASF Wolman GmbH | 21-WR-004 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 5.1 | XXXXXXXXX | 2014k | Validation of an Atom Absorption Spectrometer Method for the Determination of Copper in Wolmanit® CX products | BASF Wolman GmbH | 14-WD-015 | No | Yes | BASF Wolman GmbH | Wolmanit CX-formulations (e.g. Wolmanit CX-10, Wolmanit CX-8, Wolmanit CX-8N, Wolmanit CX-8WB, Wolmanit CX-8F, Wolmanit CX-8FP) |
| 5.1 | XXXXXXXXX | 2014l | Validation of a Photometer Method for the Determination of Bis- (N-cyclohexyldiazenium-dioxy) -copper in Wolmanit CX products. | BASF Wolman GmbH | 14-WD-017 | No | Yes | BASF Wolman GmbH | Wolmanit CX-formulations (e.g. Wolmanit CX-10, Wolmanit CX-8, Wolmanit CX-8N, Wolmanit CX-8WB, Wolmanit CX-8F, Wolmanit CX-8FP) |
| 5.1 | XXXXXXXXX | 2019a | Validation of a method for determination co-formulants in wood preservative- Wolmanit CX (product group) | MPA Eberswalde | 31/19/3671/01 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8WB |
| 5.2 | XXXXXXXXX | 2014m | Validation of an UPLC method for the determination of Cu(HDO)2 in water | BASF Wolman GmbH | 10-FEA-010 | No | Yes | BASF Wolman GmbH | Cu-HDO containing water samples |
| 5.2 | XXXXXXXXX | 2015 | Validation of an UPLC method in combination with solid phase extraction for the determination of Cu(HDO)2 in tap water | BAM | BAM Reference No. 15031686 | No | Yes | BASF Wolman GmbH | Cu-HDO containing water samples |
| 6.7-01 | XXXXXXXXX | 2002 | Holzschutzmittel - Wolmanit CX-LP 14781 Biologische Prüfungen gemäß ÖNORM EN 113 (ÖNORM EN 84, ÖNORM EN 73) | Holzforschung Austria | 1590/2001 /P | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 14781 |
| 6.7-02 | XXXXXXXXX | 2010 | Biologische Prüfung von Wolmanit CX-LP 15687 gemäß ÖNORM EN 113 nach vorangegangener Verdunstungsbeanspruchung gemäß ÖNORM EN 73 | Holzforschung Austria | 2316/2010/2 - HH | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 15687 |
| 6.7-03 | XXXXXXXXX | 2007a | Determination of the toxic values against recently hatched larvae of Hylotrupes bajulus (L.) according to EN 47 (06/2005) after leaching procedure according to EN 84 (05/97) | MPA Eberswalde | 32/07/9008/01 | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 14781 |
| 6.7-04 | XXXXXXXXX | 2007b | Determination of the toxic values against recently hatched larvae of Hylotrupes bajulus (L.) according to EN 47 (06/2005) after evaporative ageing procedure according to EN 73 (04/90) | MPA Eberswalde | 32/07/9008/02 | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 14781 |
| 6.7-05 | XXXXXXXXX | 2011 | Biologische Prüfung von Wolmanit CX-LP 15687 gemäß ÖNORM EN 113 nach vorangegangener Auswaschbeanspruchung gemäß ÖNORM EN 84 | Holzforschung Austria | 2316/2010/1 –HH | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 15687 |
| 6.7-06 | XXXXXXXXX | 2015a | Bestimmung des Grenzwertes der Wirksamkeit gegen Moderfäule und andere erdbewohnende Mikroorganismen gemäß DIN V ENV 807: 2001-12 | BASF Wolman GmbH | B 2615 g | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 14781 |
| 6.7-07 | XXXXXXXXX | 2015b | Bestimmung des Grenzwertes der Wirksamkeit gegen Moderfäule und andere erdbewohnende Mikroorganismen gemäß DIN V ENV 807: 2001-12 | BASF Wolman GmbH | B 2615 d | No | Yes | BASF Wolman GmbH | Wolmanit CX-8F |
| 6.7-08 | XXXXXXXXX | 2002 | RAPPORT D'ESSAI N°: 01-16-EN 117, Norme EN 117 (1990), Nom du produit: Wolmanit CX-10 (80%) | CIRAD – Foret; Laboratoire de Préservation | 01-16-EN 117 | No | Yes | BASF Wolman GmbH | Wolmanit CX-10 (80%) |
| 6.7-09 | XXXXXXXXX | 2007c | Determination of toxic values against Reticulitermes santonensis De Feytaud according to EN 117 (06/2005) after evaporative aging procedure according to EN 73 (04/90) | MPA Eberswalde | 32/07/9008/04 | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 14781 |
| 6.7-10 | XXXXXXXXX | 2014 | Biologische Prüfung von Wolmanit CX-LP 14781 gemäß ÖNORM EN 252 nach 5 Jahren Freilandexposition | HOLZFORSCHUNG AUSTRIA | 746/2008/1 - HH | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 14781 |
| 6.7-11 | XXXXXXXXX | 2017 | Determination of toxic values against Reticulitermes species according to EN 117:2012 | Tecnalia | 063778-5-a | No | Yes | BASF Wolman GmbH | Wolmanit CX-LP 14781 |
| B 8.1 | XXXXXXXXX | 1994 | Acute Dermal Irrita-tion/Corrosion Study with “Wolmanit CX-10” | Austrian Research Centre Seibersdorf | OEFZS-A—2988 BASF | Yes | Yes | BASF Wolman GmbH | Wolmanit CX-10 (VM 546) |
| B 8.2 | XXXXXXXXX | 1994 | Acute eye irrita-tion/Corrosion study with “Wolmanit CX-10” | Austrian Research Centre Seibersdorf | OEFZS-A—2989 | Yes | Yes | BASF Wolman GmbH | Wolmanit CX-10 (VM 546) |
| B 8.3/01 | XXXXXXXXX | 2007 | "WOLMANIT LP16067B": Skin Sensitization Study (Buehler Test) | AUSTRIAN RESEARCH CENTERS Tox-ikologie | WOL104 | Yes | Yes | BASF Wolman GmbH | Wolmanit LP 16067B |
| B 8.5.1 | XXXXXXXXX | 1994 | Acute oral toxicity of Wolmanit CX-10 in rats | Austrian Research Centre Seibersdorf | OEFZS-A—2986 | Yes | Yes | BASF Wolman GmbH | Wolmanit CX-10 (VM 546) |
| B 8.5.2 | XXXXXXXXX | 2003 | “Wolmanit CX-LP 15172” Acute Inhalation Toxicity in Rats | ARC Seibersdorf research GmbH | Wol 66 BASF | Yes | Yes | Wolman GmbH | Wolmanit CX-LP 15172 |
| B 8.5.3 | XXXXXXXXX | 1994 | Acute dermal toxicity of “Wolmanit CX-10” in rats | Research Centre Seibersdorf | OEFZS-A—2987 | Yes | Yes | BASF Wolman GmbH | Wolmanit CX-10 (VM 546) |
| B 8.6/01 | XXXXXXXXX | 2006 | Study of penetration through human skin in vitro | BASF SE | 52H0893/052242 | Yes | Yes | BASF Wolman GmbH | LP 16013 (Wolmanit CX) |
| 8.10 | XXXXXXXXX | 2002 | Surface Sampling and Analysis for Residues of Cu-HDO and Copper from Wolmanit CX-10 treated wood by the wipe test | BASF Wolman GmbH | 02/1603 | No | Yes | BASF Wolman GmbH | Wolmanit CX-10 |
| 8.10 | XXXXXXXXX | 2002 | Raumluftmessungen an Holzern, die mit  Wolmanit CX-S impragniert wurden | Dr. Wolman GmbH BASF Group | PM-8s02120/scht | No | Yes | Dr. Wolman GmbH BASF Group | Wolmanit CX-S |
| 8.10/01 | XXXXXXXXX | 2004 | Estimation of the dermal exposure when using Wolmanit CX-10 in a vacuum pressure treatment plant | BASF Wolman GmbH | 2602/2004 | No | Yes | BASF Wolman GmbH | Wolmanit CX-10  ("old") |
| 8.10 | XXXXXXXXX | 2015 | Estimation of the dermal hand exposure when using Wolmanit CX-formulations in vacuum pressure treatment plants | BASF Wolman GmbH | Wol-Te-151116 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8  Wolmanit CX-8N  Wolmanit CX-10  Wolmanit CX-10.2  Wolmanit CX-8M |
| 8.10 | XXXXXXXXX | 2015 | Surface sampling and analysis for residues of active substances from Wolmanit CX- treated wood by the wipe test | BASF Wolman GmbH | UP 24508 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8  Wolmanit CX-8F  Wolmanit CX-8 FP |
| 8.10 | XXXXXXXXX | 2018 | Measurement report Workplace concentration measurements | BASF Wolman GmbH | --- | No | Yes | BASF Wolman GmbH | Wolmanit CX-8 |
| 9.2.1.1 | XXXXXXXXX | 2003 | "WOLMANIT CX- LP 15172": Acute Toxicity Study for Zebra fish | ARC Seibersdorf research GmbH | ARC-UL-0908 | Yes | Yes | BASF Wolman GmbH | WOLMANIT CX- LP 15172 |
| 9.2.1.2 | XXXXXXXXX | 2003 | "WOLMANIT CX- LP 15172": Acute Toxicity Study for Daphnia magna | ARC Seibersdorf research GmbH | ARC-UL-0909 | Yes | Yes | BASF Wolman GmbH | WOLMANIT CX- LP 15172 |
| 9.2.1.3 | XXXXXXXXX | 2003 | Wolmanit CX-LP 15172: Alga (Selenastrum capricornutum) Growth Inhibition Test | ARC Seibersdorf research GmbH | ARC-UL-0812 | Yes | Yes | BASF Wolman GmbH | WOLMANIT CX- LP 15172 |
| 9.2.1.5 | XXXXXXXXX | 2003 | Wolmanit CX-LP 15172: Activated Sludge Respiration Inhibition Test | ARC Seibersdorf research GmbH | ARC-UL-0776 | Yes | Yes | BASF Wolman GmbH | WOLMANIT CX- LP 15172 |
| 9.2.2.3 | XXXXXXXXX | 2003 | Wolmanit CX-LP 15172-Determination of the effect on the emergence, growth and the observation of morphological changes of rice (Oryza sativa L.) | BASF - Experimental Toxicology and Ecology | 03/0050/65/1 | Yes | Yes | BASF Wolman GmbH | WOLMANIT CX- LP 15172 |
| 10.2.01 | XXXXXXXXX | 2013a | Field monitoring of a soil compartment after installa-tion of Wolmanit CX-8 treat-ed poles | BASF Wolman GmbH | 3107/2012 | No | Yes | BASF Wolman GmbH | Wolmanit CX-8 |
| 10.2.02 | XXXXXXXXX | 2013b | Field monitoring study of a quarry pond after installation of a Wolmanit CX-8 treated jetty | BASF Wolman GmbH | 1405/2012 | No | Yes | BASF Wolman GmbH | Wolmanti CX-8 |
| 10.3 | XXXXXXXXX | 2015 | NT Build 509 " Leaching of active ingredients from preservative-treated timber-Semi-field testing" | MPA Eberswalde - Materialprüfanstalt Brandenburg GmbH | No 31/13/2061/01A | No | Yes | BASF Wolman GmbH | LP17178 |
| 10.3 | XXXXXXXXX | 2014 | OECD 313 "Estimation of Emissions from Preservative-treated wood to the environment: Laboratory Method for Wooden Commodities that are not Covered and are in Contact with Fresh Water or Seawater (2007)" | MPA Eberswalde - Materialprüfanstalt Brandenburg GmbH | No 31/13/2061/07 | No | Yes | BASF Wolman GmbH | LP17179 |
| 10.3 | XXXXXXXXX | 2019b | NT Build 509 " Leaching of active ingredients from preservative-treated timber-Semi-field testing" | MPA Eberswalde - Materialprüfanstalt Brandenburg GmbH | No 31/16/2844/08F | No | Yes | BASF Wolman GmbH | LP17680 |
| 10.3 | XXXXXXXXX | 2015c | Comparison of the leaching behavior of Wolmanit CX-10 family, Wolmanit CX-8WB family and Wolmanit CX-8FP | BASF Wolman GmbH | B2589/08/2015 | No | Yes | BASF Wolman GmbH |  |

## Output tables from exposure assessment tools

### Relevant calculations for primary and secondary human exposure

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Scenario 1, Handling Model 1** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **2-MEA** |  |
| Concentration of substance in product | 2,8 | 13,04 | 4,9 | 31,6 | % |
| Concentration of application solution | 5,21 | 5,21 | 5,21 | 5,21 | % |
| Indicative exposure value of hands(dermal exposure inside gloves, application solution) | 1080 | 1080 | 1080 | 1080 | mg/cycle |
| Indicative exposure value rest of body (application solution) | 8570 | 8570 | 8570 | 8570 | mg/cycle |
| Indicative inhalative exposure (application solution) | 1,9 | 1,9 | 1,9 | 1,9 | mg/m³ |
| Number of cycles per working day | 3 | 3 | 3 | 3 | - |
| Penetration through clothing (body) | 10 | 10 | 10 | 10 | % |
| Dermal absorption rates of a.s (%) | 25 | 5 | 50 | 50 | % |
| Inhalation rate: (m³/min) | 0,0208 | 0,0208 | 0,0208 | 0,0208 | m³/min |
| Cycle time (min ) | 180 | 180 | 180 | 180 | min/day |
| Body weight | 60 | 60 | 60 | 60 | kg |
| Potential dermal hands exposure to substance, Tier II | 4,7265 | 22,0120 | 8,2714 | 53,3421 | mg/day |
| Systemic dermal hands exposure | 0,0197 | 0,0183 | 0,0689 | 0,4445 | mg/kg bw/day |
| Potential dermal body exposure to substance, Tier II | 37,5057 | 174,6696 | 65,6351 | 423,2792 | mg/day |
| Systemic dermal body exposure | 0,0156 | 0,0146 | 0,0547 | 0,3527 | mg/kg bw/day |
| Inhalative exposure | 0,0104 | 0,0484 | 0,0182 | 0,1171 | mg/day |
| Systemic inhalative exposure | 0,0002 | 0,0008 | 0,0003 | 0,0020 | mg/kg bw/day |
| **Systemic total exposure (mg/kg bw/day)** | **0,0355** | **0,0337** | **0,1239** | **0,7992** | **mg/kg bw/day** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Scenario 1, Calculations with measured data (following handling model 1):** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **2-MEA** |  |
| Concentration of substance in product | 2,8 | 13,04 | 4,9 | 31,6 | % |
| Concentration of application solution | 5,21 | 5,21 | 5,21 | 5,21 | % |
| Indicative exposure value of hands(dermal exposure inside gloves, application solution) | 108,68 | 108,68 | 108,68 | 108,68 | mg/cycle |
| Indicative exposure value rest of body (application solution) | 8570 | 8570 | 8570 | 8570 | mg/cycle |
| Indicative inhalative exposure (application solution) | 1,9 | 1,9 | 1,9 | 1,9 | mg/m³ |
| Number of cycles per working day | 3 | 3 | 3 | 3 | - |
| Penetration through clothing (body) | 10 | 10 | 10 | 10 | % |
| Dermal absorption rates of a.s (%) | 25 | 5 | 50 | 50 | % |
| Inhalation rate: (m³/min) | 0,02083 | 0,02083 | 0,02083 | 0,02083 | m³/min |
| Cycle time (min ) | 180 | 180 | 180 | 180 | min/day |
| Body weight | 60 | 60 | 60 | 60 | kg |
| Potential dermal hands exposure to substance, Tier II | 0,476 | 2,215 | 0,832 | 5,368 | mg/day |
| Systemic dermal hands exposure | 0,002 | 0,002 | 0,007 | 0,045 | mg/kg bw/day |
| Potential dermal body exposure to substance, Tier II | 37,506 | 174,670 | 65,635 | 423,279 | mg/day |
| Systemic dermal body exposure | 0,0156 | 0,0146 | 0,0547 | 0,3527 | mg/kg bw/day |
| Inhalative exposure | 0,0104 | 0,0484 | 0,0182 | 0,1173 | mg/day |
| Systemic inhalative exposure | 0,0002 | 0,0008 | 0,0003 | 0,0020 | mg/kg bw/day |
| **Systemic total exposure (mg/kg bw/day)** | **0,0178** | **0,0172** | **0,0619** | **0,3994** | **mg/kg bw/day** |

**Secondary Exposure**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **2-Aminoethanol** |  |
| Concentration of substance in product | 2,8 | 13,04 | 4,9 | 31,6 | % |
| Product Retention | 31,25 | 31,25 | 31,25 | 31,25 | kg/m³ |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenario 2** |  | | | | |  |
| **SANDING, INHALATION** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** | | **2-MEA** |  |
| Substance applied to wood (UC4 special) | 875 | 4075 | | 1531,25 | 9875 | g/m3 |
| Substance applied to wood (UC4 normal) | 630 | 2934 | | 1102,5 | 7110 | g/m3 |
| Volume of post | 0,004 | 0,004 | | 0,004 | 0,004 | m³ |
| Substance applied to wood (UC4 special) | 3,5 | 16,3 | | 6,125 | 39,5 | g |
| Substance applied to wood (UC4 normal) | 2,52 | 11,736 | | 4,41 | 28,44 | g |
| Volume of outer 1 cm layer of post | 0,003008 | 0,003008 | | 0,003008 | 0,003008 | m³ |
| all substance in outer 1 cm layer of post (UC4 special) | 1,1635638 | 5,418883 | | 2,0362367 | 13,1316489 | mg/cm³ |
| all substance in outer 1 cm layer of post (UC4 normal) | 0,837766 | 3,9015957 | | 1,46609043 | 9,45478723 | mg/cm³ |
| Exposure Time | 6 | 6 | | 6 | 6 | h/day |
| Inhalation rate | 1,25 | 1,25 | | 1,25 | 1,25 | m³/h |
| Dust concentration in air | 5 | 5 | | 5 | 5 | mg/m³ |
| Inhaled wood dust | 37,5 | 37,5 | | 37,5 | 37,5 | mg/day |
| Wood density | 400 | 400 | | 400 | 400 | mg/cm³ |
| Inhaled wood dust | 0,09375 | 0,09375 | | 0,09375 | 0,09375 | cm³/day |
| Inhalative potential exposure to substance (UC4 special) | 0,1090841 | 0,5080203 | | 0,19089719 | 1,23109209 | mg/day |
| Inhalative potential exposure to substance (UC4 normal) | 0,0785406 | 0,3657746 | | 0,13744598 | 0,8863863 | mg/day |
| Inhalative absorption | 100 | 100 | | 100 | 100 | % |
| Body weight of adult | 60 | 60 | | 60 | 60 | kg |
| **Inhalative systemic exposure, Tier 1 (UC4 special)** | **0,0018** | **0,0085** | | **0,0032** | **0,0205** | **mg/kg bw/day** |
| **Inhalative systemic exposure, Tier 1 UC4 normal** | **0,0013** | **0,0061** | | **0,0023** | **0,0148** | **mg/kg bw/day** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SANDING, DERMAL EXPOSURE** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **2-MEA** | |  |
|  |  |  |  | |  |  |
|  |  |  |  | |  |  |
| Product Retention Szenario 2 special | 31,25 | 31,25 | 31,25 | | 31,25 | kg/m3 |
| Product Retention Szenario 2 normal/Product Retention Szenario 4 | 22,5 | 22,5 | 22,5 | | 22,5 | kg/m3 |
| max. concentration of a.s. in b.p. | 2,8 | 13,04 | 4,9 | | 31,6 | %w/w |
| amount of a.s. per m³ wood | 875 | 4075 | 1531,25 | | 9875 | g a.s./m³ |
| amount of a.s. in the outer 1cm layer, all on surface, UC 4 normal | 0,63 | 2,934 | 1,1025 | | 7,11 | mg a.s./cm² |
|  |  |  |  | |  |  |
| amount of a.s. in the outer 1cm layer, all on surface, UC 4 special | 0,875 | 4,075 | 1,53125 | | 9,875 | mg a.s./cm² |
| Hand surface area | 410 | 410 | 410 | | 410 | cm² |
| Contaminated hand surface area | 40 | 40 | 40 | | 40 | % |
| Dermal absorption [%] | 25 | 5 | 50 | | 50 | % |
| Body weight of adult | 60 | 60 | 60 | | 60 | kg |
| Frequence of use | 1 | 1 | 1 | | 1 | 1/day |
| **Dermal systemic exposure, Tier 1 UC 4 special** | **0,5979** | **0,5569** | **2,0927** | | **13,4958** | **mg/kg bw/day** |
| **Dermal systemic exposure, Tier 1 UC 4 normal** | **0,0498** | **0,0464** | **0,1744** | | **1,1250** | **mg/kg bw/day** |
|  | | | | | | |
| Transfer factor (dislodgeable residues) | 2 | 2 | 2 | | 2 | % |
| **Dermal systemic exposure, Tier 2 UC4 special** | **0,0120** | **0,0111** | **0,0419** | | **0,2699** | **mg/kg bw/day** |
| **Dermal systemic exposure, Tier 2 UC 4 normal** | **0,0086** | **0,0080** | **0,0301** | | **0,1943** | **mg/kg bw/day** |
| **Total systemic exposure, Tier 1 UC4 special** | **0,5997** | **0,5654** | **2,0959** | | **13,5164** | **mg/kg bw/day** |
| **Total systemic exposure, Tier 1 UC4 normal** | **0,4318** | **0,4071** | **1,5090** | | **9,7318** | **mg/kg bw/day** |
| **Total systemic exposure, Tier 2 UC4 special** | **0,0138** | **0,0196** | **0,0450** | | **0,2904** | **mg/kg bw/day** |
| **Total systemic exposure, Tier 2 UC4 normal** | **0,0099** | **0,0141** | **0,0324** | | **0,2091** | **mg/kg bw/day** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Cu-HDO** | **Cu-Carb.** | **2-EHA** |  |
| Concentration of substance in product | 2,8 | 13,04 | 4,9 | % |
| Product Retention | 22,5 | 22,5 | 22,5 | kg/m³ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scenario 3** |  |  |  |  |
| **Mouthing of treated wood chips** |  |  |  |  |
| Size of wood chip (4x4x1cm) | 16 | 16 | 16 | cm³ |
| Substance applied to wood | 630 | 2934 | 1102,5 | g/m³ |
| Substance applied to wood | 0,63 | 2,934 | 1,1025 | mg/cm³ |
| Substance contained in wood chip | 10,08 | 46,944 | 17,64 | mg |
| Extraction of active substance by chewing | 10 | 10 | 10 | % |
| Body weight toddler | 10 | 10 | 10 | kg |
| Frequency | 1 | 1 | 1 | 1/day |
| **Oral systemic exposure, Tier 1** | **0,1008** | **0,4694** | **0,176** | **mg/kg bw/day** |
|  |  |  |  |  |
| Water solubility of substance | 6,1 | 1,237 | --- | mg/L |
| Salvia produced by toddler per day | 0,2 | 0,2 | --- | L/day |
| Duration of chewing | 5 | 5 | --- | h |
| Oral absorption | 100 | 36 | 90 | % |
| Body weight toddler | 10 | 10 | --- | kg |
| **Oral systemic exposure, Tier 2** | **0,0254** | **0,0019** | **---** | **mg/kg bw/day** |
|  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Scenario 4** |  |  |  |  |  |
| **Playing on treated wood structures** | **Cu-HDO** | **Cu-Carb.** | **2-EHA** | **2-MEA** |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| max. concentration of a.s. in b.p. | 2,8 | 13,04 | 4,9 | 31,6 | %w/w |
| amount of a.s. per m³ wood | 630 | 2934 | 1102,5 | 7110 | g a.s./m³ |
| amount of a.s. in the outer 1cm layer, all on surface, UC 4 normal | 0,63 | 2,934 | 1,1025 | 7,11 | mg a.s./cm² |
| Hand surface area | 115,2 | 115,2 | 115,2 | 115,2 | cm² |
| Contaminated hand surface area | 40 | 40 | 40 | 40 | % |
| Oral absorption | 100 | 36 | 100 | 100 | % |
| Body weight of toddler | 10 | 10 | 10 | 10 | kg |
| Frequence of use | 1 | 1 | 1 | 1 | 1/day |
| **Oral/total systemic exposure, Tier 1** | **2,9030** | **4,8672** | **4,5723** | **32,7629** | **Oral bzw. Dermal (2-MEA) systemic exposure, Tier 1** |
| **Tier 2** |  |  |  |  |  |
| Transfer factor (dislodgeable residues) | 2 | 2 | 2 | 2 | Transfer factor (dislodgeable residues) |
| **Oral bzw. Dermal (2-MEA) systemic exposure, Tier 2** | **0,0581** | **0,0973** | **0,0914** | **0,6553** | **Oral bzw. Dermal (2-MEA) systemic exposure, Tier 2** |
| **Tier 3** |  | | | | |
| measured concentration | 0,0000375 | 0,0007944 |  |  | mg/cm² |
| Number of contacts7 | 10 | 10 |  |  | per event |
| **Oral bzw. Dermal (2-MEA) systemic exposure, Tier 2** | **0,0015** | **0,0113** |  |  | **mg/kg bw/day** |

**Scenario 5: Inhalation of volatilised residues:**

|  |  |  |
| --- | --- | --- |
| **Inhalation exposure** |  |  |
| **Tier 1** | **2-EHA** | **2-MEA** |
| Vapour pressure (Pa) | 4 | 50 |
| Molecular weight (g/mol) | 144,2 | 61,08 |
| Gas constant (J/K mol) | 8,31451 | 8,31451 |
| Temperature (°K) | 293 | 293 |
| SVC (g/m³) | 0,2367669 | 1,25361665 |
| SVC (mg/m³) | 236,76689 | 1253,61665 |
| Inhalative absorption (%) | 100 | 100 |
| long-term inhalation rate (m³/day) | 8 | 8 |
| Bodyweight (toddler) | 10 | 10 |
|  |  |  |
| **Inhalation exposure toddler (mg/kg bw/day)** | **189,4135** | **1002,8933** |
|  |  |  |
|  |  |  |
|  |  |  |
| **Tier 3** |
| Measured concentration in air (mg/m³) | 0,037 | 0,018 |
| long-term inhalation rate (m³/day) toddler | 8 | 8 |
| long-term inhalation rate (m³/day) adult | 16 | 16 |
| Bodyweight (toddler) | 10 | 10 |
| Bodyweight (adult) | 60 | 60 |
| **Inhalation exposure toddler (mg/kg bw/day)** | **0,0296** | **0,0144** |
| **Inhalation exposure adult (mg/kg bw/day)** | **0,0099** | **0,0048** |
| DNEL\_long term (mg/kg bw/day) | 1 | 0,166 |

**Scenario 6**

**Animal Exposure:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Oral Exposure** |  | | | | | |
| **Tier 1** | **Cu-HDO** | | **Cu-Carbonate** | **2-EHA** | | **2-MEA** |
| Concentration of substance in product (%) | 2,8 | | 13,04 | 4,9 | | 31,6 |
| Maximum absorption of biocidal product into treated wood in hte outer 1 cm layer (L/m³) | 50 | | 50 | 50 | | 50 |
| Treatment solution UC 4 (protection against termites) (%) | 3,75 | | 3,75 | 3,75 | | 3,75 |
| Amount of active substance in the outer 1 cm layer of wood (g/m3) | 52,5 | | 244,5 | 91,875 | | 592,5 |
| Horse wood consumption (m³/day) | 0,000019 | | 1,9E-05 | 0,000019 | | 0,000019 |
| Extraction by chewing (%) | 100 | | 100 | 100 | | 100 |
| Oral absorption (%) | 100 | | 100 | 100 | | 100 |
| Tongue surface area calf (m2) | 0,008 | | 0,008 | 0,008 | | 0,008 |
| Licks per day (1/day) | 10 | | 10 | 10 | | 10 |
| Thickness of treated wood of which a. s./SoC is extracted by licking (m) | 0,01 | | 0,01 | 0,01 | | 0,01 |
| Body weight horse (kg) | 400 | | 400 | 400 | | 400 |
| Body weight lactating goat (kg) | 70 | | 70 | 70 | | 70 |
| Body weight slaughter goat (kg) | 13 | | 13 | 13 | | 13 |
| Body weight fattening pig (kg) | 100 | | 100 | 100 | | 100 |
| Body weight breeding pig (kg) | 260 | | 260 | 260 | | 260 |
| Body weight beef cattle (kg) | 500 | | 500 | 500 | | 500 |
| Body weight dairy cattle (kg) | 650 | | 650 | 650 | | 650 |
| Body weight calf cattle | 200 | | 200 | 200 | | 200 |
| **Oral systemic exposure horse, Tier 1 (mg/kg bw/day)** | **0,0025** | | **0,0116** | **0,0044** | | - |
| **Oral systemic exposure lactating goat, Tier 1 (mg/kg bw/day)** | **0,0143** | | **0,0664** | **0,0249** | | - |
| **Oral systemic exposure slaughter goat, Tier 1 (mg/kg bw/day)** | **0,0767** | | **0,3573** | **0,1343** | | - |
| **Oral exposure calf Tier 1 (mg/kg bw/day) - LICKING** | **0,2100** | | **0,9780** | **0,3675** | | - |
| **Oral systemic exposure fattening pig, Tier 1 (mg/kg bw/day)** | no stereotypic wood chewing - not calculated | | | | | - |
| **Oral systemic exposure breeding pig, Tier 1 (mg/kg bw/day)** | - |
| **Oral systemic exposure beef cattle, Tier 1 (mg/kg bw/day)** | - |
| **Oral systemic exposure dairy cattle, Tier 1 (mg/kg bw/day)** | - |
|  | | | | | | |
| **Tier 2** | |  | | | | |
| Extraction by chewing (%) | | 100 | 100 | 100 | - | |
| Oral absorption (%) | | 100 | 25 | 100 | - | |
| **Oral systemic exposure horse, Tier 2 (mg/kg bw/day)** | | 0,0025 | 0,0029 | **0,0044** | - | |
| **Oral systemic exposure lactating goat, Tier 2 (mg/kg bw/day)** | | **0,0143** | **0,0166** | **0,0249** | - | |
| **Oral systemic exposure slaughter goat, Tier 2 (mg/kg bw/day)** | | **0,0767** | **0,0893** | **0,1343** | - | |
| **Oral exposure calf Tier 2 (mg/kg bw/day) - LICKING** | | **0,2100** | **0,2445** | **0,3675** | - | |
|  | | | | | | |
| **Dermal exposure** | |  | | | | |
| **Tier 1** | |  | | | | |
| Thickness of surface layer of the wooden wall  representing the amount of substance per square meter (mm) | | 0,05 | 0,05 | 0,05 | 0,05 | |
| Amount of a.s. / SoC per square meter (mg/m²) | | 2,625 | 12,225 | 4,59375 | 29,625 | |
| Body surface area in contact with surface, horse (m²) | | 1,62 | 1,62 | 1,62 | 1,62 | |
| Body surface area in contact with surface, lactating goat (m²) | | 0,45 | 0,45 | 0,45 | 0,45 | |
| Body surface area in contact with surface, slaughter goat (m²) | | 0,15 | 0,15 | 0,15 | 0,15 | |
| Body surface area in contact with surface, fattening pig (m²) | | 0,45 | 0,45 | 0,45 | 0,45 | |
| Body surface area in contact with surface, breeding pig (m²) | | 0,84 | 0,84 | 0,84 | 0,84 | |
| Body surface area in contact with surface, beef cattle (m²) | | 1,44 | 1,44 | 1,44 | 1,44 | |
| Body surface area in contact with surface, dairy cattle (m²) | | 1,68 | 1,68 | 1,68 | 1,68 | |
| Body surface area in contact with surface, calf (m²) | | 0,87 | 0,87 | 0,87 | 0,87 | |
| Transfer coefficient from a treated surface (%) | | 100 | 100 | 100 | 100 | |
| **Dermal exposure horse (mg/kg bw/day)** | | 0,0106 | 0,0495 | 0,0186 | 0,1200 | |
| **Dermal exposure lactating goat (mg/kg bw/day)** | | 0,0169 | 0,0786 | 0,0295 | 0,1904 | |
| **Dermal exposure slaughter goat (mg/kg bw/day)** | | 0,0303 | 0,1411 | 0,0530 | 0,3418 | |
| **Dermal exposure fattening pig (mg/kg bw/day)** | | 0,0118 | 0,0550 | 0,0207 | 0,1333 | |
| **Dermal exposure breeding pig (mg/kg bw/day)** | | 0,0085 | 0,0395 | 0,0148 | 0,0957 | |
| **Dermal exposure beef cattle (mg/kg bw/day)** | | 0,0076 | 0,0352 | 0,0132 | 0,0853 | |
| **Dermal exposure dairy cattle (mg/kg bw/day)** | | 0,0068 | 0,0316 | 0,0119 | 0,0766 | |
| **Dermal exposure calf (mg/kg bw/day)** | | 0,0114 | 0,0532 | 0,0200 | 0,1289 | |
|  | | | | | | |
| **Inhalation exposure** | |  | | | | |
| **Tier 1** | |  | | | | |
| Vapour pressure (Pa) | | 0,0001 | 0,00001 | 4 | 50 | |
| Molecular weight (g/mol) | | 349,9 | 303,5 | 144,2 | 61,08 | |
| Gas constant (J/K mol) | | 8,31451 | 8,31451 | 8,31451 | 8,31451 | |
| Temperature (°K) | | 293 | 293 | 293 | 293 | |
| SVC (g/m³) | | 1,44E-05 | 1,2E-06 | 0,236767 | 1,253617 | |
| Inhalative absorption (%) | | 100 | 100 | 100 | 100 | |
| Alveolar ventilation rate horse (m³/day) | | 43 | 43 | 43 | 43 | |
| Alveolar ventilation rate lactating goat(m³/day) | | 11 | 11 | 11 | 11 | |
| Alveolar ventilation rate slaughter goat (m³/day) | | 3 | 3 | 3 | 3 | |
| Alveolar ventilation rate fattening pig (m³/day) | | 14 | 14 | 14 | 14 | |
| Alveolar ventilation rate breeding pig(m³/day) | | 30 | 30 | 30 | 30 | |
| Alveolar ventilation rate beef cattle (m³/day) | | 51 | 51 | 51 | 51 | |
| Alveolar ventilation rate dairy cattle (m³/day) | | 62 | 62 | 62 | 62 | |
| Alveolar ventilation rate calf (m³/day) | | 25 | 25 | 25 | 25 | |
| **Inhalation exposure horse (mg/kg bw/day)** | | 0,0015 | 0,0001 | 25,4524 | 134,7638 | |
| **Inhalation exposure lactating goat (mg/kg bw/day)** | | 0,0023 | 0,0001 | 37,2062 | 196,9969 | |
| **Inhalation exposure slaughter goat (mg/kg bw/day)** | | 0,0033 | 0,0002 | 54,6385 | 289,2962 | |
| **Inhalation exposure fattening pig (mg/kg bw/day)** | | 0,0020 | 0,0001 | 33,1474 | 175,5063 | |
| **Inhalation exposure breeding pig (mg/kg bw/day)** | | 0,0017 | 0,0001 | 27,3193 | 144,6481 | |
| **Inhalation exposure beef cattle (mg/kg bw/day)** | | 0,0015 | 0,0001 | 24,1502 | 127,8689 | |
| **Inhalation exposure dairy cattle (mg/kg bw/day)** | | 0,0014 | 0,0001 | 22,5839 | 119,5757 | |
| **Inhalation exposure calf (mg/kg bw/day)** | | 0,0018 | 0,0001 | 29,5959 | 156,7021 | |
|  | | | | | | |
|  | | | | | | |
| **Tier 3** | | | | | | |
| Measured concentration in air (mg/m³) | |  |  | 0,037 | 0,018 | |
| Inhalation exposure horse (mg/kg bw/day) | |  | | 0,0040 | 0,0019 | |
| Inhalation exposure lactating goat (mg/kg bw/day) | | 0,0058 | 0,0028 | |
| **Inhalation exposure slaughter goat (mg/kg bw/day)** | |  | | 0,0085 | 0,0042 | |
| Inhalation exposure fattening pig (mg/kg bw/day) | |  | | 0,0052 | 0,0025 | |
| Inhalation exposure breeding pig (mg/kg bw/day) | |  | | 0,0043 | 0,0021 | |
| Inhalation exposure beef cattle (mg/kg bw/day) | |  | | 0,0038 | 0,0018 | |
| Inhalation exposure dairy cattle (mg/kg bw/day) | |  | | 0,0035 | 0,0017 | |
| **Inhalation exposure calf (mg/kg bw/day)** | |  | | 0,0046 | 0,0023 | |
|  | | | | | | |
| **Total Exposure = Oral exposure 1 + Dermal exposure + Inhalative Exposure 1** | | | | | | |
| **Tier 1** | |  |  |  |  | |
| **horse** | | **0,0147** | **0,0612** | **25,4754** | **134,8838** | |
| **lactating goat** | | **0,0334** | **0,1451** | **37,2607** | **197,1873** | |
| **slaughter goat** | | **0,1103** | **0,4986** | **54,8258** | **289,6380** | |
| **fattening pig** | | **0,0138** | **0,0551** | **33,1680** | **175,6263** | |
| **breeding pig** | | **0,0101** | **0,0396** | **27,3341** | **144,8385** | |
| **beef cattle** | | **0,0090** | **0,0353** | **24,1635** | **128,2107** | |
| **dairy cattle** | | **0,0082** | **0,0317** | **22,5958** | **119,7091** | |
| **calf cattle** | | **0,2232** | **1,0313** | **29,9833** | **156,8310** | |
| **Total Exposure = Oral exposure Tier 2 + Dermal exposure + Inhalative Exposure 1** | | | | | | |
| **Tier 2** | |  |  |  |  | |
| **horse** | | 0,0147 | 0,0525 | 25,4754 | 134,8838 | |
| **lactating goat** | | 0,0334 | 0,0953 | 37,2607 | 197,1873 | |
| **slaughter goat** | | 0,1103 | 0,2306 | 54,8258 | 289,6380 | |
| **fattening pig** | | 0,0138 | 0,0551 | 33,1680 | 175,6263 | |
| **breeding pig** | | 0,0101 | 0,0396 | 27,3341 | 144,8385 | |
| **beef cattle** | | 0,0090 | 0,0353 | 24,1635 | 128,2107 | |
| **dairy cattle** | | 0,0082 | 0,0317 | 22,5958 | 119,7091 | |
| **calf cattle** | | 0,0132 | 0,0533 | 29,6158 | 156,8310 | |
| **Total Exposure = Oral exposure Tier 2 + Dermal exposure + Inhalative Exposure 3** | | | | | | |
| **Tier 3** | |  |  |  |  | |
| **horse** | | 0,0147 | 0,0525 | 0,0269 | 0,1219 | |
| **lactating goat** | | 0,0334 | 0,0953 | 0,0603 | 0,1933 | |
| **slaughter goat** | | 0,1103 | 0,2306 | 0,1958 | 0,3460 | |
| **fattening pig** | | 0,0138 | 0,0551 | 0,0259 | 0,1358 | |
| **breeding pig** | | 0,0101 | 0,0396 | 0,0191 | 0,0978 | |
| **beef cattle** | | 0,0090 | 0,0353 | 0,0170 | 0,0872 | |
| **dairy cattle** | | 0,0082 | 0,0317 | 0,0154 | 0,0783 | |
| **calf cattle** | | 0,2232 | 0,2978 | 0,3921 | 0,1311 | |
|  | | | | | | |
| **Trigger value of mg/kg bw** | | **0,004** | **0,004** | **0,004** | **0,004** | |

### Relevant environmental exposure calculations

### Exposure estimate sheets from ECHA

### Assessed substance: Copper

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario [1]: Emission estimation for industrial preventive processes - Vacuum pressure and double vacuum (ESD § 4.1.3, p.51)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) Emission scenario for vacuum pressure and double vacuum - product application (ESD Table 4.8, p.57)** | | | | | | | |
| Input |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Volume of wood treated per day | Vacuum-pressure |  | VOLUMEwood-treated | 30 | m3.d-1 | D/P | ESD Table 4.8 |
|  |  |  |  |  |  |  |  |
| Quantity of a substance applied per m3 of wood | |  | Qai | 2,5 | kg.m-3 | S |  |
|  |  |  |  |  |  |  |  |
| Fraction released to facility drain | Water solubilty 1 to <50 mg/l |  | Ffacilitydrain | 0,003 | [-] | P | ESD Table 4.8 |
|  |  |  |  |  |  |  |  |
| Fraction released to air | Vapour pressure at 20 °C: <0.005 Pa |  | Fair | 0,001 | [-] | P | EUSES 2.1 background document, Table III-60 (page III-76) |
|  |  |  |  |  |  |  |  |
| Output |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Local emission rate to air - quantity locally emitted per day to air | |  | Elocalair | 7,50E-02 | kg.d-1 | O | Elocalair = Qai \* VOLUMEwood-treated \* Fair |
|  |  |  |  |  |  |  |  |
| Local emission rate to facility drain - quantity of a substance locally emitted per day to the facility drain | |  | Elocalfacilitydrain | 2,25E-01 | kg.d-1 | O | Elocalfacilitydrain = Qai \* VOLUMEwood-treated \* Ffacilitydrain |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| B) Emission scenario for vacuum pressure and double vacuum - storage of treated wood prior to shipping (including removal processes in the receiving environmental compartment - soil) (ESD Table 4.9, p.58, Table 3.4, p.27) | | | | | | | |
| Input |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Effective surface area of treated wood, considered to be exposed to rain, per 1 m2 storage area (i.e. soil) | |  | AREAwood-expo | 11 | m2.m-2 | D |  |
|  |  |  |  |  |  |  |  |
| Surface area of the storage place | Vacuum-pressure |  | AREAstorage | 525 | m2 | D/P | ESD Table 4.9 |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period | |  | TIME2 | 7300 | d | D | Value agreed at the WG IV 2015 (Tolyfluanid discussion) (20 years) |
|  |  |  |  |  |  |  |  |
| Average daily flux i.e. the average quantity of a substance that is daily leached out of 1 m2 of treated wood during 14 day storage period | |  | FLUXstorage,vac-pres | 3,39E-6 | kg.m-2.d-1 | S |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kg.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| Soil depth | |  | DEPTHsoil | 0,5 | m | D |  |
|  |  |  |  |  |  |  |  |
| Fraction of rainwater running off the storage site | |  | Frunoff | 0,5 | [-] | D |  |
|  |  |  |  |  |  |  |  |
| Flow rate of surface water (creek/river) | |  | FLOWsurfacewater | 25920 | m3.d-1 | D | This value corresponds to 0.3 m3.s-1 which is the default value for a small creek. |
|  |  |  |  |  |  |  |  |
| Intermediate calculations |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Volume of wet soil |  |  | Vsoil | 262,5 | m3 | O | Vsoil = AREAstorage \* DEPTHsoil |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of a substance, leached due to rainfall from stored treated wood, over the initial assessment period | |  | Qleach,storage,TIME1 | 5,87E-01 | kg | O | Qleach,storage,TIME1 = FLUXstorage,vac-pres \* AREAwood-expo \* AREAstorage \* TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of a substance, leached due to rainfall from stored treated wood, over a longer assessment period | |  | Qleach,storage,TIME2 | 1,43E+02 | kg | O | Qleach,storage,TIME2 = FLUXstorage,vac-pres \* AREAwood-expo \* AREAstorage \* TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily release onto soil of substance due to leaching over the storage duration per m2 of storage area | |  | Elocalsoil | 3,72E-05 | kg.m-2.d-1 | O | Elocalsoil = FLUXstorage \* AREAwood-expo |
|  |  |  |  |  |  |  |  |
| Output |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes in the soil** | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Local concentration in soil at storage place at the end of the initial assessment period | | | Clocalsoil,time1 | 6,57E-07 | kg.kgwwt-1 | O | Clocalsoil,TIME1 = Qleach,storage,TIME1 \* (1 - Frunoff) / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Local concentration in soil at storage place at the end of a longer assessment period | | | Clocalsoil,time2 | 1,60E-04 | kg.kgwwt-1 | O | Clocalsoil,TIME2 = Qleach,storage,TIME2 \* (1 - Frunoff) / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Local emission rate in surface water resulting from leaching from stored treated wood due to rain run-off, over the initial assessment period | |  | Elocalsurfacewater,TIME1 | 9,78E-03 | kg.d-1 | O | Elocalsurfacewater,TIME1 = Qleach,storage,TIME1 \* Frunoff / TIME1 |
|  |  |  |  |  |  |  |  |
| Local emission rate in surface water resulting from leaching from stored treated wood due to rain run-off, over a longer assessment period | |  | Elocalsurfacewater,TIME2 | 9,78E-03 | kg.d-1 | O | Elocalsurfacewater,TIME2 = Qleach,storage,TIME2 \* Frunoff / TIME2 |
|  |  |  |  |  |  |  |  |
| Local concentration in surface water over the initial assessment period | |  | Clocalsurfacewater,TIME1 | 3,77E-04 | mg.L-1 | O | Clocalsurfacewater,TIME1 = Elocalsurfacewater,TIME1 \* 1000 / FLOWsurfacewater |
|  |  |  |  |  |  |  |  |
| Local concentration in surface water over a longer assessment period | |  | Clocalsurfacewater,TIME2 | 3,77E-04 | mg.L-1 | O | Clocalsurfacewater,TIME2 = Elocalsurfacewater,TIME2 \* 1000 / FLOWsurfacewater |
|  |  |  |  |  |  |  |  |
| Considering removal processes in the soil (ESD Table 3.4, p.27) | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | | |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario [2]: Emission estimation for treated wood in service (ESD § 4.3, p.65) - Emission scenario for UC 3 - Wood not covered, not in contact with ground, exposed to weather or subject to frequent wetting (ESD § 4.3.3, p.68)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) House scenario including removal processes (ESD Table 4.15, p.70, Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area | |  | AREAhouse | 125 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  |  |  |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | Vacuum pressure treatment |  | TIME3 | 7300 | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 22,44 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 231,82 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 232,36 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Soil volume (wet) |  |  | Vsoil | 13 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 2,81E+03 | mg | O | Qleach,TIME1 = AREAhouse \* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 2,90E+04 | mg | O | Qleach,TIME2 = AREAhouse \* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 2,90E+04 | mg | O | Qleach,TIME3= AREAhouse \* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | Clocalsoil,leach,TIME1 | 1,27E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME1 = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | Clocalsoil,leach,TIME2 | 1,31E+00 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME2 = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | Clocalsoil,leach,TIME3 | 1,31E+00 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| **Resulting local emission to relevant environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | Esoil,leach,TIME1 | 9,35E+01 | mg.d-1 | O | Esoil,leach,TIME1 = AREAhouse \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | Esoil,leach,TIME2 | 7,94E+01 | mg.d-1 | O | Esoil,leach,TIME2 = AREAhouse \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | Esoil,leach,TIME3 | 3,98E+00 | mg.d-1 | O | Esoil,leach,TIME3 = AREAhouse \* Q\*leach,TIME3 / TIME3 |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **B) Noise barrier scenario including removal processes (ESD Table 4.17, p.74, Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area | |  | AREAnoise-barrier | 3000 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | Vacuum pressure treatment |  | TIME3 | 7300 | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 22,44 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 231,82 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 232,36 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Soil volume (wet) |  |  | Vsoil | 250 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| Fraction released to soil |  |  | Fsoil | 0,3 | [-] | D |  |
|  |  |  |  |  |  |  |  |
| Fraction released to the STP |  |  | FSTP | 0,7 | [-] | D |  |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Emissions to soil |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 2,02E+04 | mg | O | Qleach,TIME1 = AREAnoise-barrier \* FSoil \* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 2,09E+05 | mg | O | Qleach,TIME2 = AREAnoise-barrier \* FSoil \* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 2,09E+05 | mg | O | Qleach,TIME3 = AREAnoise-barrier \* FSoil \* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | Clocalsoil,leach,TIME1 | 4,75E-02 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME1 = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | Clocalsoil,leach,TIME2 | 4,91E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME2 = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | Clocalsoil,leach,TIME3 | 4,92E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Emissions to STP |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the initial assessment period | |  | ESTP,TIME1 | 1,571E+03 | mg.d-1 | O | ESTP,TIME1 = AREAnoise-barrier \* FSTP \* Q\*leach,TIME1/TIME1 |
|  |  |  |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the intermediate assessment period | |  | ESTP,TIME2 | 1,334E+03 | mg.d-1 | O | ESTP,TIME2 = AREAnoise-barrier \* FSTP \* Q\*leach,TIME2/TIME2 |
|  |  |  |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the longer assessment period | |  | ESTP,TIME3 | 6,68E+01 | mg.d-1 | O | ESTP,TIME3 = AREAnoise-barrier \* FSTP \* Q\*leach,TIME3/TIME3 |
|  |  |  |  |  |  |  |  |
| **Resulting local emission to relevant environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | Esoil,leach,TIME1 | 6,73E+02 | mg.d-1 | O | Esoil,leach,TIME1 = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | Esoil,leach,TIME2 | 5,72E+02 | mg.d-1 | O | Esoil,leach,TIME2 = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | Esoil,leach,TIME3 | 2,86E+01 | mg.d-1 | O | Esoil,leach,TIME3 = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME3 / TIME3 |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **C) Bridge over pond scenario including removal processes (ESD Table 4.18, p.76 and Table 3.8, p.31/32)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area | |  | AREAbridge | 10 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | Vacuum pressure treatment |  | TIME3 | 7300 | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 22,44 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 231,82 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 232,36 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Water volume under bridge |  |  | Vwater | 1000 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 2,24E+02 | mg | O | Qleach,TIME1 = AREAbridge \* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 2,32E+03 | mg | O | Qleach,TIME2 = AREAbridge \* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 2,32E+03 | mg | O | Qleach,TIME3 = AREAbridge \* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the initial assessment period | |  | Clocalwater,leach,TIME1 | 2,24E-01 | mg.l-1 | O | Clocalsoil,leach,TIME1 = Qleach,TIME1 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the intermediate assessment period | |  | Clocalwater,leach,TIME2 | 2,32E+00 | mg.l-1 | O | Clocalsoil,leach,TIME2 = Qleach,TIME2 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of a longer assessment period | |  | Clocalwater,leach,TIME3 | 2,32E+00 | mg.l-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| For wood which was treated *in situ* emissions to water can occur during the application itself and from leaching from treated wood in service. The total local concentration in water is calculated below. | | | | | | | |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local water at the end of the initial assessment period | |  | Clocalwater,total,TIME1 | 2,24E-01 | mg.l-1 | O | Clocalwater,total,TIME1 = Clocalwater,brush+Clocalwater,leach,TIME1 |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local water at the end of the intermediate assessment period | |  | Clocalwater,total,TIME2 | 2,32E+00 | mg.l-1 | O | Clocalwater,total,TIME2 = Clocalwater,brush+Clocalwater,leach,TIME2 |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local water at the end of a longer assessment period | |  | Clocalwater,total,TIME3 | 2,32E+00 | mg.l-1 | O | Clocalwater,total,TIME3 = Clocalwater,brush+Clocalwater,leach,TIME3 |
|  |  |  |  |  |  |  |  |
| **Resulting local emission to relevant environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the initial assessment period | |  | Ewater,leach,TIME1 | 7,48E+00 | mg.d-1 | O | Ewater,leach,TIME1 = AREAbridge \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the intermediate assessment period | |  | Ewater,leach,TIME2 | 6,35E+00 | mg.d-1 | O | Ewater,leach,TIME2 = AREAbridge \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over a longer duration | |  | Ewater,leach,TIME3 | 3,18E-01 | mg.d-1 | O | Ewater,leach,TIME3 = AREAbridge \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario [3]: Emission estimation for treated wood in service (ESD § 4.3, p.65) - Emission scenario for UC 4a - Wood in contact with the ground (ESD § 4.3.4, p.76)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) Transmission pole (ESD Table 4.19 p.78, Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area above soil | |  | AREApole,above | 5,5 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Leachable wood area below soil |  |  | AREApole,below | 1,6 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | |  | TIME3 | 7300 | d | D | ESD § 4.3.2, #213, p.68 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 176,07 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 969,17 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 1018,5 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over an increased assessment period |  |  | Q\*leach,TIME3 special application | 1024,7 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Soil volume (wet) |  |  | Vsoil | 2,97 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes in the receiving environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 1,25E+03 | mg | O | Qleach,TIME1 = (AREApole,above + AREApole,below)\* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 6,88E+03 | mg | O | Qleach,TIME2 = (AREApole,above + AREApole,below)\* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 7,23E+03 | mg | O | Qleach,TIME3 = (AREApole,above + AREApole,below)\* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over an increased assessment period |  |  | Qleach,TIME3 neache application | 7,28E+03 | mg | O | Qleach,TIME3 = (AREApole,above + AREApole,below)\* Q\*leach,TIME3 special application |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | Clocalsoil,leach,TIME1 | 2,48E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME1 = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | Clocalsoil,leach,TIME2 | 1,36E+00 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME2 = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | Clocalsoil,leach,TIME3 | 1,43E+00 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of an increased assessment period |  |  | Clocalsoil,leach,TIME3 special application | 1,44E+00 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 special application /  (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| **Resulting local emission to relevant environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | Esoil,leach,TIME1 | 4,17E+01 | mg.d-1 | O | Esoil,leach,TIME1 = (AREApole,above + AREApole,below) \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | Esoil,leach,TIME2 | 1,89E+01 | mg.d-1 | O | Esoil,leach,TIME2 = (AREApole,above + AREApole,below) \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | Esoil,leach,TIME3 | 9,91E-01 | mg.d-1 | O | Esoil,leach,TIME3 = (AREApole,above + AREApole,below) \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over an increased duration |  |  | Esoil,leach,TIME3 special application | 4,98E-01 | mg.d-1 | O | Esoil,leach,TIME3 = (AREApole,above + AREApole,below) \* Q\*leach,TIME3 special application / TIME3 |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario [4]: Emission estimation for treated wood in service (ESD § 4.3, p.65) - Emission scenario for UC 4b - Wood in contact with fresh water (ESD § 4.3.5, p.80)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) Jetty in a lake (ESD Table 4.21 p.82 and Table 3.8, p.31/32)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area planks | |  | AREAplanks | 16,2 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Leachable wood area poles |  |  | AREApoles | 10 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | |  | TIME3 | 7300 | d | D | ESD § 4.3.2, #213, p.68 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 142,7203053 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 422,8846565 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 499,6037405 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Water volume |  |  | Vwater | 1,60E+04 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 3,74E+03 | mg | O | Qleach,TIME1 = (AREAplanks + AREApoles)\* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 1,11E+04 | mg | O | Qleach,TIME2 = (AREAplanks + AREApoles)\* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 1,31E+04 | mg | O | Qleach,TIME3 = (AREAplanks + AREApoles)\* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the initial assessment period | |  | Clocalwater,leach,TIME1 | 2,34E-04 | mg.l-1 | O | Clocalwater,leach,TIME1 = Qleach,TIME1 \* 0.001/ Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the intermediate assessment period | |  | Clocalwater,leach,TIME2 | 6,92E-04 | mg.l-1 | O | Clocalwater,leach,TIME2 = Qleach,TIME2 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of a longer assessment period | |  | Clocalwater,leach,TIME3 | 8,18E-04 | mg.l-1 | O | Clocalwater,leach,TIME3 = Qleach,TIME3 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| **Resulting local emission to relevant environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the initial assessment period | |  | Ewater,leach,TIME1 | 1,25E+02 | mg.d-1 | O | Ewater,leach,TIME1 = (AREAplanks + AREApoles) \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the intermediate assessment period | |  | Ewater,leach,TIME2 | 3,04E+01 | mg.d-1 | O | Ewater,leach,TIME2 = (AREAplanks + AREApoles) \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over a longer duration | |  | Ewater,leach,TIME3 | 1,79E+00 | mg.d-1 | O | Ewater,leach,TIME3 = (AREAplanks + AREApoles) \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **B) Sheet piling in a waterway (ESD Table 4.22 p.83 and Table 3.8, p.33/34)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Wood area per m waterway length | |  | AREApoles | 4,71 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period | |  | TIME3 | 7300 | d | D | ESD § 4.3.2, #213, p.68 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 314,7 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 496,1 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 649,8 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Water volume per m waterway length | |  | Vwater | 7,5 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Residence time of water in waterway | |  | TAUwway | 20 | d | D |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 9,88E+02 | mg | O | Qleach,TIME1 = AREApoles \* Q\*leach,TIME1/TIME1 \* TAUwway |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 1,28E+02 | mg | O | Qleach,TIME2 = AREApoles \* Q\*leach,TIME2/TIME2 \* TAUwway |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 8,39E+00 | mg | O | Qleach,TIME3 = AREApoles \* Q\*leach,TIME3/TIME3 \* TAUwway |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the initial assessment period | |  | Clocalwater,leach,TIME1 | 1,32E-01 | mg.l-1 | O | Clocalwater,leach,TIME1 = Qleach,TIME1 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the intermediate assessment period | |  | Clocalwater,leach,TIME2 | 1,71E-02 | mg.l-1 | O | Clocalwater,leach,TIME2 = Qleach,TIME2 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of a longer assessment period | |  | Clocalwater,leach,TIME3 | 1,12E-03 | mg.l-1 | O | Clocalwater,leach,TIME3 = Qleach,TIME3 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| **Resulting local emission to relevant environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the initial assessment period | |  | Ewater,leach,TIME1 | 4,94E+01 | mg.d-1 | O | Ewater,leach,TIME1 = AREApoles \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the intermediate assessment period | |  | Ewater,leach,TIME2 | 6,40E+00 | mg.d-1 | O | Ewater,leach,TIME2 = AREApoles \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over a longer duration | |  | Ewater,leach,TIME3 | 4,19E-01 | mg.d-1 | O | Ewater,leach,TIME3 = AREApoles \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

### Assessed substance: Cu-HDO

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario [1]: Emission estimation for industrial preventive processes - Vacuum pressure and double vacuum (ESD § 4.1.3, p.51)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) Emission scenario for vacuum pressure and double vacuum - product application (ESD Table 4.8, p.57)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Volume of wood treated per day | Vacuum-pressure |  | VOLUMEwood-treated | 30 | m3.d-1 | D/P | ESD Table 4.8 |
|  |  |  |  |  |  |  |  |
| Quantity of a substance applied per m3 of wood | |  | Qai | 0,875 | kg.m-3 | S |  |
|  |  |  |  |  |  |  |  |
| Fraction released to facility drain | Water solubilty 1 to <50 mg/l |  | Ffacilitydrain | 0,003 | [-] | P | ESD Table 4.8 |
|  |  |  |  |  |  |  |  |
| Fraction released to air | Vapour pressure at 20 °C: <0.005 Pa |  | Fair | 0,001 | [-] | P | EUSES 2.1 background document, Table III-60 (page III-76) |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Local emission rate to air - quantity locally emitted per day to air | |  | Elocalair | 2,63E-02 | kg.d-1 | O | Elocalair = Qai \* VOLUMEwood-treated \* Fair |
|  |  |  |  |  |  |  |  |
| Local emission rate to facility drain - quantity of a substance locally emitted per day to the facility drain | |  | Elocalfacilitydrain | 7,88E-02 | kg.d-1 | O | Elocalfacilitydrain = Qai \* VOLUMEwood-treated \* Ffacilitydrain |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **B) Emission scenario for vacuum pressure and double vacuum - storage of treated wood prior to shipping (including removal processes in the receiving environmental compartment - soil) (ESD Table 4.9, p.58, Table 3.4, p.27)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Effective surface area of treated wood, considered to be exposed to rain, per 1 m2 storage area (i.e. soil) | |  | AREAwood-expo | 11 | m2.m-2 | D |  |
|  |  |  |  |  |  |  |  |
| Surface area of the storage place | Vacuum-pressure |  | AREAstorage | 525 | m2 | D/P | ESD Table 4.9 |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period | |  | TIME2 | 7300 | d | D | Value agreed at the WG IV 2015 (Tolyfluanid discussion) (20 years) |
|  |  |  |  |  |  |  |  |
| Average daily flux i.e. the average quantity of a substance that is daily leached out of 1 m2 of treated wood during 14 day storage period | |  | FLUXstorage,vac-pres | 0,40E-06 | kg.m-2.d-1 | S |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kg.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| Soil depth | |  | DEPTHsoil | 0,5 | m | D |  |
|  |  |  |  |  |  |  |  |
| Fraction of rainwater running off the storage site | |  | Frunoff | 0,5 | [-] | D |  |
|  |  |  |  |  |  |  |  |
| Flow rate of surface water (creek/river) | |  | FLOWsurfacewater | 25920 | m3.d-1 | D | This value corresponds to 0.3 m3.s-1 which is the default value for a small creek. |
|  |  |  |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the soil (Table 3.4, p.27)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| First order rate constant for removal from soil | |  | k | 0,12 | d-1 | S |  |
|  |  |  |  |  |  |  |  |
| Soil-water partitioning coefficient |  |  | Ksoil-water | 908,52 | m3.m-3 | S |  |
|  |  |  |  |  |  |  |  |
| Intermediate calculations |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Volume of wet soil |  |  | Vsoil | 262,5 | m3 | O | Vsoil = AREAstorage \* DEPTHsoil |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of a substance, leached due to rainfall from stored treated wood, over the initial assessment period | |  | Qleach,storage,TIME1 | 6,90E-02 | kg | O | Qleach,storage,TIME1 = FLUXstorage,vac-pres \* AREAwood-expo \* AREAstorage \* TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of a substance, leached due to rainfall from stored treated wood, over a longer assessment period | |  | Qleach,storage,TIME2 | 1,68E+01 | kg | O | Qleach,storage,TIME2 = FLUXstorage,vac-pres \* AREAwood-expo \* AREAstorage \* TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily release onto soil of substance due to leaching over the storage duration per m2 of storage area | |  | Elocalsoil | 4,38E-06 | kg.m-2.d-1 | O | Elocalsoil = FLUXstorage \* AREAwood-expo |
|  |  |  |  |  |  |  |  |
| Output |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes in the soil** | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Local concentration in soil at storage place at the end of the initial assessment period | | | Clocalsoil,time1 | 7,73E-08 | kg.kgwwt-1 | O | Clocalsoil,TIME1 = Qleach,storage,TIME1 \* (1 - Frunoff) / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Local concentration in soil at storage place at the end of a longer assessment period | | | Clocalsoil,time2 | 1,88E-05 | kg.kgwwt-1 | O | Clocalsoil,TIME2 = Qleach,storage,TIME2 \* (1 - Frunoff) / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Local emission rate in surface water resulting from leaching from stored treated wood due to rain run-off, over the initial assessment period | |  | Elocalsurfacewater,TIME1 | 1,149E-03 | kg.d-1 | O | Elocalsurfacewater,TIME1 = Qleach,storage,TIME1 \* Frunoff / TIME1 |
|  |  |  |  |  |  |  |  |
| Local emission rate in surface water resulting from leaching from stored treated wood due to rain run-off, over a longer assessment period | |  | Elocalsurfacewater,TIME2 | 1,149E-03 | kg.d-1 | O | Elocalsurfacewater,TIME2 = Qleach,storage,TIME2 \* Frunoff / TIME2 |
|  |  |  |  |  |  |  |  |
| Local concentration in surface water over the initial assessment period | |  | Clocalsurfacewater,TIME1 | 4,43E-05 | mg.L-1 | O | Clocalsurfacewater,TIME1 = Elocalsurfacewater,TIME1 \* 1000 / FLOWsurfacewater |
|  |  |  |  |  |  |  |  |
| Local concentration in surface water over a longer assessment period | |  | Clocalsurfacewater,TIME2 | 4,43E-05 | mg.L-1 | O | Clocalsurfacewater,TIME2 = Elocalsurfacewater,TIME2 \* 1000 / FLOWsurfacewater |
|  |  |  |  |  |  |  |  |
| Considering removal processes in the soil (ESD Table 3.4, p.27) | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Steady-state concentration in local soil | | | Clocalsoil,steady\_state | 2,15E-08 | kg.kgwwt-1 | O | Clocalsoil,ss = Elocalsoil \* (1 - Frunoff)/(DEPTHsoil \* RHOsoil \* ksoil) |
|  |  |  |  |  |  |  |  |
| Steady-state concentration in soil pore water | | | Clocalpore,steady\_state | 4,02E-08 | kg.m-3 | O | Clocalpore,ss = Clocalsoil,ss \* RHOsoil / Ksoil\_water |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario [2]: Emission estimation for treated wood in service (ESD § 4.3, p.65) - Emission scenario for UC 3 - Wood not covered, not in contact with ground, exposed to weather or subject to frequent wetting (ESD § 4.3.3, p.68)** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| **A) House scenario including removal processes (ESD Table 4.15, p.70, Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |  |
| **Input** |  | |  |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |
| *Variable/parameter* |  | |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  | |  |  |  |  |  |  |
| Leachable wood area | | |  | AREAhouse | 125 | m2 | D |  |
|  |  | |  |  |  |  |  |  |
| Duration of the initial assessment period | | |  | TIME1 | 30 | d | D |  |
|  |  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | Vacuum pressure treatment | |  | TIME3 | 7300 | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | | |  | Q\*leach,TIME1 | 2,64 | mg.m-2 | S |  |
|  |  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | | |  | Q\*leach,TIME2 | 28,12 | mg.m-2 | S |  |
|  |  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | | |  | Q\*leach,TIME3 | 34,69 | mg.m-2 | S |  |
|  |  | |  |  |  |  |  |  |
| Soil volume (wet) | | |  | Vsoil | 13 | m3 | D |  |
|  |  | |  |  |  |  |  |  |
| Bulk density of wet soil | | |  | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  | |  |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| Soil-water partitioning coefficient | |  | | Ksoil-water | 908,52 | m3.m-3 | S |  |
|  |  |  | |  |  |  |  |  |
| First order rate constant for removal from soil | |  | | k | 0,12 | d-1 | S |  |
|  |  |  | |  |  |  |  |  |
| **Output** |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| *Variable/parameter* | |  | | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  | |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | | Qleach,TIME1 | 3,30E+02 | mg | O | Qleach,TIME1 = AREAhouse \* Q\*leach,TIME1 |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | | Qleach,TIME2 | 3,52E+03 | mg | O | Qleach,TIME2 = AREAhouse \* Q\*leach,TIME2 |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | | Qleach,TIME3 | 4,34E+03 | mg | O | Qleach,TIME3= AREAhouse \* Q\*leach,TIME3 |
|  |  |  | |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | | Clocalsoil,leach,TIME1 | 1,49E-02 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME1 = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  | |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | | Clocalsoil,leach,TIME2 | 1,59E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME2 = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  | |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | | Clocalsoil,leach,TIME3 | 1,96E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  | |  |  |  |  |  |
| **Considering removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | | Esoil,leach,TIME1 | 1,10E+01 | mg.d-1 | O | Esoil,leach,TIME1 = AREAhouse \* Q\*leach,TIME1 / TIME1 |
|  |  |  | |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | | Esoil,leach,TIME2 | 9,63E+00 | mg.d-1 | O | Esoil,leach,TIME2 = AREAhouse \* Q\*leach,TIME2 / TIME2 |
|  |  |  | |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | | Esoil,leach,TIME3 | 5,94E-01 | mg.d-1 | O | Esoil,leach,TIME3 = AREAhouse \* Q\*leach,TIME3 / TIME3 |
|  |  |  | |  |  |  |  |  |
| **NOTE (from the ESD):  #64 (p.29)** Equations 3.7, 3.8, 3.11 and 3.12 give the concentration in soil taking into account continuous releases to soil and a single emission during application which increases the steady state concentration due to continuous release depending on time. The underlying assumption being that the steady state is reached during the time period and that the releases are the same every day. However, equations 3.11 and 3.12 calculate the concentration in soil as a function of time. As represented they calculate Clocalsoil at the end of the assessment period, time1, and time2 respectively. Equations 3.7 and 3.8 are the time weighted average forms of Equations 3.11 and 3.12, respectively. They calculate the time weighted average Clocalsoil over a period time1 (eq. 3.7) and over time2 (eq. 3.8).  **#65 (p.29)** Thus, depending on the value of Clocalsoil,applic and the degradation half life, either equations 3.7/3.8 or 3.11/3.12 represent a worst-case situation, e.g. for persistent substances, equations 3.7 and 3.8 are recommended for those cases where Clocalsoil,applic is not zero.  **Note that for this scenario is set Clocalsoil=0** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| ESD Eq. 3.7) Time weighted concentration in local soil over the initial assessment period | |  | | Clocalsoil,TIME1 | 3,03E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME1 = [Esoil,leach,TIME1/(Vsoil\*RHOsoil \* k)] + [1/(k\*TIME1)] \* [Clocalsoil,brush\_house - Esoil,leach,TIME1/(Vsoil\*RHOsoil\*k)]\*(1-e-TIME1\*k) |
|  |  |  | |  |  |  |  |  |
| Time weighted concentration in local soil over the intermediate assessment period | |  | | Clocalsoil,TIME2 | 3,55E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME2 = [Esoil,leach,TIME2/(Vsoil\*RHOsoil \* k)] + [1/(k\*TIME2)] \* [Clocalsoil,brush\_house - Esoil,leach,TIME2/(Vsoil\*RHOsoil\*k)]\*(1-e-TIME2\*k) |
|  |  |  | |  |  |  |  |  |
| ESD Eq. 3.8) Time weighted concentration in local soil over a longer duration | |  | | Clocalsoil,TIME3 | 2,24E-04 | mg.kgwwt-1 | O | Clocalsoil,TIME3 = [Esoil,leach,TIME3/(Vsoil\*RHOsoil \* k)] + [1/(k\*TIME3)] \* [Clocalsoil,brush\_house - Esoil,leach,TIME3/(Vsoil\*RHOsoil\*k)]\*(1-e-TIME3\*k) |
|  |  |  | |  |  |  |  |  |
| Average concentration in soil pore water over the initial assessment period | |  | | Clocalpore,TIME1 | 5,66E-06 | mg.l-1 | O | Clocalpore,TIME1 = Clocalsoil,TIME1\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| Average concentration in soil pore water over the intermediate assessment period | |  | | Clocalpore,TIME2 | 5,66E-06 | mg.l-1 | O | Clocalpore,TIME2 = Clocalsoil,TIME2\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| Average concentration in soil pore water over a longer duration | |  | | Clocalpore,TIME3 | 4,19E-07 | mg.l-1 | O | Clocalpore,TIME3 = Clocalsoil,TIME3\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| ESD Eq. 3.11) Concentration in local soil after the initial assessment period | |  | | Clocalsoil,TIME1 | 4,03E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME1 = [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k) - Clocalsoil,brush\_house] \* e-TIME1\*k |
|  |  |  | |  |  |  |  |  |
| Concentration in local soil over the intermediate assessment period | |  | | Clocalsoil,TIME2 | 3,63E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME2 = [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k) - Clocalsoil,brush\_house] \* e-TIME2\*k |
|  |  |  | |  |  |  |  |  |
| ESD Eq. 3.12) Concentration in local soil over a longer duration | |  | | Clocalsoil,TIME3 | 2,24E-04 | mg.kgwwt-1 | O | Clocalsoil,TIME3 = [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k) - Clocalsoil,brush\_house] \* e-TIME3\*k |
|  |  |  | |  |  |  |  |  |
| Concentration in soil pore water after the initial assessment period | |  | | Clocalpore,TIME1 | 7,55E-06 | mg.l-1 | O | Clocalpore,TIME1 = Clocalsoil,TIME1\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| Concentration in soil pore water after the intermediate assessment period | |  | | Clocalpore,TIME2 | 6,79E-06 | mg.l-1 | O | Clocalpore,TIME2 = Clocalsoil,TIME2\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| Concentration in soil pore water over a longer duration | |  | | Clocalpore,TIME3 | 4,19E-07 | mg.l-1 | O | Clocalpore,TIME3 = Clocalsoil,TIME3\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | | | | | | | | |
|  | | | | | | | | |
| **B) Noise barrier scenario including removal processes (ESD Table 4.17, p.74, Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | | |
| **Input** |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| *Variable/parameter* |  |  | | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  | |  |  |  |  |  |
| Leachable wood area | |  | | AREAnoise-barrier | 3000 | m2 | D |  |
|  |  |  | |  |  |  |  |  |
| Duration of the initial assessment period | |  | | TIME1 | 30 | d | D |  |
|  | |  | |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | |  | | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  | |  |  |  |  |  |
| Duration of a longer assessment period (service life) | Vacuum pressure treatment |  | | TIME3 | 7300 | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | | Q\*leach,TIME1 | 2,64 | mg.m-2 | S |  |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | | Q\*leach,TIME2 | 28,12 | mg.m-2 | S |  |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | | Q\*leach,TIME3 | 34,69 | mg.m-2 | S |  |
|  |  |  | |  |  |  |  |  |
| Soil volume (wet) |  |  | | Vsoil | 250 | m3 | D |  |
|  |  |  | |  |  |  |  |  |
| Bulk density of wet soil |  |  | | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  |  | |  |  |  |  |  |
| Fraction released to soil |  |  | | Fsoil | 0,3 | [-] | D |  |
|  |  |  | |  |  |  |  |  |
| Fraction released to the STP |  |  | | FSTP | 0,7 | [-] | D |  |
|  |  |  | |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| Soil-water partitioning coefficient | |  | | Ksoil-water | 908,52 | m3.m-3 | S | Value set in table A above. Editable in table A only. |
|  |  |  | |  |  |  |  |  |
| First order rate constant for removal from soil | |  | | k | 0,12 | d-1 | S | Value set in table A above. Editable in table A only. |
|  |  |  | |  |  |  |  |  |
| **Output** |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| *Variable/parameter* | |  | | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  | |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| **Emissions to soil** |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | | Qleach,TIME1 | 2,38E+03 | mg | O | Qleach,TIME1 = AREAnoise-barrier \* FSoil \* Q\*leach,TIME1 |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | | Qleach,TIME2 | 2,53E+04 | mg | O | Qleach,TIME2 = AREAnoise-barrier \* FSoil \* Q\*leach,TIME2 |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | | Qleach,TIME3 | 3,12E+04 | mg | O | Qleach,TIME3 = AREAnoise-barrier \* FSoil \* Q\*leach,TIME3 |
|  |  |  | |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | | Clocalsoil,leach,TIME1 | 5,59E-03 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME1 = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  | |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | | Clocalsoil,leach,TIME2 | 5,95E-02 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME2 = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  | |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | | Clocalsoil,leach,TIME3 | 7,35E-02 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  | |  |  |  |  |  |
| **Emissions to STP** |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the initial assessment period | |  | | ESTP,TIME1 | 1,85E+02 | mg.d-1 | O | ESTP,TIME1 = AREAnoise-barrier \* FSTP \* Q\*leach,TIME1/TIME1 |
|  |  |  | |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the intermediate assessment period | |  | | ESTP,TIME2 | 1,62E+02 | mg.d-1 | O | ESTP,TIME2 = AREAnoise-barrier \* FSTP \* Q\*leach,TIME2/TIME2 |
|  |  |  | |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the longer assessment period | |  | | ESTP,TIME3 | 9,98E+00 | mg.d-1 | O | ESTP,TIME3 = AREAnoise-barrier \* FSTP \* Q\*leach,TIME3/TIME3 |
|  |  |  | |  |  |  |  |  |
| **Considering removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | | Esoil,leach,TIME1 | 7,92E+01 | mg.d-1 | O | Esoil,leach,TIME1 = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME1 / TIME1 |
|  |  |  | |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | | Esoil,leach,TIME2 | 6,93E+01 | mg.d-1 | O | Esoil,leach,TIME2 = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME2 / TIME2 |
|  |  |  | |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | | Esoil,leach,TIME3 | 4,28E+00 | mg.d-1 | O | Esoil,leach,TIME3 = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME3 / TIME3 |
|  |  |  | |  |  |  |  |  |
| NOTE (from the ESD):  #64 (p.29) Equations 3.7, 3.8, 3.11 and 3.12 give the concentration in soil taking into account continuous releases to soil and a single emission during application which increases the steady state concentration due to continuous release depending on time. The underlying assumption being that the steady state is reached during the time period and that the releases are the same every day. However, equations 3.11 and 3.12 calculate the concentration in soil as a function of time. As represented they calculate Clocalsoil at the end of the assessment period, time1, and time2 respectively. Equations 3.7 and 3.8 are the time weighted average forms of Equations 3.11 and 3.12, respectively. They calculate the time weighted average Clocalsoil over a period time1 (eq. 3.7) and over time2 (eq. 3.8).  #65 (p.29) Thus, depending on the value of Clocalsoil,applic and the degradation half life, either equations 3.7/3.8 or 3.11/3.12 represent a worst-case situation, e.g. for persistent substances, equations 3.7 and 3.8 are recommended for those cases where Clocalsoil,applic is not zero.  **Note also that for the noise barrier scenario Clocalsoil=0**. | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| ESD Eq. 3.7) Time weighted concentration in local soil over the initial assessment period | |  | | Clocalsoil,TIME1 | 1,13E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME1 = [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] + [1/(k \* TIME1)] \* [- Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] \* (1-e-TIME1\*k) |
|  |  |  | |  |  |  |  |  |
| Time weighted concentration in local soil over the intermediate assessment period | |  | | Clocalsoil,TIME2 | 1,33E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME2 = [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] + [1/(k \* TIME2)] \* [- Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] \* (1-e-TIME2\*k) |
|  |  |  | |  |  |  |  |  |
| ESD Eq. 3.8) Time weighted concentration in local soil over a longer duration | |  | | Clocalsoil,TIME3 | 8,38E-05 | mg.kgwwt-1 | O | Clocalsoil,TIME3 = [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] + [1/(k \* TIME3)] \* [- Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] \* (1-e-TIME3\*k) |
|  |  |  | |  |  |  |  |  |
| Average concentration in soil pore water over the initial assessment period | |  | | Clocalpore,TIME1 | 2,12E-06 | mg.l-1 | O | Clocalpore,TIME1 = Clocalsoil,TIME1\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| Average concentration in soil pore water over the intermediate assessment period | |  | | Clocalpore,TIME2 | 2,49E-06 | mg.l-1 | O | Clocalpore,TIME2 = Clocalsoil,TIME2\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| Average concentration in soil pore water over a longer duration | |  | | Clocalpore,TIME3 | 1,57E-07 | mg.l-1 | O | Clocalpore,TIME3 = Clocalsoil,TIME3\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| ESD Eq. 3.11) Concentration in local soil after the initial assessment period | |  | | Clocalsoil,TIME1 | 1,51E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME1 = [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] \* e-TIME1\*k |
|  |  |  | |  |  |  |  |  |
| Concentration in local soil over the intermediate assessment period | |  | | Clocalsoil,TIME2 | 1,36E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME2 = [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] \* e-TIME2\*k |
|  |  |  | |  |  |  |  |  |
| ESD Eq. 3.12) Concentration in local soil over a longer duration | |  | | Clocalsoil,TIME3 | 8,39E-05 | mg.kgwwt-1 | O | Clocalsoil,TIME3 = [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] \* e-TIME3\*k |
|  |  |  | |  |  |  |  |  |
| Concentration in soil pore water after the initial assessment period | |  | | Clocalpore,TIME1 | 2,83E-06 | mg.l-1 | O | Clocalpore,TIME1 = Clocalsoil,TIME1\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| Concentration in soil pore water over the intermediate assessment period | |  | | Clocalpore,TIME2 | 2,54E-06 | mg.l-1 | O | Clocalpore,TIME2 = Clocalsoil,TIME2\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| Concentration in soil pore water over a longer duration | |  | | Clocalpore,TIME3 | 1,57E-07 | mg.l-1 | O | Clocalpore,TIME3 = Clocalsoil,TIME3\*RHOsoil\*0.001/Ksoil-water |
|  |  |  | |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| **C) Bridge over pond scenario including removal processes (ESD Table 4.18, p.76 and Table 3.8, p.31/32)** | | | | | | | | |
| **Input** |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| *Variable/parameter* |  |  | | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  | |  |  |  |  |  |
| Leachable wood area | |  | | AREAbridge | 10 | m2 | D |  |
|  |  |  | |  |  |  |  |  |
| Duration of the initial assessment period | |  | | TIME1 | 30 | d | D |  |
|  | |  | |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | |  | | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  | |  |  |  |  |  |
| Duration of a longer assessment period (service life) | Vacuum pressure treatment |  | | TIME3 | 7300 | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | | Q\*leach,TIME1 | 2,64 | mg.m-2 | S |  |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | | Q\*leach,TIME2 | 28,12 | mg.m-2 | S |  |
|  | |  | |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | | Q\*leach,TIME3 | 34,69 | mg.m-2 | S |  |
|  |  |  | |  |  |  |  |  |
| Water volume under bridge |  |  | | Vwater | 1000 | m3 | D |  |
|  |  |  | |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the water body (Table 3.8, p.31/32)** | | | | | | | |  |
|  |  |  | |  |  |  |  |  |
| First order rate constant for removal from water | |  | | k | 0,1019 | d-1 | S |  |
|  |  |  | |  |  |  |  |  |
| **Output** |  |  | |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
| *Variable/parameter* |  |  | | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  | |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | | Qleach,TIME1 | 2,64E+01 | mg | O | Qleach,TIME1 = AREAbridge \* Q\*leach,TIME1 |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | | Qleach,TIME2 | 2,81E+02 | mg | O | Qleach,TIME2 = AREAbridge \* Q\*leach,TIME2 |
|  |  |  | |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | | Qleach,TIME3 | 3,47E+02 | mg | O | Qleach,TIME3 = AREAbridge \* Q\*leach,TIME3 |
|  |  |  | |  |  |  |  |  |
| Concentration in local water at the end of the initial assessment period | |  | | Clocalwater,leach,TIME1 | 2,64E-02 | mg.l-1 | O | Clocalsoil,leach,TIME1 = Qleach,TIME1 \* 0.001 / Vwater |
|  |  |  | |  |  |  |  |  |
| Concentration in local water at the end of the intermediate assessment period | |  | | Clocalwater,leach,TIME2 | 2,81E-01 | mg.l-1 | O | Clocalsoil,leach,TIME2 = Qleach,TIME2 \* 0.001 / Vwater |
|  |  |  | |  |  |  |  |  |
| Concentration in local water at the end of a longer assessment period | |  | | Clocalwater,leach,TIME3 | 3,47E-01 | mg.l-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 \* 0.001 / Vwater |
|  |  |  | |  |  |  |  |  |
| **Considering removal processes in the water body (Table 3.8, p.31/32)** | | | | | | | | |
|  |  |  | |  |  |  |  |  |
| Average daily emission due to leaching over the initial assessment period | |  | | Ewater,leach,TIME1 | 8,80E-01 | mg.d-1 | O | Ewater,leach,TIME1 = AREAbridge \* Q\*leach,TIME1 / TIME1 |
|  |  |  | |  |  |  |  |  |
| Average daily emission due to leaching over the intermediate assessment period | |  | | Ewater,leach,TIME2 | 7,70E-01 | mg.d-1 | O | Ewater,leach,TIME2 = AREAbridge \* Q\*leach,TIME2 / TIME2 |
|  |  |  | |  |  |  |  |  |
| Average daily emission due to leaching over a longer duration | |  | | Ewater,leach,TIME3 | 4,75E-02 | mg.d-1 | O | Ewater,leach,TIME3 = AREAbridge \* Q\*leach,TIME3 / TIME3 |
|  |  |  | |  |  |  |  |  |
| Time weighted concentration in local water over the initial assessment period | |  | | Clocalwater,TIME1 | 5,94E-03 | mg.l-1 | O | Clocalwater,TIME1 = [Ewater,leach,TIME1/(Vwater\*k\*1000)] \* [1-(1-e-TIME1\*k)/(k\*TIME1)] |
|  |  |  | |  |  |  |  |  |
| Time weighted concentration in local water over the intermediate assessment period | |  | | Clocalwater,TIME2 | 7,36E-03 | mg.l-1 | O | Clocalwater,TIME2 = [Ewater,leach,TIME2/(Vwater\*k\*1000)] \* [1-(1-e-TIME2\*k)/(k\*TIME2)] |
|  |  |  | |  |  |  |  |  |
| Time weighted concentration in local water over a longer duration | |  | | Clocalwater,TIME3 | 4,66E-04 | mg.l-1 | O | Clocalwater,TIME3 = [Ewater,leach,TIME3/(Vwater\*k\*1000)] \* [1-(1-e-TIME3\*k)/(k\*TIME3)] |
|  |  |  | |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  | |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario [3]: Emission estimation for treated wood in service (ESD § 4.3, p.65) - Emission scenario for UC 4a - Wood in contact with the ground (ESD § 4.3.4, p.76)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) Transmission pole (ESD Table 4.19 p.78, Table 3.5, p.28 and Table 3.6, p.29)** | | | | |  |  |  |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area above soil | |  | AREApole,above | 5,5 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Leachable wood area below soil |  |  | AREApole,below | 1,6 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | |  | TIME3 | 7300 | d | D | ESD § 4.3.2, #213, p.68 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 78,93 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 219,43 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 321,38 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Soil volume (wet) |  |  | Vsoil | 2,97 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Soil-water partioning coefficient | |  | Ksoil-water | 908,522 | m3.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| First order rate constant for removal from soil | |  | k | 0,12 | d-1 | D |  |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes in the receiving environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 5,60E+02 | mg | O | Qleach,TIME1 = (AREApole,above + AREApole,below)\* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 1,56E+03 | mg | O | Qleach,TIME2 = (AREApole,above + AREApole,below)\* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 2,28E+03 | mg | O | Qleach,TIME3 = (AREApole,above + AREApole,below)\* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | Clocalsoil,leach,TIME1 | 1,11E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME1 = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | Clocalsoil,leach,TIME2 | 3,09E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME2 = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | Clocalsoil,leach,TIME3 | 4,52E-01 | mg.kgwwt-1 | O | Clocalsoil,leach,TIME3 = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| **Considering removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | Esoil,leach,TIME1 | 1,87E+01 | mg.d-1 | O | Esoil,leach,TIME1 = (AREApole,above + AREApole,below) \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | Esoil,leach,TIME2 | 4,27E+00 | mg.d-1 | O | Esoil,leach,TIME2 = (AREApole,above + AREApole,below) \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | Esoil,leach,TIME3 | 3,13E-01 | mg.d-1 | O | Esoil,leach,TIME3 = (AREApole,above + AREApole,below) \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| NOTE (from the ESD):  #64 (p.29) Equations 3.7, 3.8, 3.11 and 3.12 give the concentration in soil taking into account continuous releases to soil and a single emission during application which increases the steady state concentration due to continuous release depending on time. The underlying assumption being that the steady state is reached during the time period and that the releases are the same every day. However, equations 3.11 and 3.12 calculate the concentration in soil as a function of time. As represented they calculate Clocalsoil at the end of the assessment period, time1, and time2 respectively. Equations 3.7 and 3.8 are the time weighted average forms of Equations 3.11 and 3.12, respectively. They calculate the time weighted average Clocalsoil over a period time1 (eq. 3.7) and over time2 (eq. 3.8).  #65 (p.29) Thus, depending on the value of Clocalsoil,applic and the degradation half life, either equations 3.7/3.8 or 3.11/3.12 represent a worst-case situation, e.g. for persistent substances, equations 3.7 and 3.8 are recommended for those cases where Clocalsoil,applic is not zero.  Note also that for this scenario Clocalsoil=0. | | | | | | | |
|  |  |  |  |  |  |  |  |
| ESD Eq. 3.7) Time weighted concentration in local soil over the initial assessment period | |  | Clocalsoil,TIME1 | 2,25E-02 | mg.kgwwt-1 | O | Clocalsoil,TIME1 = [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] + [1/(k \* TIME1)] \* [- Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] \* (1-e-TIME1\*k) |
|  |  |  |  |  |  |  |  |
| Time weighted concentration in local soil over the intermediate assessment period | |  | Clocalsoil,TIME2 | 6,88E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME2 = [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] + [1/(k \* TIME2)] \* [- Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] \* (1-e-TIME2\*k) |
|  |  |  |  |  |  |  |  |
| ESD Eq. 3.8) Time weighted concentration in local soil over a longer duration | |  | Clocalsoil,TIME3 | 5,15E-04 | mg.kgwwt-1 | O | Clocalsoil,TIME3 = [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] + [1/(k \* TIME3)] \* [- Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] \* (1-e-TIME3\*k) |
|  |  |  |  |  |  |  |  |
| Average concentration in soil pore water over the initial assessment period | |  | Clocalpore,TIME1 | 4,21E-05 | mg.l-1 | O | Clocalpore,TIME1 = Clocalsoil,TIME1 \* RHOsoil \* 0.001 / Ksoil-water |
|  |  |  |  |  |  |  |  |
| Average concentration in soil pore water over the intermediate assessment period | |  | Clocalpore,TIME2 | 1,29E-05 | mg.l-1 | O | Clocalpore,TIME2 = Clocalsoil,TIME2 \* RHOsoil \* 0.001 / Ksoil-water |
|  |  |  |  |  |  |  |  |
| Average concentration in soil pore water over a longer duration | |  | Clocalpore,TIME3 | 9,64E-07 | mg.l-1 | O | Clocalpore,TIME3 = Clocalsoil,TIME3 \* RHOsoil \* 0.001 / Ksoil-water |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| ESD Eq. 3.11) Concentration in local soil after the initial assessment period | |  | Clocalsoil,TIME1 | 3,00E-02 | mg.kgwwt-1 | O | Clocalsoil,TIME1 = [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] \* e-TIME1\*k |
|  |  |  |  |  |  |  |  |
| Concentration in local soil after the intermediate assessment period | |  | Clocalsoil,TIME2 | 7,04E-03 | mg.kgwwt-1 | O | Clocalsoil,TIME2 = [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] \* e-TIME2\*k |
|  |  |  |  |  |  |  |  |
| ESD Eq. 3.12) Concentration in local soil over a longer duration | |  | Clocalsoil,TIME3 | 5,16E-04 | mg.kgwwt-1 | O | Clocalsoil,TIME3 = [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] \* e-TIME3\*k |
|  |  |  |  |  |  |  |  |
| Concentration in soil pore water after the initial assessment period | |  | Clocalpore,TIME1 | 5,61E-05 | mg.l-1 | O | Clocalpore,TIME1 = Clocalsoil,TIME1 \* RHOsoil \* 0.001 / Ksoil-water |
|  |  |  |  |  |  |  |  |
| Concentration in soil pore water after the intermediate assessment period | |  | Clocalpore,TIME2 | 1,32E-05 | mg.l-1 | O | Clocalpore,TIME2 = Clocalsoil,TIME2 \* RHOsoil \* 0.001 / Ksoil-water |
|  |  |  |  |  |  |  |  |
| Concentration in soil pore water over a longer duration | |  | Clocalpore,TIME3 | 9,65E-07 | mg.l-1 | O | Clocalpore,TIME3 = Clocalsoil,TIME3 \* RHOsoil \* 0.001 / Ksoil-water |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario [4]: Emission estimation for treated wood in service (ESD § 4.3, p.65) - Emission scenario for UC 4b - Wood in contact with fresh water (ESD § 4.3.5, p.80)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) Jetty in a lake (ESD Table 4.21 p.82 and Table 3.8, p.31/32)** | | | | | | | |
| Input |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area planks | |  | AREAplanks | 16,2 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Leachable wood area poles |  |  | AREApoles | 10 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | |  | TIME3 | 7300 | d | D | ESD § 4.3.2, #213, p.68 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 88,84198473 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 177,4092366 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 281,5505344 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Water volume |  |  | Vwater | 1,60E+04 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Additional information needed to estimate emissions taking into account removal processes in the water body (Table 3.8, p.31/32) | | | | | | |  |
|  |  |  |  |  |  |  |  |
| First order rate constant for removal from water | |  | k | 0,1019 | d-1 | S |  |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 2,33E+03 | mg | O | Qleach,TIME1 = (AREAplanks + AREApoles)\* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 4,65E+03 | mg | O | Qleach,TIME2 = (AREAplanks + AREApoles)\* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 7,38E+03 | mg | O | Qleach,TIME3 = (AREAplanks + AREApoles)\* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the initial assessment period | |  | Clocalwater,leach,TIME1 | 1,45E-04 | mg.l-1 | O | Clocalwater,leach,TIME1 = Qleach,TIME1 \* 0.001/ Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the intermediate assessment period | |  | Clocalwater,leach,TIME2 | 2,91E-04 | mg.l-1 | O | Clocalwater,leach,TIME2 = Qleach,TIME2 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of a longer assessment period | |  | Clocalwater,leach,TIME3 | 4,61E-04 | mg.l-1 | O | Clocalwater,leach,TIME3 = Qleach,TIME3 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| **Considering removal processes in the water body (Table 3.8, p.31/32)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the initial assessment period | |  | Ewater,leach,TIME1 | 7,76E+01 | mg.d-1 | O | Ewater,leach,TIME1 = (AREAplanks + AREApoles) \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the intermediate assessment period | |  | Ewater,leach,TIME2 | 1,27E+01 | mg.d-1 | O | Ewater,leach,TIME2 = (AREAplanks + AREApoles) \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over a longer duration | |  | Ewater,leach,TIME3 | 1,01E+00 | mg.d-1 | O | Ewater,leach,TIME3 = (AREAplanks + AREApoles) \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| Time weighted concentration in local water over the initial assessment period | |  | Clocalwater,TIME1 | 3,28E-05 | mg.l-1 | O | Clocalwater,TIME1 = [Ewater,leach,TIME1\*0.001/(Vwater\*k)] \* [1-(1-e-TIME1\*k)/(k\*TIME1)] |
|  |  |  |  |  |  |  |  |
| Time weighted concentration in local water over the intermediate assessment period | |  | Clocalwater,TIME2 | 7,60E-06 | mg.l-1 | O | Clocalwater,TIME2 = [Ewater,leach,TIME2\*0.001/(Vwater\*k)] \* [1-(1-e-TIME2\*k)/(k\*TIME2)] |
|  |  |  |  |  |  |  |  |
| Time weighted concentration in local water over a longer duration | |  | Clocalwater,TIME3 | 6,19E-07 | mg.l-1 | O | Clocalwater,TIME3 = [Ewater,leach,TIME3\*0.001/(Vwater\*k)] \* [1-(1-e-TIME3\*k)/(k\*TIME3)] |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | | | | | | | |
|  |  |  |  |  |  |  |  |
| **B) Sheet piling in a waterway (ESD Table 4.22 p.83 and Table 3.8, p.33/34)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Wood area per m waterway length | |  | AREApoles | 4,71 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should not be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period | |  | TIME3 | 7300 | d | D | ESD § 4.3.2, #213, p.68 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 225,8 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 390,6 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 646,1 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Water volume per m waterway length | |  | Vwater | 7,5 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Residence time of water in waterway | |  | TAUwway | 20 | d | D |  |
|  |  |  |  |  |  |  |  |
| Additional information needed to estimate emissions taking into account removal processes in the water body (Table 3.8, p.33/34) | | | | | | |  |
|  |  |  |  |  |  |  |  |
| First order rate constant for removal from water | |  | k | 0,1019 | d-1 | S |  |
|  |  |  |  |  |  |  |  |
| Concentration of suspended matter in the surface water | |  | SUSPwater | 0,015 | kg.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| Solids-water partitioning coefficient for suspended matter | |  | Kpsusp | 3,02774 | m3.kg-1 | S | If needed calculate Kpsusp below and insert the value here |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Calculation of solids-water partitioning coefficient for suspended matter | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Partition coefficient organic carbon-water |  |  | Koc | 30,2774 | m3.kg-1 | S |  |
|  |  |  |  |  |  |  |  |
| Weight fraction of organic carbon in the suspended solids | |  | Foc,susp | 0,1 | kgoc.kgsolid-1 | D | Guidance on the Biocidal Products Regulation, Vol IV Environment - Part B (v 1.0 April 2015) - Table 5, p.49 |
|  |  |  |  |  |  |  |  |
| Solids-water partitioning coefficient for suspended matter | |  | Kpsusp | 3,02774 | m3.kg-1 | O | Kpsusp = Koc \* Foc,susp (Vol IV Part B, p.52) |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | 7,09E+02 | mg | O | Qleach,TIME1 = AREApoles \* Q\*leach,TIME1/TIME1 \* TAUwway |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | 1,01E+02 | mg | O | Qleach,TIME2 = AREApoles \* Q\*leach,TIME2/TIME2 \* TAUwway |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | 8,34E+00 | mg | O | Qleach,TIME3 = AREApoles \* Q\*leach,TIME3/TIME3 \* TAUwway |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the initial assessment period | |  | Clocalwater,leach,TIME1 | 9,45E-02 | mg.l-1 | O | Clocalwater,leach,TIME1 = Qleach,TIME1 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the intermediate assessment period | |  | Clocalwater,leach,TIME2 | 1,34E-02 | mg.l-1 | O | Clocalwater,leach,TIME2 = Qleach,TIME2 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of a longer assessment period | |  | Clocalwater,leach,TIME3 | 1,11E-03 | mg.l-1 | O | Clocalwater,leach,TIME3 = Qleach,TIME3 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| **Considering removal processes in the water body (Table 3.8, p.33/34)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the initial assessment period | |  | Ewater,leach,TIME1 | 3,55E+01 | mg.d-1 | O | Ewater,leach,TIME1 = AREApoles \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the intermediate assessment period | |  | Ewater,leach,TIME2 | 5,04E+00 | mg.d-1 | O | Ewater,leach,TIME2 = AREApoles \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over a longer duration | |  | Ewater,leach,TIME3 | 4,17E-01 | mg.d-1 | O | Ewater,leach,TIME3 = AREApoles \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| Time weighted concentration in local water over the initial assessment period | |  | Clocalwater,TIME1 | 2,66E-02 | mg.l-1 | O | Clocalwater,TIME1 = [Ewater,leach,TIME1\*0.001/(Vwater\*k)] \* [1-(1-e-TAUwway\*k)/(k\*TAUwway)] |
|  |  |  |  |  |  |  |  |
| Time weighted concentration in local water over the intermediate assessment period | |  | Clocalwater,TIME2 | 3,78E-03 | mg.l-1 | O | Clocalwater,TIME2 = [Ewater,leach,TIME2\*0.001/(Vwater\*k)] \* [1-(1-e-TAUwway\*k)/(k\*TAUwway)] |
|  |  |  |  |  |  |  |  |
| Time weighted concentration in local water over a longer duration | |  | Clocalwater,TIME3 | 3,13E-04 | mg.l-1 | O | Clocalwater,TIME3 = [Ewater,leach,TIME3\*0.001/(Vwater\*k)] \* [1-(1-e-TAUwway\*k)/(k\*TAUwway)] |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | | | | | | | |

### Calculated PEC values (EUSES 2.1.2)

### Assessed substance: Copper

### SCENARIO [1]: INDUSTRIAL PROCESS, VACUUM PRESSURE: EUSES 2.1.2 OUTPUT FILE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section/parameter** |  | **Actual value** | **Unit** | **Stat** |
|  |  |  |  |  |
| **DEFAULTS** |  |  |  |  |
| **DEFAULT IDENTIFICATION** |  |  |  |  |
| General name |  | Standard Euses 2.1 |  | D |
| Description |  | According to TGDs |  | D |
|  |  |  |  |  |
| **CHARACTERISTICS OF COMPARTMENTS** |  |  |  |  |
| **GENERAL** |  |  |  |  |
| Density of solid phase |  | 2,5 | [kg.l-1] | D |
| Density of water phase |  | 1 | [kg.l-1] | D |
| Density of air phase |  | 1,3E-03 | [kg.l-1] | D |
| Environmental temperature |  | 12 | [oC] | D |
| Standard temperature for Vp and Sol |  | 25 | [oC] | D |
| Temperature correction method |  | Temperature correction for local distribution |  | D |
| Constant of Junge equation |  | 0,01 | [Pa.m] | D |
| Surface area of aerosol particles |  | 0,01 | [m2.m-3] | D |
| Gas constant (8.314) |  | 8.314 | [Pa.m3.mol-1.K-1] | D |
|  |  |  |  |  |
| **SUSPENDED MATTER** |  |  |  |  |
| Volume fraction solids in suspended matter |  | 0,1 | [m3.m-3] | D |
| Volume fraction water in suspended matter |  | 0,9 | [m3.m-3] | D |
| Weight fraction of organic carbon in suspended matter |  | 0,1 | [kg.kg-1] | D |
| Bulk density of suspended matter |  | 1,15E+03 | [kgwwt.m-3] | O |
| Conversion factor wet-dry suspened matter |  | 4,6 | [kgwwt.kgdwt-1] | O |
|  |  |  |  |  |
| **SEDIMENT** |  |  |  |  |
| Volume fraction solids in sediment |  | 0,2 | [m3.m-3] | D |
| Volume fraction water in sediment |  | 0,8 | [m3.m-3] | D |
| Weight fraction of organic carbon in sediment |  | 0,05 | [kg.kg-1] | D |
|  |  |  |  |  |
| **SOIL** |  |  |  |  |
| Volume fraction solids in soil |  | 0,6 | [m3.m-3] | D |
| Volume fraction water in soil |  | 0,2 | [m3.m-3] | D |
| Volume fraction air in soil |  | 0,2 | [m3.m-3] | D |
| Weight fraction of organic carbon in soil |  | 0,02 | [kg.kg-1] | D |
| Weight fraction of organic matter in soil |  | 0,034 | [kg.kg-1] | O |
| Bulk density of soil |  | 1,7E+03 | [kgwwt.m-3] | O |
| Conversion factor wet-dry soil |  | 1,13 | [kgwwt.kgdwt-1] | O |
|  |  |  |  |  |
| **STP SLUDGE** |  |  |  |  |
| Fraction of organic carbon in raw sewage sludge |  | 0,3 | [kg.kg-1] | D |
| Fraction of organic carbon in settled sewage sludge |  | 0,3 | [kg.kg-1] | D |
| Fraction of organic carbon in activated sewage sludge |  | 0,37 | [kg.kg-1] | D |
| Fraction of organic carbon in effluent sewage sludge |  | 0,37 | [kg.kg-1] | D |
|  |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION RATES** |  |  |  |  |
| Rate constant for abiotic degradation in STP |  | 0 | [d-1] | D |
| Rate constant for abiotic degradation in bulk sediment |  | 0 | [d-1] (12[oC]) | D |
| Rate constant for anaerobic biodegradation in sediment |  | 0 | [d-1] (12[oC]) | D |
| Fraction of sediment compartment that is aerated |  | 0,1 | [m3.m-3] | D |
| Concentration of OH-radicals in atmosphere |  | 5,00E+05 | [molec.cm-3] | D |
| Rate constant for abiotic degradation in bulk soil |  | 0 | [d-1] (12[oC]) | D |
|  |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| Fraction of EU production volume for region |  | 100 | [%] | D |
| Fraction of EU tonnage for region (private use) |  | 10 | [%] | D |
| Fraction connected to sewer systems |  | 80 | [%] | D |
|  |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **GENERAL** |  |  |  |  |
| Number of inhabitants feeding one STP |  | 1,00E+04 | [eq] | D |
| Sewage flow |  | 200 | [l.eq-1.d-1] | D |
| Effluent discharge rate of local STP |  | 2,00E+06 | [l.d-1] | O |
| Temperature correction for STP degradation |  | No |  | D |
| Temperature of air above aeration tank |  | 15 | [oC] | D |
| Temperature of water in aeration tank |  | 15 | [oC] | D |
| Height of air column above STP |  | 10 | [m] | D |
| Number of inhabitants of region |  | 2,00E+07 | [eq] | D |
| Number of inhabitants of continental system |  | 3,5E+08 | [eq] | O |
| Windspeed in the system |  | 3 | [m.s-1] | D |
|  |  |  |  |  |
| **RAW SEWAGE** |  |  |  |  |
| Mass of O2 binding material per person per day |  | 54 | [g.eq-1.d-1] | D |
| Dry weight solids produced per person per day |  | 0,09 | [kg.eq-1.d-1] | D |
| Density solids in raw sewage |  | 1,5 | [kg.l-1] | D |
| Fraction of organic carbon in raw sewage sludge |  | 0,3 | [kg.kg-1] | D |
|  |  |  |  |  |
| **PRIMARY SETTLER** |  |  |  |  |
| Depth of primary settler |  | 4 | [m] | D |
| Hydraulic retention time of primary settler |  | 2 | [hr] | D |
| Density suspended and settled solids in primary settler |  | 1,5 | [kg.l-1] | D |
| Fraction of organic carbon in settled sewage sludge |  | 0,3 | [kg.kg-1] | D |
|  |  |  |  |  |
| **ACTIVATED SLUDGE TANK** |  |  |  |  |
| Depth of aeration tank |  | 3 | [m] | D |
| Density solids of activated sludge |  | 1,3 | [kg.l-1] | D |
| Concentration solids of activated sludge |  | 4 | [kg.m-3] | D |
| Steady state O2 concentration in activated sludge |  | 2,00E-03 | [kg.m-3] | D |
| Mode of aeration |  | Surface |  | D |
| Aeration rate of bubble aeration |  | 1,31E-05 | [m3.s-1.eq-1] | D |
| Fraction of organic carbon in activated sewage sludge |  | 0,37 | [kg.kg-1] | D |
| Sludge loading rate |  | 0,15 | [kg.kg-1.d-1] | D |
| Hydraulic retention time in aerator (9-box STP) |  | 6,9 | [hr] | O |
| Hydraulic retention time in aerator (6-box STP) |  | 10,8 | [hr] | O |
| Sludge retention time of aeration tank |  | 9,2 | [d] | O |
|  |  |  |  |  |
| **SOLIDS-LIQUIDS SEPARATOR** |  |  |  |  |
| Depth of solids-liquid separator |  | 3 | [m] | D |
| Density suspended and settled solids in solids-liquid separator |  | 1,3 | [kg.l-1] | D |
| Concentration solids in effluent |  | 30 | [mg.l-1] | D |
| Hydraulic retention time of solids-liquid separator |  | 6 | [hr] | D |
| Fraction of organic carbon in effluent sewage sludge |  | 0,37 | [kg.kg-1] | D |
|  |  |  |  |  |
| **LOCAL DISTRIBUTION** |  |  |  |  |
| **AIR AND SURFACE WATER** |  |  |  |  |
| Concentration in air at source strength 1 [kg.d-1] |  | 2,78E-04 | [mg.m-3] | D |
| Standard deposition flux of aerosol-bound compounds |  | 0,01 | [mg.m-2.d-1] | D |
| Standard deposition flux of gaseous compounds |  | 5,00E-04 | [mg.m-2.d-1] | O |
| Suspended solids concentration in STP effluent water |  | 15 | [mg.l-1] | D |
| Dilution factor (rivers) |  | 10 | [-] | D |
| Flow rate of the river |  | 1,8E+04 | [m3.d-1] | D |
| Calculate dilution from river flow rate |  | No |  | D |
| Dilution factor (coastal areas) |  | 100 | [-] | D |
|  |  |  |  |  |
| **SOIL** |  |  |  |  |
| Mixing depth of grassland soil |  | 0,1 | [m] | D |
| Dry sludge application rate on agricultural soil |  | 5,00E+03 | [kg.ha-1.yr-1] | D |
| Dry sludge application rate on grassland |  | 1000 | [kg.ha-1.yr-1] | D |
| Averaging time soil (for terrestrial ecosystem) |  | 30 | [d] | D |
| Averaging time agricultural soil |  | 180 | [d] | D |
| Averaging time grassland |  | 180 | [d] | D |
| PMTC, air side of air-soil interface |  | 1,05E-03 | [m.s-1] | O |
| Soil-air PMTC (air-soil interface) |  | 5,56E-06 | [m.s-1] | D |
| Soil-water film PMTC (air-soil interface) |  | 5,56E-10 | [m.s-1] | D |
| Mixing depth agricultural soil |  | 0,2 | [m] | D |
| Fraction of rain water infiltrating soil |  | 0,25 | [-] | D |
| Average annual precipitation |  | 700 | [mm.yr-1] | D |
|  |  |  |  |  |
| **REGIONAL AND CONTINENTAL DISTRIBUTION** |  |  |  |  |
| **CONFIGURATION** |  |  |  |  |
| Fraction of direct regional emissions to seawater |  | 1 | [%] | D |
| Fraction of direct continental emissions to seawater |  | 0 | [%] | D |
| Fraction of regional STP effluent to seawater |  | 0 | [%] | D |
| Fraction of continental STP effluent to seawater |  | 0 | [%] | D |
| Fraction of flow from continental rivers to regional rivers |  | 0,034 | [-] | D |
| Fraction of flow from continental rivers to regional sea |  | 0 | [-] | D |
| Fraction of flow from continental rivers to continental sea |  | 0,966 | [-] | O |
| Number of inhabitants of region |  | 2,00E+07 | [eq] | D |
| Number of inhabitants in the EU |  | 3,7E+08 | [eq] | D |
| Number of inhabitants of continental system |  | 3,5E+08 | [eq] | O |
|  |  |  |  |  |
| **AREAS** |  |  |  |  |
| **REGIONAL** |  |  |  |  |
| Area (land+rivers) of regional system |  | 4,00E+04 | [km2] | D |
| Area fraction of freshwater, region (excl. sea) |  | 0,03 | [-] | D |
| Area fraction of natural soil, region (excl. sea) |  | 0,27 | [-] | D |
| Area fraction of agricultural soil, region (excl. sea) |  | 0,6 | [-] | D |
| Area fraction of industrial/urban soil, region (excl. sea) |  | 0,1 | [-] | D |
| Length of regional seawater |  | 40 | [km] | D |
| Width of regional seawater |  | 10 | [km] | D |
| Area of regional seawater |  | 400 | [km2] | O |
| Area (land+rivers+sea) of regional system |  | 4,04E+04 | [km2] | O |
| Area fraction of freshwater, region (total) |  | 0,0297 | [-] | O |
| Area fraction of seawater, region (total) |  | 9,9E-03 | [-] | O |
| Area fraction of natural soil, region (total) |  | 0,267 | [-] | O |
| Area fraction of agricultural soil, region (total) |  | 0,594 | [-] | O |
| Area fraction of industrial/urban soil, region (total) |  | 0,099 | [-] | O |
|  |  |  |  |  |
| **CONTINENTAL** |  |  |  |  |
| Total area of EU (continent+region, incl. sea) |  | 7,04E+06 | [km2] | D |
| Area (land+rivers+sea) of continental system |  | 7,00E+06 | [km2] | O |
| Area (land+rivers) of continental system |  | 3,5E+06 | [km2] | O |
| Area fraction of freshwater, continent (excl. sea) |  | 0,03 | [-] | D |
| Area fraction of natural soil, continent (excl. sea) |  | 0,27 | [-] | D |
| Area fraction of agricultural soil, continent (excl. sea) |  | 0,6 | [-] | D |
| Area fraction of industrial/urban soil, continent (excl. sea) |  | 0,1 | [-] | D |
| Area fraction of freshwater, continent (total) |  | 0,015 | [-] | O |
| Area fraction of seawater, continent (total) |  | 0,5 | [-] | D |
| Area fraction of natural soil, continent (total) |  | 0,135 | [-] | O |
| Area fraction of agricultural soil, continent (total) |  | 0,3 | [-] | O |
| Area fraction of industrial/urban soil, continent (total) |  | 0,05 | [-] | O |
|  |  |  |  |  |
| **MODERATE** |  |  |  |  |
| Area of moderate system (incl.continent,region) |  | 8,5E+07 | [km2] | D |
| Area of moderate system (excl.continent, region) |  | 7,8E+07 | [km2] | O |
| Area fraction of water, moderate system |  | 0,5 | [-] | D |
|  |  |  |  |  |
| **ARCTIC** |  |  |  |  |
| Area of arctic system |  | 4,25E+07 | [km2] | D |
| Area fraction of water, arctic system |  | 0,6 | [-] | D |
|  |  |  |  |  |
| **TROPIC** |  |  |  |  |
| Area of tropic system |  | 1,28E+11 | [km2] | D |
| Area fraction of water, tropic system |  | 0,7 | [-] | D |
|  |  |  |  |  |
| **TEMPERATURE** |  |  |  |  |
| Environmental temperature, regional scale |  | 12 | [oC] | D |
| Environmental temperature, continental scale |  | 12 | [oC] | D |
| Environmental temperature, moderate scale |  | 12 | [oC] | D |
| Environmental temperature, arctic scale |  | -10 | [oC] | D |
| Environmental temperature, tropic scale |  | 25 | [oC] | D |
| Enthalpy of vaporisation |  | 50 | [kJ.mol-1] | D |
| Enthalpy of solution |  | 10 | [kJ.mol-1] | D |
|  |  |  |  |  |
| **MASS TRANSFER** |  |  |  |  |
| Air-film PMTC (air-water interface) |  | 5,9E-03 | [m.s-1] | O |
| Water-film PMTC (air-water interface) |  | 6,4E-06 | [m.s-1] | O |
| PMTC, air side of air-soil interface |  | 1,05E-03 | [m.s-1] | O |
| PMTC, soil side of air-soil interface |  | 1,73E-11 | [m.s-1] | O |
| Soil-air PMTC (air-soil interface) |  | 5,56E-06 | [m.s-1] | D |
| Soil-water film PMTC (air-soil interface) |  | 5,56E-10 | [m.s-1] | D |
| Water-film PMTC (sediment-water interface) |  | 2,78E-06 | [m.s-1] | D |
| Pore water PMTC (sediment-water interface) |  | 2,78E-08 | [m.s-1] | D |
|  |  |  |  |  |
| **AIR** |  |  |  |  |
| **GENERAL** |  |  |  |  |
| Atmospheric mixing height |  | 1000 | [m] | D |
| Windspeed in the system |  | 3 | [m.s-1] | D |
| Aerosol deposition velocity |  | 1,00E-03 | [m.s-1] | D |
| Aerosol collection efficiency |  | 2,00E+05 | [-] | D |
|  |  |  |  |  |
| **RAIN** |  |  |  |  |
| Average precipitation, regional system |  | 700 | [mm.yr-1] | D |
| Average precipitation, continental system |  | 700 | [mm.yr-1] | D |
| Average precipitation, moderate system |  | 700 | [mm.yr-1] | D |
| Average precipitation, arctic system |  | 250 | [mm.yr-1] | D |
| Average precipitation, tropic system |  | 1,3E+03 | [mm.yr-1] | D |
|  |  |  |  |  |
| **RESIDENCE TIMES** |  |  |  |  |
| Residence time of air, regional |  | 0,687 | [d] | O |
| Residence time of air, continental |  | 9,05 | [d] | O |
| Residence time of air, moderate |  | 30,2 | [d] | O |
| Residence time of air, arctic |  | 22,3 | [d] | O |
| Residence time of air, tropic |  | 38,6 | [d] | O |
|  |  |  |  |  |
| **WATER** |  |  |  |  |
| **DEPTH** |  |  |  |  |
| Water depth of freshwater, regional system |  | 3 | [m] | D |
| Water depth of seawater, regional system |  | 10 | [m] | D |
| Water depth of freshwater, continental system |  | 3 | [m] | D |
| Water depth of seawater, continental system |  | 200 | [m] | D |
| Water depth, moderate system |  | 1000 | [m] | D |
| Water depth, arctic system |  | 1000 | [m] | D |
| Water depth, tropic system |  | 1000 | [m] | D |
|  |  |  |  |  |
| **SUSPENDED SOLIDS** |  |  |  |  |
| Suspended solids conc. freshwater, regional |  | 15 | [mg.l-1] | D |
| Suspended solids conc. seawater, regional |  | 5 | [mg.l-1] | D |
| Suspended solids conc. freshwater, continental |  | 15 | [mg.l-1] | D |
| Suspended solids conc. seawater, continental |  | 5 | [mg.l-1] | D |
| Suspended solids conc. seawater, moderate |  | 5 | [mg.l-1] | D |
| Suspended solids conc. seawater, arctic |  | 5 | [mg.l-1] | D |
| Suspended solids conc. seawater, tropic |  | 5 | [mg.l-1] | D |
| Concentration solids in effluent, regional |  | 30 | [mg.l-1] | D |
| Concentration solids in effluent, continental |  | 30 | [mg.l-1] | D |
| Concentration biota |  | 1 | [mgwwt.l-1] | D |
|  |  |  |  |  |
| **RESIDENCE TIMES** |  |  |  |  |
| Residence time of freshwater, regional |  | 43,3 | [d] | O |
| Residence time of seawater, regional |  | 4,64 | [d] | O |
| Residence time of freshwater, continental |  | 172 | [d] | O |
| Residence time of seawater, continental |  | 365 | [d] | O |
| Residence time of water, moderate |  | 2,69E+03 | [d] | O |
| Residence time of water, arctic |  | 5,84E+03 | [d] | O |
| Residence time of water, tropic |  | 1,09E+04 | [d] | O |
|  |  |  |  |  |
| **SEDIMENT** |  |  |  |  |
| **DEPTH** |  |  |  |  |
| Sediment mixing depth |  | 0,03 | [m] | D |
|  |  |  |  |  |
| **SUSPENDED SOLIDS** |  |  |  |  |
| (Biogenic) prod. susp. solids in freshwater, reg |  | 10 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in seawater, reg |  | 10 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in freshwater, cont |  | 10 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in seawater, cont |  | 5 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in water, moderate |  | 1 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in water, arctic |  | 1 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in water, tropic |  | 1 | [g.m-2.yr-1] | D |
|  |  |  |  |  |
| **SEDIMENTATION RATES** |  |  |  |  |
| Settling velocity of suspended solids |  | 2,5 | [m.d-1] | D |
| Net sedimentation rate, freshwater, regional |  | 2,8 | [mm.yr-1] | O |
| Net sedimentation rate, seawater, regional |  | 1,53 | [mm.yr-1] | O |
| Net sedimentation rate, freshwater, continental |  | 2,75 | [mm.yr-1] | O |
| Net sedimentation rate, seawater, continental |  | 6,69E-03 | [mm.yr-1] | O |
| Net sedimentation rate, moderate |  | 2,8E-03 | [mm.yr-1] | O |
| Net sedimentation rate, arctic |  | 2,00E-03 | [mm.yr-1] | O |
| Net sedimentation rate, tropic |  | 2,00E-03 | [mm.yr-1] | O |
|  |  |  |  |  |
| **SOIL** |  |  |  |  |
| **GENERAL** |  |  |  |  |
| Fraction of rain water infiltrating soil |  | 0,25 | [-] | D |
| Fraction of rain water running off soil |  | 0,25 | [-] | D |
|  |  |  |  |  |
| **DEPTH** |  |  |  |  |
| Chemical-dependent soil depth |  | No |  | D |
| Mixing depth natural soil |  | 0,05 | [m] | D |
| Mixing depth agricultural soil |  | 0,2 | [m] | D |
| Mixing depth industrial/urban soil |  | 0,05 | [m] | D |
| Mixing depth of soil, moderate system |  | 0,05 | [m] | D |
| Mixing depth of soil, arctic system |  | 0,05 | [m] | D |
| Mixing depth of soil, tropic system |  | 0,05 | [m] | D |
|  |  |  |  |  |
| **EROSION** |  |  |  |  |
| Soil erosion rate, regional system |  | 0,03 | [mm.yr-1] | D |
| Soil erosion rate, continental system |  | 0,03 | [mm.yr-1] | D |
| Soil erosion rate, moderate system |  | 0,03 | [mm.yr-1] | D |
| Soil erosion rate, arctic system |  | 0,03 | [mm.yr-1] | D |
| Soil erosion rate, tropic system |  | 0,03 | [mm.yr-1] | D |
|  |  |  |  |  |
| **SUBSTANCE** |  |  |  |  |
| **SUBSTANCE IDENTIFICATION** |  |  |  |  |
| General name |  | total Cu |  | S |
| Description |  | Wolmanit CX-8WB family - VP |  | S |
| CAS-No |  |  |  | D |
| EC-notification no. |  |  |  | D |
| EINECS no. |  |  |  | D |
|  |  |  |  |  |
| **PHYSICO-CHEMICAL PROPERTIES** |  |  |  |  |
| Molecular weight |  | 63,5 | [g.mol-1] | S |
| Melting point |  | ?? | [oC] | D |
| Boiling point |  | ?? | [oC] | D |
| Vapour pressure at test temperature |  | 1,00E-06 | [Pa] | S |
| Temperature at which vapour pressure was measured |  | 20 | [oC] | S |
| Vapour pressure at 25 [oC] |  | 1,41E-06 | [Pa] | O |
| Octanol-water partition coefficient |  | 8,5E-07 | [log10] | S |
| Water solubility at test temperature |  | 1.237 | [mg.l-1] | S |
| Temperature at which solubility was measured |  | 20 | [oC] | S |
| Water solubility at 25 [oC] |  | 1,33 | [mg.l-1] | O |
|  |  |  |  |  |
| **PARTITION COEFFICIENTS AND BIOCONCENTRATION FACTORS** |  |  |  |  |
| **SOLIDS-WATER** |  |  |  |  |
| Chemical class for Koc-QSAR |  | Non-hydrophobics (default QSAR) |  | D |
| Organic carbon-water partition coefficient |  | 1,06E+05 | [l.kg-1] | S |
| Solids-water partition coefficient in soil |  | 2,12E+03 | [l.kg-1] | O |
| Solids-water partition coefficient in sediment |  | 5,3E+03 | [l.kg-1] | O |
| Solids-water partition coefficient suspended matter |  | 1,06E+04 | [l.kg-1] | O |
| Solids-water partition coefficient in raw sewage sludge |  | 3,18E+04 | [l.kg-1] | O |
| Solids-water partition coefficient in settled sewage sludge |  | 3,18E+04 | [l.kg-1] | O |
| Solids-water partition coefficient in activated sewage sludge |  | 3,92E+04 | [l.kg-1] | O |
| Solids-water partition coefficient in effluent sewage sludge |  | 3,92E+04 | [l.kg-1] | O |
| Soil-water partition coefficient |  | 3,18E+03 | [m3.m-3] | O |
| Suspended matter-water partition coefficient |  | 2,65E+03 | [m3.m-3] | O |
| Sediment-water partition coefficient |  | 2,65E+03 | [m3.m-3] | O |
|  |  |  |  |  |
| **AIR-WATER** |  |  |  |  |
| Environmental temperature |  | 12 | [oC] | D |
| Water solubility at environmental temperature |  | 1,1 | [mg.l-1] | O |
| Vapour pressure at environmental temperature |  | 5,62E-07 | [Pa] | O |
| Sub-cooled liquid vapour pressure |  | 5,62E-07 | [Pa] | O |
| Fraction of chemical associated with aerosol particles |  | 0,994 | [-] | O |
| Henry's law constant at test temparature |  | ?? | [Pa.m3.mol-1] | D |
| Temperature at which Henry's law constant was measured |  | 25 | [oC] | D |
| Henry's law constant at 25 [oC] |  | 6,76E-05 | [Pa.m3.mol-1] | O |
| Henry's law constant at enviromental temparature |  | 3,24E-05 | [Pa.m3.mol-1] | O |
| Air-water partitioning coefficient |  | 1,37E-08 | [m3.m-3] | O |
|  |  |  |  |  |
| **BIOCONCENTRATION FACTORS** |  |  |  |  |
| **PREDATOR EXPOSURE** |  |  |  |  |
| Bioconcentration factor for earthworms |  | 0,852 | [l.kgwwt-1] | O |
|  |  |  |  |  |
| **HUMAN AND PREDATOR EXPOSURE** |  |  |  |  |
| Bioconcentration factor for fish |  | 1,41 | [l.kgwwt-1] | O |
| QSAR valid for calculation of BCF-Fish |  | Yes |  | O |
| Biomagnification factor in fish |  | 1 | [-] | O |
| Biomagnification factor in predator |  | 1 | [-] | O |
|  |  |  |  |  |
| **HUMAN EXPOSURE** |  |  |  |  |
| Partition coefficient between leaves and air |  | 4,83E+07 | [m3.m-3] | O |
| Partition coefficient between plant tissue and water |  | 0,66 | [m3.m-3] | O |
| Transpiration-stream concentration factor |  | 0,214 | [-] | O |
| Bioaccumulation factor for meat |  | 7,94E-07 | [d.kg-1] | O |
| Bioaccumulation factor for milk |  | 7,94E-06 | [d.kg-1] | O |
| Purification factor for surface water |  | 1 | [-] | O |
|  |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION RATES** |  |  |  |  |
| **CHARACTARIZATION** |  |  |  |  |
| Characterization of biodegradability |  | Not biodegradable |  | D |
|  |  |  |  |  |
| **STP** |  |  |  |  |
| Degradation calculation method in STP |  | First order, standard OECD/EU tests |  | D |
| Rate constant for biodegradation in STP |  | 0 | [d-1] | O |
| Total rate constant for degradation in STP |  | 0 | [d-1] | O |
| Maximum growth rate of specific microorganisms |  | 2 | [d-1] | D |
| Half saturation concentration |  | 0,5 | [g.m-3] | D |
|  |  |  |  |  |
| **WATER/SEDIMENT** |  |  |  |  |
| **WATER** |  |  |  |  |
| Rate constant for hydrolysis in surface water |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for photolysis in surface water |  | 6,93E-07 | [d-1] | O |
| Rate constant for biodegradation in surface water |  | 0 | [d-1] (12[oC]) | O |
| Total rate constant for degradation in bulk surface water |  | 1,39E-06 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in saltwater |  | 0 | [d-1] (12[oC]) | O |
| Total rate constant for degradation in bulk saltwater |  | 1,39E-06 | [d-1] (12[oC]) | O |
|  |  |  |  |  |
| **SEDIMENT** |  |  |  |  |
| Rate constant for biodegradation in aerated sediment |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Total rate constant for degradation in bulk sediment |  | 6,93E-08 | [d-1] (12[oC]) | O |
|  |  |  |  |  |
| **AIR** |  |  |  |  |
| Specific degradation rate constant with OH-radicals |  | 0 | [cm3.molec-1.s-1] | D |
| Rate constant for degradation in air |  | 0 | [d-1] | O |
|  |  |  |  |  |
| **SOIL** |  |  |  |  |
| Rate constant for biodegradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Total rate constant for degradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
|  |  |  |  |  |
| **REMOVAL RATE CONSTANTS SOIL** |  |  |  |  |
| Total rate constant for degradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for volatilisation from agricultural soil |  | 1,94E-09 | [d-1] | O |
| Rate constant for leaching from agricultural soil |  | 7,54E-07 | [d-1] | O |
| Total rate constant for removal from agricultural top soil |  | 1,45E-06 | [d-1] | O |
| Rate constant for volatilisation from grassland soil |  | 3,89E-09 | [d-1] | O |
| Rate constant for leaching from grassland soil |  | 1,51E-06 | [d-1] | O |
| Total rate constant for removal from grassland top soil |  | 2,2E-06 | [d-1] | O |
| Rate constant for volatilisation from industrial soil |  | 7,78E-09 | [d-1] | O |
| Rate constant for leaching from industrial soil |  | 3,02E-06 | [d-1] | O |
| Total rate constant for removal from industrial soil |  | 3,72E-06 | [d-1] | O |
|  |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **BIOCIDE SCENARIO INPUT DATA** |  |  |  |  |
| Usage/production title |  |  |  | D |
| Scenario choice for biocides |  | (8) Wood preservatives |  | S |
| Additional scenario information |  | (8.1.3) Industrial process, Vacuum pressure |  | S |
|  |  |  |  |  |
| **INDUSTRIAL USE** |  |  |  |  |
| Emission scenario |  | Local emissions and specific soil concentrations |  | S |
|  |  |  |  |  |
| **INTERMEDIATE RESULTS** |  |  |  |  |
| **RELEASE FRACTIONS AND EMISSION DAYS** |  |  |  |  |
| **INDUSTRIAL USE** |  |  |  |  |
| **INPUT** |  |  |  |  |
| Application rate |  | Solid |  | D |
| Solid application rate applied formulation |  | ?? | [kg.m-2] | D |
| Fluid application rate applied formulation |  | ?? | [m3.m-2] | D |
| Density of product |  | ?? | [kg.m-3] | D |
| Fraction of active ingredient |  | ?? | [-] | D |
| Vacuum pressure or double vacuum? |  | Vacuum pressure |  | D |
| Average daily flux of the active ingredient during storage period |  | ?? | [g.m-2.d-1] | D |
| Concentration in STP effluent, from processing |  | 0,0156 | [mg.l-1] | O |
| Effluent discharge rate of this STP |  | 2,00E+06 | [l.d-1] | O |
|  |  |  |  |  |
| **PROCESSING** |  |  |  |  |
| Quantity of active ingredient applied per m3 of wood |  | ?? | [kg.m-3] | D |
| Local emission to air during episode |  | 0,075 | [kg.d-1] | S |
| Local emission to wastewater during episode |  | 0,225 | [kg.d-1] | S |
| Number of emission days per year |  | 250 | [-] | O |
|  |  |  |  |  |
| **STORAGE** |  |  |  |  |
| Surface area of the storage place |  | 525 | [m2] | O |
| Wet soil mass |  | 4,46E+05 | [kgwwt] | O |
| Local emission to industrial soil |  | ?? | [kg.d-1] | O |
| Concentration of substance in soil, initial period |  | ?? | [mg.kgwwt-1] | O |
| Concentration of substance in soil, longer period |  | ?? | [mg.kgwwt-1] | O |
| Local emission to surface water |  | 0 | [kg.d-1] | D |
| Concentration in surface water during emission episode (dissolved) |  | 1,35E-03 | [mg.l-1] | O |
| Steady state concentration in soil |  | ?? | [mg.kgwwt-1] | O |
| Steady state concentration in soil pore water |  | ?? | [mg.l-1] | O |
| Concentration in industrial/application soil |  | ?? | [mg.kgwwt-1] | O |
| Number of emission days per year |  | 250 | [-] | O |
|  |  |  |  |  |
| **DEFAULTS** |  |  |  |  |
| Effective surface area exposed to rain per unit of storage area |  | 11 | [m2.m-2] | D |
| Volume of wood treated per day |  | 30 | [m3.d-1] | O |
| Storage density of treated wood stacked on storage area |  | 2 | [m3.m-2] | D |
| Depth of receiving soil compartment |  | 0,5 | [m] | D |
| Fraction of rainwater running of storage site |  | 0,5 | [-] | D |
|  |  |  |  |  |
| **DEFAULTS (CONTINUED)** |  |  |  |  |
| Duration of storage of treated wood prior to shipment |  | 35 | [d] | O |
| Number of emission days, initial period |  | 30 | [d] | D |
| Number of emission days, longer period |  | 365 | [d] | D |
| Volume flow rate of creek/river |  | 2,59E+07 | [m3.d-1] | D |
| Fraction of tonnage released to air |  | 1,00E-03 | [-] | O |
| Fraction of tonnage released to wastewater |  | 0,03 | [-] | O |
| Total rate constant for removal from industrial soil |  | 3,72E-06 | [d-1] | O |
| Soil-water partition coefficient |  | 3,18E+03 | [m3.m-3] | O |
|  |  |  |  |  |
| **LOCAL** |  |  |  |  |
| **[INDUSTRIAL USE]** |  |  |  |  |
| Local emission to air during episode |  | 0,075 | [kg.d-1] | S |
| Emission to air calculated by special scenario |  | Yes |  | O |
| Local emission to wastewater during episode |  | 0,225 | [kg.d-1] | S |
| Emission to water calculated by special scenario |  | Yes |  | O |
| Specific biocides scenario available |  | Yes |  | D |
| Show this step in further calculations |  | Yes |  | O |
| Intermittent release |  | No |  | D |
|  |  |  |  |  |
| **DISTRIBUTION** |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **[INDUSTRIAL USE]** |  |  |  |  |
| **INPUT AND CONFIGURATION [INDUSTRIAL USE]** |  |  |  |  |
| **INPUT** |  |  |  |  |
| Use or bypass STP (local freshwater assessment) |  | Use STP |  | D |
| Use or bypass STP (local marine assessment) |  | Bypass STP |  | D |
| Local emission to wastewater during episode |  | 0,225 | [kg.d-1] | S |
| Concentration in untreated wastewater |  | 0,112 | [mg.l-1] | O |
| Local emission entering the STP |  | 0,225 | [kg.d-1] | O |
|  |  |  |  |  |
| **CONFIGURATION** |  |  |  |  |
| Type of local STP |  | With primary settler (9-box) |  | D |
| Number of inhabitants feeding this STP |  | 1,00E+04 | [eq] | O |
| Effluent discharge rate of this STP |  | 2,00E+06 | [l.d-1] | O |
| Calculate dilution from river flow rate |  | No |  | O |
| Flow rate of the river |  | 1,8E+04 | [m3.d-1] | O |
| Dilution factor (rivers) |  | 10 | [-] | O |
| Dilution factor (coastal areas) |  | 100 | [-] | O |
|  |  |  |  |  |
| **OUTPUT [INDUSTRIAL USE]** |  |  |  |  |
| Fraction of emission directed to air by STP |  | 4,15E-06 | [%] | O |
| Fraction of emission directed to water by STP |  | 13,9 | [%] | O |
| Fraction of emission directed to sludge by STP |  | 86,1 | [%] | O |
| Fraction of the emission degraded in STP |  | 0 | [%] | O |
| Total of fractions |  | 100 | [%] | O |
| Local indirect emission to air from STP during episode |  | 9,34E-09 | [kg.d-1] | O |
| Concentration in untreated wastewater |  | 0,112 | [mg.l-1] | O |
| Concentration of chemical (total) in the STP-effluent |  | 0,0156 | [mg.l-1] | O |
| Concentration in effluent exceeds solubility |  | No |  | O |
| Concentration in dry sewage sludge |  | 245 | [mg.kg-1] | O |
| PEC for micro-organisms in the STP |  | 0,0156 | [mg.l-1] | O |
|  |  |  |  |  |
| **LIFE CYCLE STEPS** |  |  |  |  |
| **[INDUSTRIAL USE]** |  |  |  |  |
| **LOCAL CONCENTRATIONS AND DEPOSITIONS [INDUSTRIAL USE]** |  |  |  |  |
| **AIR** |  |  |  |  |
| Concentration in air during emission episode |  | 2,09E-05 | [mg.m-3] | O |
| Annual average concentration in air, 100 m from point source |  | 1,43E-05 | [mg.m-3] | O |
| Total deposition flux during emission episode |  | 7,46E-04 | [mg.m-2.d-1] | O |
| Annual average total deposition flux |  | 5,11E-04 | [mg.m-2.d-1] | O |
|  |  |  |  |  |
| **WATER, SEDIMENT** |  |  |  |  |
| Concentration in surface water during emission episode (dissolved) |  | 1,35E-03 | [mg.l-1] | O |
| Concentration in surface water exceeds solubility |  | No |  | O |
| Annual average concentration in surface water (dissolved) |  | 9,24E-04 | [mg.l-1] | O |
| Concentration in seawater during emission episode (dissolved) |  | 9,71E-04 | [mg.l-1] | O |
| Annual average concentration in seawater (dissolved) |  | 6,65E-04 | [mg.l-1] | O |
|  |  |  |  |  |
| **SOIL, GROUNDWATER** |  |  |  |  |
| Concentration in agric. soil averaged over 30 days |  | 3,6 | [mg.kgwwt-1] | O |
| Concentration in agric. soil averaged over 180 days |  | 3,6 | [mg.kgwwt-1] | O |
| Concentration in grassland averaged over 180 days |  | 1,45 | [mg.kgwwt-1] | O |
| Fraction of steady-state (agricultural soil) |  | 5,27E-03 | [-] | O |
| Fraction of steady-state (grassland soil) |  | 8,01E-03 | [-] | O |
|  |  |  |  |  |
| **LOCAL PECS [INDUSTRIAL USE]** |  |  |  |  |
| **AIR** |  |  |  |  |
| Annual average local PEC in air (total) |  | 1,43E-05 | [mg.m-3] | O |
|  |  |  |  |  |
| **WATER, SEDIMENT** |  |  |  |  |
| Local PEC in surface water during emission episode (dissolved) |  | 1,35E-03 | [mg.l-1] | O |
| Qualitative assessment might be needed (TGD Part II, 5.6) |  | No |  | O |
| Annual average local PEC in surface water (dissolved) |  | 9,24E-04 | [mg.l-1] | O |
| Local PEC in fresh-water sediment during emission episode |  | 3,11 | [mg.kgwwt-1] | O |
| Local PEC in seawater during emission episode (dissolved) |  | 9,71E-04 | [mg.l-1] | O |
| Qualitative assessment might be needed (TGD Part II, 5.6) |  | No |  | O |
| Annual average local PEC in seawater (dissolved) |  | 6,65E-04 | [mg.l-1] | O |
| Local PEC in marine sediment during emission episode |  | 2,24 | [mg.kgwwt-1] | O |
|  |  |  |  |  |
| **SOIL, GROUNDWATER** |  |  |  |  |
| Local PEC in agric. soil (total) averaged over 30 days |  | 3,6 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 180 days |  | 3,6 | [mg.kgwwt-1] | O |
| Local PEC in grassland (total) averaged over 180 days |  | 1,45 | [mg.kgwwt-1] | O |
| Local PEC in pore water of agricultural soil |  | 1,93E-03 | [mg.l-1] | O |
| Local PEC in pore water of grassland |  | 7,74E-04 | [mg.l-1] | O |
| Local PEC in groundwater under agricultural soil |  | 1,93E-03 | [mg.l-1] | O |

### SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 1: EUSES 2.1.2 OUTPUT FILE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section/parameter** |  | **Actual value** | **Unit** | **Stat** |
|  |  |  |  |  |
| **PHYSICO-CHEMICAL PROPERTIES** |  |  |  |  |
| Melting point |  | ?? | [oC] | D |
| Boiling point |  | ?? | [oC] | D |
| Vapour pressure at test temperature |  | 1,00E-06 | [Pa] | S |
| Temperature at which vapour pressure was measured |  | 20 | [oC] | S |
| Vapour pressure at 25 [oC] |  | 1,41E-06 | [Pa] | O |
| Water solubility at test temperature |  | 1.237 | [mg.l-1] | S |
| Temperature at which solubility was measured |  | 20 | [oC] | S |
| Water solubility at 25 [oC] |  | 1,33 | [mg.l-1] | O |
| Octanol-water partition coefficient |  | 8,5E-07 | [log10] | S |
| Henry's law constant at 25 [oC] |  | 6,76E-05 | [Pa.m3.mol-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| Tonnage of substance in Europe |  | 0 | [tonnes.yr-1] | O |
| Regional production volume of substance |  | 0 | [tonnes.yr-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[1 "", IC=15/UC=39]** |  |  |  |  |
| Industry category |  | 15/0 Others |  | D |
| Use category |  | 39 Biocides, non-agricultural |  | D |
| Fraction of tonnage for application |  | 1 | [-] | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[SERVICE LIFE]** |  |  |  |  |
| Use specific emission scenario |  | Yes |  | D |
| Emission tables |  | No applicable emission tables |  | S |
| Emission scenario |  | Local wastewater emission and application soil concentration |  | S |
| Scenario choice for biocides |  | (8) Wood preservatives |  | S |
| Additional scenario information |  | (8.2.2) Treated wood, noise barrier |  | S |
| Fraction of tonnage released to air |  | 0 | [-] | O |
| Fraction of tonnage released to wastewater |  | 0,7 | [-] | O |
| Fraction of tonnage released to surface water |  | 0 | [-] | O |
| Fraction of tonnage released to industrial soil |  | 0,3 | [-] | O |
| Fraction of tonnage released to agricultural soil |  | 0 | [-] | O |
| Fraction of the main local source |  | 0 | [-] | O |
| Number of emission days per year |  | 30 | [-] | O |
| Local emission to air during episode |  | 0 | [kg.d-1] | O |
| Local emission to wastewater during episode |  | 1,57E-03 | [kg.d-1] | O |
| Intermittent release |  | No |  | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **TOTAL REGIONAL EMISSIONS TO COMPARTMENTS** |  |  |  |  |
| Total regional emission to air |  | 0 | [kg.d-1] | O |
| Total regional emission to wastewater |  | 0 | [kg.d-1] | O |
| Total regional emission to surface water |  | 0 | [kg.d-1] | O |
| Total regional emission to industrial soil |  | 0 | [kg.d-1] | O |
| Total regional emission to agricultural soil |  | 0 | [kg.d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **PARTITION COEFFICIENTS** |  |  |  |  |
|  |  |  |  |  |
| Organic carbon-water partition coefficient |  | 1,06E+05 | [l.kg-1] | S |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION** |  |  |  |  |
| Characterization of biodegradability |  | Not biodegradable |  | D |
| Degradation calculation method in STP |  | First order, standard OECD/EU tests |  | D |
| Rate constant for biodegradation in STP |  | 0 | [d-1] | O |
| Rate constant for biodegradation in surface water |  | 0 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in aerated sediment |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for hydrolysis in surface water |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for photolysis in surface water |  | 6,93E-07 | [d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **LOCAL STP [1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| **OUTPUT** |  |  |  |  |
| Fraction of emission directed to air by STP |  | 4,15E-06 | [%] | O |
| Fraction of emission directed to water by STP |  | 13,9 | [%] | O |
| Fraction of emission directed to sludge by STP |  | 86,1 | [%] | O |
| Fraction of the emission degraded in STP |  | 0 | [%] | O |
| Concentration in untreated wastewater |  | 7,85E-04 | [mg.l-1] | O |
| Concentration of chemical (total) in the STP-effluent |  | 1,09E-04 | [mg.l-1] | O |
| Concentration in effluent exceeds solubility |  | No |  | O |
| Concentration in dry sewage sludge |  | 1,71 | [mg.kg-1] | O |
| PEC for micro-organisms in the STP |  | 1,09E-04 | [mg.l-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DISTRIBUTION** |  |  |  |  |
| **LOCAL SCALE** |  |  |  |  |
| **[1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| Concentration in air during emission episode |  | 1,81E-14 | [mg.m-3] | O |
| Annual average concentration in air, 100 m from point source |  | 1,49E-15 | [mg.m-3] | O |
| Concentration in surface water during emission episode (dissolved) |  | 9,42E-06 | [mg.l-1] | O |
| Annual average concentration in surface water (dissolved) |  | 7,74E-07 | [mg.l-1] | O |
| Local PEC in surface water during emission episode (dissolved) |  | 9,42E-06 | [mg.l-1] | O |
| Annual average local PEC in surface water (dissolved) |  | 7,74E-07 | [mg.l-1] | O |
| Local PEC in fresh-water sediment during emission episode |  | 0,0217 | [mg.kgwwt-1] | O |
| Concentration in seawater during emission episode (dissolved) |  | 6,78E-06 | [mg.l-1] | O |
| Annual average concentration in seawater (dissolved) |  | 5,57E-07 | [mg.l-1] | O |
| Local PEC in seawater during emission episode (dissolved) |  | 6,78E-06 | [mg.l-1] | O |
| Annual average local PEC in seawater (dissolved) |  | 5,57E-07 | [mg.l-1] | O |
| Local PEC in marine sediment during emission episode |  | 0,0156 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 30 days |  | 0,0251 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 180 days |  | 0,0251 | [mg.kgwwt-1] | O |
| Local PEC in grassland (total) averaged over 180 days |  | 0,01 | [mg.kgwwt-1] | O |
| Local PEC in groundwater under agricultural soil |  | 1,34E-05 | [mg.l-1] | O |

### SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 2: EUSES 2.1.2 OUTPUT FILE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section/parameter** |  | **Actual value** | **Unit** | **Stat** |
|  |  |  |  |  |
| **PHYSICO-CHEMICAL PROPERTIES** |  |  |  |  |
| Melting point |  | ?? | [oC] | D |
| Boiling point |  | ?? | [oC] | D |
| Vapour pressure at test temperature |  | 1,00E-06 | [Pa] | S |
| Temperature at which vapour pressure was measured |  | 20 | [oC] | S |
| Vapour pressure at 25 [oC] |  | 1,41E-06 | [Pa] | O |
| Water solubility at test temperature |  | 1.237 | [mg.l-1] | S |
| Temperature at which solubility was measured |  | 20 | [oC] | S |
| Water solubility at 25 [oC] |  | 1,33 | [mg.l-1] | O |
| Octanol-water partition coefficient |  | 8,5E-07 | [log10] | S |
| Henry's law constant at 25 [oC] |  | 6,76E-05 | [Pa.m3.mol-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| Tonnage of substance in Europe |  | 0 | [tonnes.yr-1] | O |
| Regional production volume of substance |  | 0 | [tonnes.yr-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[1 "", IC=15/UC=39]** |  |  |  |  |
| Industry category |  | 15/0 Others |  | D |
| Use category |  | 39 Biocides, non-agricultural |  | D |
| Fraction of tonnage for application |  | 1 | [-] | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[SERVICE LIFE]** |  |  |  |  |
| Use specific emission scenario |  | Yes |  | D |
| Emission tables |  | No applicable emission tables |  | S |
| Emission scenario |  | Local wastewater emission and application soil concentration |  | S |
| Scenario choice for biocides |  | (8) Wood preservatives |  | S |
| Additional scenario information |  | (8.2.2) Treated wood, noise barrier |  | S |
| Fraction of tonnage released to air |  | 0 | [-] | O |
| Fraction of tonnage released to wastewater |  | 0,7 | [-] | O |
| Fraction of tonnage released to surface water |  | 0 | [-] | O |
| Fraction of tonnage released to industrial soil |  | 0,3 | [-] | O |
| Fraction of tonnage released to agricultural soil |  | 0 | [-] | O |
| Fraction of the main local source |  | 0 | [-] | O |
| Number of emission days per year |  | 365 | [-] | O |
| Local emission to air during episode |  | 0 | [kg.d-1] | O |
| Local emission to wastewater during episode |  | 6,73E-04 | [kg.d-1] | O |
| Intermittent release |  | No |  | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **TOTAL REGIONAL EMISSIONS TO COMPARTMENTS** |  |  |  |  |
| Total regional emission to air |  | 0 | [kg.d-1] | O |
| Total regional emission to wastewater |  | 0 | [kg.d-1] | O |
| Total regional emission to surface water |  | 0 | [kg.d-1] | O |
| Total regional emission to industrial soil |  | 0 | [kg.d-1] | O |
| Total regional emission to agricultural soil |  | 0 | [kg.d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **PARTITION COEFFICIENTS** |  |  |  |  |
|  |  |  |  |  |
| Organic carbon-water partition coefficient |  | 1,06E+05 | [l.kg-1] | S |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION** |  |  |  |  |
| Characterization of biodegradability |  | Not biodegradable |  | D |
| Degradation calculation method in STP |  | First order, standard OECD/EU tests |  | D |
| Rate constant for biodegradation in STP |  | 0 | [d-1] | O |
| Rate constant for biodegradation in surface water |  | 0 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in aerated sediment |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for hydrolysis in surface water |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for photolysis in surface water |  | 6,93E-07 | [d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **LOCAL STP [1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| **OUTPUT** |  |  |  |  |
| Fraction of emission directed to air by STP |  | 4,15E-06 | [%] | O |
| Fraction of emission directed to water by STP |  | 13,9 | [%] | O |
| Fraction of emission directed to sludge by STP |  | 86,1 | [%] | O |
| Fraction of the emission degraded in STP |  | 0 | [%] | O |
| Concentration in untreated wastewater |  | 3,37E-04 | [mg.l-1] | O |
| Concentration of chemical (total) in the STP-effluent |  | 4,68E-05 | [mg.l-1] | O |
| Concentration in effluent exceeds solubility |  | No |  | O |
| Concentration in dry sewage sludge |  | 0,734 | [mg.kg-1] | O |
| PEC for micro-organisms in the STP |  | 4,68E-05 | [mg.l-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DISTRIBUTION** |  |  |  |  |
| **LOCAL SCALE** |  |  |  |  |
| **[1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| Concentration in air during emission episode |  | 7,77E-15 | [mg.m-3] | O |
| Annual average concentration in air, 100 m from point source |  | 7,77E-15 | [mg.m-3] | O |
| Concentration in surface water during emission episode (dissolved) |  | 4,04E-06 | [mg.l-1] | O |
| Annual average concentration in surface water (dissolved) |  | 4,04E-06 | [mg.l-1] | O |
| Local PEC in surface water during emission episode (dissolved) |  | 4,04E-06 | [mg.l-1] | O |
| Annual average local PEC in surface water (dissolved) |  | 4,04E-06 | [mg.l-1] | O |
| Local PEC in fresh-water sediment during emission episode |  | 9,3E-03 | [mg.kgwwt-1] | O |
| Concentration in seawater during emission episode (dissolved) |  | 2,9E-06 | [mg.l-1] | O |
| Annual average concentration in seawater (dissolved) |  | 2,9E-06 | [mg.l-1] | O |
| Local PEC in seawater during emission episode (dissolved) |  | 2,9E-06 | [mg.l-1] | O |
| Annual average local PEC in seawater (dissolved) |  | 2,9E-06 | [mg.l-1] | O |
| Local PEC in marine sediment during emission episode |  | 6,69E-03 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 30 days |  | 0,0108 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 180 days |  | 0,0108 | [mg.kgwwt-1] | O |
| Local PEC in grassland (total) averaged over 180 days |  | 4,3E-03 | [mg.kgwwt-1] | O |
| Local PEC in groundwater under agricultural soil |  | 5,75E-06 | [mg.l-1] | O |

### SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 3: EUSES 2.1.2 OUTPUT FILE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section/parameter** |  | **Actual value** | **Unit** | **Stat** |
|  |  |  |  |  |
| **PHYSICO-CHEMICAL PROPERTIES** |  |  |  |  |
| Melting point |  | ?? | [oC] | D |
| Boiling point |  | ?? | [oC] | D |
| Vapour pressure at test temperature |  | 1,00E-06 | [Pa] | S |
| Temperature at which vapour pressure was measured |  | 20 | [oC] | S |
| Vapour pressure at 25 [oC] |  | 1,41E-06 | [Pa] | O |
| Water solubility at test temperature |  | 1.237 | [mg.l-1] | S |
| Temperature at which solubility was measured |  | 20 | [oC] | S |
| Water solubility at 25 [oC] |  | 1,33 | [mg.l-1] | O |
| Octanol-water partition coefficient |  | 8,5E-07 | [log10] | S |
| Henry's law constant at 25 [oC] |  | 6,76E-05 | [Pa.m3.mol-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| Tonnage of substance in Europe |  | 0 | [tonnes.yr-1] | O |
| Regional production volume of substance |  | 0 | [tonnes.yr-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[1 "", IC=15/UC=39]** |  |  |  |  |
| Industry category |  | 15/0 Others |  | D |
| Use category |  | 39 Biocides, non-agricultural |  | D |
| Fraction of tonnage for application |  | 1 | [-] | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[SERVICE LIFE]** |  |  |  |  |
| Use specific emission scenario |  | Yes |  | D |
| Emission tables |  | No applicable emission tables |  | S |
| Emission scenario |  | Local wastewater emission and application soil concentration |  | S |
| Scenario choice for biocides |  | (8) Wood preservatives |  | S |
| Additional scenario information |  | (8.2.2) Treated wood, noise barrier |  | S |
| Fraction of tonnage released to air |  | 0 | [-] | O |
| Fraction of tonnage released to wastewater |  | 0,7 | [-] | O |
| Fraction of tonnage released to surface water |  | 0 | [-] | O |
| Fraction of tonnage released to industrial soil |  | 0,3 | [-] | O |
| Fraction of tonnage released to agricultural soil |  | 0 | [-] | O |
| Fraction of the main local source |  | 0 | [-] | O |
| Number of emission days per year |  | 30 | [-] | O |
| Local emission to air during episode |  | 0 | [kg.d-1] | O |
| Local emission to wastewater during episode |  | 4,56E-05 | [kg.d-1] | O |
| Intermittent release |  | No |  | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **TOTAL REGIONAL EMISSIONS TO COMPARTMENTS** |  |  |  |  |
| Total regional emission to air |  | 0 | [kg.d-1] | O |
| Total regional emission to wastewater |  | 0 | [kg.d-1] | O |
| Total regional emission to surface water |  | 0 | [kg.d-1] | O |
| Total regional emission to industrial soil |  | 0 | [kg.d-1] | O |
| Total regional emission to agricultural soil |  | 0 | [kg.d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **PARTITION COEFFICIENTS** |  |  |  |  |
|  |  |  |  |  |
| Organic carbon-water partition coefficient |  | 1,06E+05 | [l.kg-1] | S |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION** |  |  |  |  |
| Characterization of biodegradability |  | Not biodegradable |  | D |
| Degradation calculation method in STP |  | First order, standard OECD/EU tests |  | D |
| Rate constant for biodegradation in STP |  | 0 | [d-1] | O |
| Rate constant for biodegradation in surface water |  | 0 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in aerated sediment |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for hydrolysis in surface water |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for photolysis in surface water |  | 6,93E-07 | [d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **LOCAL STP [1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| **OUTPUT** |  |  |  |  |
| Fraction of emission directed to air by STP |  | 4,15E-06 | [%] | O |
| Fraction of emission directed to water by STP |  | 13,9 | [%] | O |
| Fraction of emission directed to sludge by STP |  | 86,1 | [%] | O |
| Fraction of the emission degraded in STP |  | 0 | [%] | O |
| Concentration in untreated wastewater |  | 2,28E-05 | [mg.l-1] | O |
| Concentration of chemical (total) in the STP-effluent |  | 3,17E-06 | [mg.l-1] | O |
| Concentration in effluent exceeds solubility |  | No |  | O |
| Concentration in dry sewage sludge |  | 0,0497 | [mg.kg-1] | O |
| PEC for micro-organisms in the STP |  | 3,17E-06 | [mg.l-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DISTRIBUTION** |  |  |  |  |
| **LOCAL SCALE** |  |  |  |  |
| **[1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| Concentration in air during emission episode |  | 5,27E-16 | [mg.m-3] | O |
| Annual average concentration in air, 100 m from point source |  | 4,33E-17 | [mg.m-3] | O |
| Concentration in surface water during emission episode (dissolved) |  | 2,74E-07 | [mg.l-1] | O |
| Annual average concentration in surface water (dissolved) |  | 2,25E-08 | [mg.l-1] | O |
| Local PEC in surface water during emission episode (dissolved) |  | 2,74E-07 | [mg.l-1] | O |
| Annual average local PEC in surface water (dissolved) |  | 2,25E-08 | [mg.l-1] | O |
| Local PEC in fresh-water sediment during emission episode |  | 6,31E-04 | [mg.kgwwt-1] | O |
| Concentration in seawater during emission episode (dissolved) |  | 1,97E-07 | [mg.l-1] | O |
| Annual average concentration in seawater (dissolved) |  | 1,62E-08 | [mg.l-1] | O |
| Local PEC in seawater during emission episode (dissolved) |  | 1,97E-07 | [mg.l-1] | O |
| Annual average local PEC in seawater (dissolved) |  | 1,62E-08 | [mg.l-1] | O |
| Local PEC in marine sediment during emission episode |  | 4,54E-04 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 30 days |  | 7,29E-04 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 180 days |  | 7,29E-04 | [mg.kgwwt-1] | O |
| Local PEC in grassland (total) averaged over 180 days |  | 2,91E-04 | [mg.kgwwt-1] | O |
| Local PEC in groundwater under agricultural soil |  | 3,9E-07 | [mg.l-1] | O |

### Assessed substance: Cu-HDO

### SCENARIO [1]: INDUSTRIAL PROCESS, VACUUM PRESSURE: EUSES 2.1.2 OUTPUT FILE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section/parameter** |  | **Actual value** | **Unit** | **Stat** |
|  |  |  |  |  |
| **DEFAULTS** |  |  |  |  |
| **DEFAULT IDENTIFICATION** |  |  |  |  |
| General name |  | Standard Euses 2.1 |  | D |
| Description |  | According to TGDs |  | D |
|  |  |  |  |  |
| **CHARACTERISTICS OF COMPARTMENTS** |  |  |  |  |
| **GENERAL** |  |  |  |  |
| Density of solid phase |  | 2,5 | [kg.l-1] | D |
| Density of water phase |  | 1 | [kg.l-1] | D |
| Density of air phase |  | 1,3E-03 | [kg.l-1] | D |
| Environmental temperature |  | 12 | [oC] | D |
| Standard temperature for Vp and Sol |  | 25 | [oC] | D |
| Temperature correction method |  | Temperature correction for local distribution |  | D |
| Constant of Junge equation |  | 0,01 | [Pa.m] | D |
| Surface area of aerosol particles |  | 0,01 | [m2.m-3] | D |
| Gas constant (8.314) |  | 8.314 | [Pa.m3.mol-1.K-1] | D |
|  |  |  |  |  |
| **SUSPENDED MATTER** |  |  |  |  |
| Volume fraction solids in suspended matter |  | 0,1 | [m3.m-3] | D |
| Volume fraction water in suspended matter |  | 0,9 | [m3.m-3] | D |
| Weight fraction of organic carbon in suspended matter |  | 0,1 | [kg.kg-1] | D |
| Bulk density of suspended matter |  | 1,15E+03 | [kgwwt.m-3] | O |
| Conversion factor wet-dry suspened matter |  | 4,6 | [kgwwt.kgdwt-1] | O |
|  |  |  |  |  |
| **SEDIMENT** |  |  |  |  |
| Volume fraction solids in sediment |  | 0,2 | [m3.m-3] | D |
| Volume fraction water in sediment |  | 0,8 | [m3.m-3] | D |
| Weight fraction of organic carbon in sediment |  | 0,05 | [kg.kg-1] | D |
|  |  |  |  |  |
| **SOIL** |  |  |  |  |
| Volume fraction solids in soil |  | 0,6 | [m3.m-3] | D |
| Volume fraction water in soil |  | 0,2 | [m3.m-3] | D |
| Volume fraction air in soil |  | 0,2 | [m3.m-3] | D |
| Weight fraction of organic carbon in soil |  | 0,02 | [kg.kg-1] | D |
| Weight fraction of organic matter in soil |  | 0,034 | [kg.kg-1] | O |
| Bulk density of soil |  | 1,7E+03 | [kgwwt.m-3] | O |
| Conversion factor wet-dry soil |  | 1,13 | [kgwwt.kgdwt-1] | O |
|  |  |  |  |  |
| **STP SLUDGE** |  |  |  |  |
| Fraction of organic carbon in raw sewage sludge |  | 0,3 | [kg.kg-1] | D |
| Fraction of organic carbon in settled sewage sludge |  | 0,3 | [kg.kg-1] | D |
| Fraction of organic carbon in activated sewage sludge |  | 0,37 | [kg.kg-1] | D |
| Fraction of organic carbon in effluent sewage sludge |  | 0,37 | [kg.kg-1] | D |
|  |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION RATES** |  |  |  |  |
| Rate constant for abiotic degradation in STP |  | 0 | [d-1] | D |
| Rate constant for abiotic degradation in bulk sediment |  | 0 | [d-1] (12[oC]) | D |
| Rate constant for anaerobic biodegradation in sediment |  | 0 | [d-1] (12[oC]) | D |
| Fraction of sediment compartment that is aerated |  | 0,1 | [m3.m-3] | D |
| Concentration of OH-radicals in atmosphere |  | 5,00E+05 | [molec.cm-3] | D |
| Rate constant for abiotic degradation in bulk soil |  | 0 | [d-1] (12[oC]) | D |
|  |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| Fraction of EU production volume for region |  | 100 | [%] | D |
| Fraction of EU tonnage for region (private use) |  | 10 | [%] | D |
| Fraction connected to sewer systems |  | 80 | [%] | D |
|  |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **GENERAL** |  |  |  |  |
| Number of inhabitants feeding one STP |  | 1,00E+04 | [eq] | D |
| Sewage flow |  | 200 | [l.eq-1.d-1] | D |
| Effluent discharge rate of local STP |  | 2,00E+06 | [l.d-1] | O |
| Temperature correction for STP degradation |  | No |  | D |
| Temperature of air above aeration tank |  | 15 | [oC] | D |
| Temperature of water in aeration tank |  | 15 | [oC] | D |
| Height of air column above STP |  | 10 | [m] | D |
| Number of inhabitants of region |  | 2,00E+07 | [eq] | D |
| Number of inhabitants of continental system |  | 3,5E+08 | [eq] | O |
| Windspeed in the system |  | 3 | [m.s-1] | D |
|  |  |  |  |  |
| **RAW SEWAGE** |  |  |  |  |
| Mass of O2 binding material per person per day |  | 54 | [g.eq-1.d-1] | D |
| Dry weight solids produced per person per day |  | 0,09 | [kg.eq-1.d-1] | D |
| Density solids in raw sewage |  | 1,5 | [kg.l-1] | D |
| Fraction of organic carbon in raw sewage sludge |  | 0,3 | [kg.kg-1] | D |
|  |  |  |  |  |
| **PRIMARY SETTLER** |  |  |  |  |
| Depth of primary settler |  | 4 | [m] | D |
| Hydraulic retention time of primary settler |  | 2 | [hr] | D |
| Density suspended and settled solids in primary settler |  | 1,5 | [kg.l-1] | D |
| Fraction of organic carbon in settled sewage sludge |  | 0,3 | [kg.kg-1] | D |
|  |  |  |  |  |
| **ACTIVATED SLUDGE TANK** |  |  |  |  |
| Depth of aeration tank |  | 3 | [m] | D |
| Density solids of activated sludge |  | 1,3 | [kg.l-1] | D |
| Concentration solids of activated sludge |  | 4 | [kg.m-3] | D |
| Steady state O2 concentration in activated sludge |  | 2,00E-03 | [kg.m-3] | D |
| Mode of aeration |  | Surface |  | D |
| Aeration rate of bubble aeration |  | 1,31E-05 | [m3.s-1.eq-1] | D |
| Fraction of organic carbon in activated sewage sludge |  | 0,37 | [kg.kg-1] | D |
| Sludge loading rate |  | 0,15 | [kg.kg-1.d-1] | D |
| Hydraulic retention time in aerator (9-box STP) |  | 6,9 | [hr] | O |
| Hydraulic retention time in aerator (6-box STP) |  | 10,8 | [hr] | O |
| Sludge retention time of aeration tank |  | 9,2 | [d] | O |
|  |  |  |  |  |
| **SOLIDS-LIQUIDS SEPARATOR** |  |  |  |  |
| Depth of solids-liquid separator |  | 3 | [m] | D |
| Density suspended and settled solids in solids-liquid separator |  | 1,3 | [kg.l-1] | D |
| Concentration solids in effluent |  | 30 | [mg.l-1] | D |
| Hydraulic retention time of solids-liquid separator |  | 6 | [hr] | D |
| Fraction of organic carbon in effluent sewage sludge |  | 0,37 | [kg.kg-1] | D |
|  |  |  |  |  |
| **LOCAL DISTRIBUTION** |  |  |  |  |
| **AIR AND SURFACE WATER** |  |  |  |  |
| Concentration in air at source strength 1 [kg.d-1] |  | 2,78E-04 | [mg.m-3] | D |
| Standard deposition flux of aerosol-bound compounds |  | 0,01 | [mg.m-2.d-1] | D |
| Standard deposition flux of gaseous compounds |  | 5,00E-04 | [mg.m-2.d-1] | O |
| Suspended solids concentration in STP effluent water |  | 15 | [mg.l-1] | D |
| Dilution factor (rivers) |  | 10 | [-] | D |
| Flow rate of the river |  | 1,8E+04 | [m3.d-1] | D |
| Calculate dilution from river flow rate |  | No |  | D |
| Dilution factor (coastal areas) |  | 100 | [-] | D |
|  |  |  |  |  |
| **SOIL** |  |  |  |  |
| Mixing depth of grassland soil |  | 0,1 | [m] | D |
| Dry sludge application rate on agricultural soil |  | 5,00E+03 | [kg.ha-1.yr-1] | D |
| Dry sludge application rate on grassland |  | 1000 | [kg.ha-1.yr-1] | D |
| Averaging time soil (for terrestrial ecosystem) |  | 30 | [d] | D |
| Averaging time agricultural soil |  | 180 | [d] | D |
| Averaging time grassland |  | 180 | [d] | D |
| PMTC, air side of air-soil interface |  | 1,05E-03 | [m.s-1] | O |
| Soil-air PMTC (air-soil interface) |  | 5,56E-06 | [m.s-1] | D |
| Soil-water film PMTC (air-soil interface) |  | 5,56E-10 | [m.s-1] | D |
| Mixing depth agricultural soil |  | 0,2 | [m] | D |
| Fraction of rain water infiltrating soil |  | 0,25 | [-] | D |
| Average annual precipitation |  | 700 | [mm.yr-1] | D |
|  |  |  |  |  |
| **REGIONAL AND CONTINENTAL DISTRIBUTION** |  |  |  |  |
| **CONFIGURATION** |  |  |  |  |
| Fraction of direct regional emissions to seawater |  | 1 | [%] | D |
| Fraction of direct continental emissions to seawater |  | 0 | [%] | D |
| Fraction of regional STP effluent to seawater |  | 0 | [%] | D |
| Fraction of continental STP effluent to seawater |  | 0 | [%] | D |
| Fraction of flow from continental rivers to regional rivers |  | 0,034 | [-] | D |
| Fraction of flow from continental rivers to regional sea |  | 0 | [-] | D |
| Fraction of flow from continental rivers to continental sea |  | 0,966 | [-] | O |
| Number of inhabitants of region |  | 2,00E+07 | [eq] | D |
| Number of inhabitants in the EU |  | 3,7E+08 | [eq] | D |
| Number of inhabitants of continental system |  | 3,5E+08 | [eq] | O |
|  |  |  |  |  |
| **AREAS** |  |  |  |  |
| **REGIONAL** |  |  |  |  |
| Area (land+rivers) of regional system |  | 4,00E+04 | [km2] | D |
| Area fraction of freshwater, region (excl. sea) |  | 0,03 | [-] | D |
| Area fraction of natural soil, region (excl. sea) |  | 0,27 | [-] | D |
| Area fraction of agricultural soil, region (excl. sea) |  | 0,6 | [-] | D |
| Area fraction of industrial/urban soil, region (excl. sea) |  | 0,1 | [-] | D |
| Length of regional seawater |  | 40 | [km] | D |
| Width of regional seawater |  | 10 | [km] | D |
| Area of regional seawater |  | 400 | [km2] | O |
| Area (land+rivers+sea) of regional system |  | 4,04E+04 | [km2] | O |
| Area fraction of freshwater, region (total) |  | 0,0297 | [-] | O |
| Area fraction of seawater, region (total) |  | 9,9E-03 | [-] | O |
| Area fraction of natural soil, region (total) |  | 0,267 | [-] | O |
| Area fraction of agricultural soil, region (total) |  | 0,594 | [-] | O |
| Area fraction of industrial/urban soil, region (total) |  | 0,099 | [-] | O |
|  |  |  |  |  |
| **CONTINENTAL** |  |  |  |  |
| Total area of EU (continent+region, incl. sea) |  | 7,04E+06 | [km2] | D |
| Area (land+rivers+sea) of continental system |  | 7,00E+06 | [km2] | O |
| Area (land+rivers) of continental system |  | 3,5E+06 | [km2] | O |
| Area fraction of freshwater, continent (excl. sea) |  | 0,03 | [-] | D |
| Area fraction of natural soil, continent (excl. sea) |  | 0,27 | [-] | D |
| Area fraction of agricultural soil, continent (excl. sea) |  | 0,6 | [-] | D |
| Area fraction of industrial/urban soil, continent (excl. sea) |  | 0,1 | [-] | D |
| Area fraction of freshwater, continent (total) |  | 0,015 | [-] | O |
| Area fraction of seawater, continent (total) |  | 0,5 | [-] | D |
| Area fraction of natural soil, continent (total) |  | 0,135 | [-] | O |
| Area fraction of agricultural soil, continent (total) |  | 0,3 | [-] | O |
| Area fraction of industrial/urban soil, continent (total) |  | 0,05 | [-] | O |
|  |  |  |  |  |
| **MODERATE** |  |  |  |  |
| Area of moderate system (incl.continent,region) |  | 8,5E+07 | [km2] | D |
| Area of moderate system (excl.continent, region) |  | 7,8E+07 | [km2] | O |
| Area fraction of water, moderate system |  | 0,5 | [-] | D |
|  |  |  |  |  |
| **ARCTIC** |  |  |  |  |
| Area of arctic system |  | 4,25E+07 | [km2] | D |
| Area fraction of water, arctic system |  | 0,6 | [-] | D |
|  |  |  |  |  |
| **TROPIC** |  |  |  |  |
| Area of tropic system |  | 1,28E+11 | [km2] | D |
| Area fraction of water, tropic system |  | 0,7 | [-] | D |
|  |  |  |  |  |
| **TEMPERATURE** |  |  |  |  |
| Environmental temperature, regional scale |  | 12 | [oC] | D |
| Environmental temperature, continental scale |  | 12 | [oC] | D |
| Environmental temperature, moderate scale |  | 12 | [oC] | D |
| Environmental temperature, arctic scale |  | -10 | [oC] | D |
| Environmental temperature, tropic scale |  | 25 | [oC] | D |
| Enthalpy of vaporisation |  | 50 | [kJ.mol-1] | D |
| Enthalpy of solution |  | 10 | [kJ.mol-1] | D |
|  |  |  |  |  |
| **MASS TRANSFER** |  |  |  |  |
| Air-film PMTC (air-water interface) |  | 3,33E-03 | [m.s-1] | O |
| Water-film PMTC (air-water interface) |  | 4,18E-06 | [m.s-1] | O |
| PMTC, air side of air-soil interface |  | 1,05E-03 | [m.s-1] | O |
| PMTC, soil side of air-soil interface |  | 3,88E-09 | [m.s-1] | O |
| Soil-air PMTC (air-soil interface) |  | 5,56E-06 | [m.s-1] | D |
| Soil-water film PMTC (air-soil interface) |  | 5,56E-10 | [m.s-1] | D |
| Water-film PMTC (sediment-water interface) |  | 2,78E-06 | [m.s-1] | D |
| Pore water PMTC (sediment-water interface) |  | 2,78E-08 | [m.s-1] | D |
|  |  |  |  |  |
| **AIR** |  |  |  |  |
| **GENERAL** |  |  |  |  |
| Atmospheric mixing height |  | 1000 | [m] | D |
| Windspeed in the system |  | 3 | [m.s-1] | D |
| Aerosol deposition velocity |  | 1,00E-03 | [m.s-1] | D |
| Aerosol collection efficiency |  | 2,00E+05 | [-] | D |
|  |  |  |  |  |
| **RAIN** |  |  |  |  |
| Average precipitation, regional system |  | 700 | [mm.yr-1] | D |
| Average precipitation, continental system |  | 700 | [mm.yr-1] | D |
| Average precipitation, moderate system |  | 700 | [mm.yr-1] | D |
| Average precipitation, arctic system |  | 250 | [mm.yr-1] | D |
| Average precipitation, tropic system |  | 1,3E+03 | [mm.yr-1] | D |
|  |  |  |  |  |
| **RESIDENCE TIMES** |  |  |  |  |
| Residence time of air, regional |  | 0,687 | [d] | O |
| Residence time of air, continental |  | 9,05 | [d] | O |
| Residence time of air, moderate |  | 30,2 | [d] | O |
| Residence time of air, arctic |  | 22,3 | [d] | O |
| Residence time of air, tropic |  | 38,6 | [d] | O |
|  |  |  |  |  |
| **WATER** |  |  |  |  |
| **DEPTH** |  |  |  |  |
| Water depth of freshwater, regional system |  | 3 | [m] | D |
| Water depth of seawater, regional system |  | 10 | [m] | D |
| Water depth of freshwater, continental system |  | 3 | [m] | D |
| Water depth of seawater, continental system |  | 200 | [m] | D |
| Water depth, moderate system |  | 1000 | [m] | D |
| Water depth, arctic system |  | 1000 | [m] | D |
| Water depth, tropic system |  | 1000 | [m] | D |
|  |  |  |  |  |
| **SUSPENDED SOLIDS** |  |  |  |  |
| Suspended solids conc. freshwater, regional |  | 15 | [mg.l-1] | D |
| Suspended solids conc. seawater, regional |  | 5 | [mg.l-1] | D |
| Suspended solids conc. freshwater, continental |  | 15 | [mg.l-1] | D |
| Suspended solids conc. seawater, continental |  | 5 | [mg.l-1] | D |
| Suspended solids conc. seawater, moderate |  | 5 | [mg.l-1] | D |
| Suspended solids conc. seawater, arctic |  | 5 | [mg.l-1] | D |
| Suspended solids conc. seawater, tropic |  | 5 | [mg.l-1] | D |
| Concentration solids in effluent, regional |  | 30 | [mg.l-1] | D |
| Concentration solids in effluent, continental |  | 30 | [mg.l-1] | D |
| Concentration biota |  | 1 | [mgwwt.l-1] | D |
|  |  |  |  |  |
| **RESIDENCE TIMES** |  |  |  |  |
| Residence time of freshwater, regional |  | 43,3 | [d] | O |
| Residence time of seawater, regional |  | 4,64 | [d] | O |
| Residence time of freshwater, continental |  | 172 | [d] | O |
| Residence time of seawater, continental |  | 365 | [d] | O |
| Residence time of water, moderate |  | 2,69E+03 | [d] | O |
| Residence time of water, arctic |  | 5,84E+03 | [d] | O |
| Residence time of water, tropic |  | 1,09E+04 | [d] | O |
|  |  |  |  |  |
| **SEDIMENT** |  |  |  |  |
| **DEPTH** |  |  |  |  |
| Sediment mixing depth |  | 0,03 | [m] | D |
|  |  |  |  |  |
| **SUSPENDED SOLIDS** |  |  |  |  |
| (Biogenic) prod. susp. solids in freshwater, reg |  | 10 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in seawater, reg |  | 10 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in freshwater, cont |  | 10 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in seawater, cont |  | 5 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in water, moderate |  | 1 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in water, arctic |  | 1 | [g.m-2.yr-1] | D |
| (Biogenic) prod. susp. solids in water, tropic |  | 1 | [g.m-2.yr-1] | D |
|  |  |  |  |  |
| **SEDIMENTATION RATES** |  |  |  |  |
| Settling velocity of suspended solids |  | 2,5 | [m.d-1] | D |
| Net sedimentation rate, freshwater, regional |  | 2,8 | [mm.yr-1] | O |
| Net sedimentation rate, seawater, regional |  | 1,53 | [mm.yr-1] | O |
| Net sedimentation rate, freshwater, continental |  | 2,75 | [mm.yr-1] | O |
| Net sedimentation rate, seawater, continental |  | 6,69E-03 | [mm.yr-1] | O |
| Net sedimentation rate, moderate |  | 2,8E-03 | [mm.yr-1] | O |
| Net sedimentation rate, arctic |  | 2,00E-03 | [mm.yr-1] | O |
| Net sedimentation rate, tropic |  | 2,00E-03 | [mm.yr-1] | O |
|  |  |  |  |  |
| **SOIL** |  |  |  |  |
| **GENERAL** |  |  |  |  |
| Fraction of rain water infiltrating soil |  | 0,25 | [-] | D |
| Fraction of rain water running off soil |  | 0,25 | [-] | D |
|  |  |  |  |  |
| **DEPTH** |  |  |  |  |
| Chemical-dependent soil depth |  | No |  | D |
| Mixing depth natural soil |  | 0,05 | [m] | D |
| Mixing depth agricultural soil |  | 0,2 | [m] | D |
| Mixing depth industrial/urban soil |  | 0,05 | [m] | D |
| Mixing depth of soil, moderate system |  | 0,05 | [m] | D |
| Mixing depth of soil, arctic system |  | 0,05 | [m] | D |
| Mixing depth of soil, tropic system |  | 0,05 | [m] | D |
|  |  |  |  |  |
| **EROSION** |  |  |  |  |
| Soil erosion rate, regional system |  | 0,03 | [mm.yr-1] | D |
| Soil erosion rate, continental system |  | 0,03 | [mm.yr-1] | D |
| Soil erosion rate, moderate system |  | 0,03 | [mm.yr-1] | D |
| Soil erosion rate, arctic system |  | 0,03 | [mm.yr-1] | D |
| Soil erosion rate, tropic system |  | 0,03 | [mm.yr-1] | D |
|  |  |  |  |  |
| **SUBSTANCE** |  |  |  |  |
| **SUBSTANCE IDENTIFICATION** |  |  |  |  |
| General name |  | Cu-HDO |  | S |
| Description |  | Wolmanit CX-8WB\_family - VP |  | S |
| CAS-No |  |  |  | D |
| EC-notification no. |  |  |  | D |
| EINECS no. |  |  |  | D |
|  |  |  |  |  |
| **PHYSICO-CHEMICAL PROPERTIES** |  |  |  |  |
| Molecular weight |  | 349,9 | [g.mol-1] | S |
| Melting point |  | ?? | [oC] | D |
| Boiling point |  | ?? | [oC] | D |
| Vapour pressure at test temperature |  | 1,00E-06 | [Pa] | S |
| Temperature at which vapour pressure was measured |  | 20 | [oC] | S |
| Vapour pressure at 25 [oC] |  | 1,41E-06 | [Pa] | O |
| Octanol-water partition coefficient |  | 2,6 | [log10] | S |
| Water solubility at test temperature |  | 6,1 | [mg.l-1] | S |
| Temperature at which solubility was measured |  | 23 | [oC] | S |
| Water solubility at 25 [oC] |  | 6,27 | [mg.l-1] | O |
|  |  |  |  |  |
| **PARTITION COEFFICIENTS AND BIOCONCENTRATION FACTORS** |  |  |  |  |
| **SOLIDS-WATER** |  |  |  |  |
| Chemical class for Koc-QSAR |  | Non-hydrophobics (default QSAR) |  | D |
| Organic carbon-water partition coefficient |  | 3,03E+09 | [l.kg-1] | S |
| Solids-water partition coefficient in soil |  | 606 | [l.kg-1] | O |
| Solids-water partition coefficient in sediment |  | 1,51E+03 | [l.kg-1] | O |
| Solids-water partition coefficient suspended matter |  | 3,03E+03 | [l.kg-1] | O |
| Solids-water partition coefficient in raw sewage sludge |  | 9,08E+03 | [l.kg-1] | O |
| Solids-water partition coefficient in settled sewage sludge |  | 9,08E+03 | [l.kg-1] | O |
| Solids-water partition coefficient in activated sewage sludge |  | 1,12E+04 | [l.kg-1] | O |
| Solids-water partition coefficient in effluent sewage sludge |  | 1,12E+04 | [l.kg-1] | O |
| Soil-water partition coefficient |  | 909 | [m3.m-3] | O |
| Suspended matter-water partition coefficient |  | 758 | [m3.m-3] | O |
| Sediment-water partition coefficient |  | 758 | [m3.m-3] | O |
|  |  |  |  |  |
| **AIR-WATER** |  |  |  |  |
| Environmental temperature |  | 12 | [oC] | D |
| Water solubility at environmental temperature |  | 5,21 | [mg.l-1] | O |
| Vapour pressure at environmental temperature |  | 5,62E-07 | [Pa] | O |
| Sub-cooled liquid vapour pressure |  | 5,62E-07 | [Pa] | O |
| Fraction of chemical associated with aerosol particles |  | 0,994 | [-] | O |
| Henry's law constant at test temparature |  | ?? | [Pa.m3.mol-1] | D |
| Temperature at which Henry's law constant was measured |  | 25 | [oC] | D |
| Henry's law constant at 25 [oC] |  | 7,88E-05 | [Pa.m3.mol-1] | O |
| Henry's law constant at enviromental temparature |  | 3,77E-05 | [Pa.m3.mol-1] | O |
| Air-water partitioning coefficient |  | 1,59E-08 | [m3.m-3] | O |
|  |  |  |  |  |
| **BIOCONCENTRATION FACTORS** |  |  |  |  |
| **PREDATOR EXPOSURE** |  |  |  |  |
| Bioconcentration factor for earthworms |  | 5,62 | [l.kgwwt-1] | O |
|  |  |  |  |  |
| **HUMAN AND PREDATOR EXPOSURE** |  |  |  |  |
| Bioconcentration factor for fish |  | 32,4 | [l.kgwwt-1] | O |
| QSAR valid for calculation of BCF-Fish |  | Yes |  | O |
| Biomagnification factor in fish |  | 1 | [-] | O |
| Biomagnification factor in predator |  | 1 | [-] | O |
|  |  |  |  |  |
| **HUMAN EXPOSURE** |  |  |  |  |
| Partition coefficient between leaves and air |  | 2,26E+08 | [m3.m-3] | O |
| Partition coefficient between plant tissue and water |  | 3,6 | [m3.m-3] | O |
| Transpiration-stream concentration factor |  | 0,595 | [-] | O |
| Bioaccumulation factor for meat |  | 1,00E-05 | [d.kg-1] | O |
| Bioaccumulation factor for milk |  | 7,94E-06 | [d.kg-1] | O |
| Purification factor for surface water |  | 1 | [-] | O |
|  |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION RATES** |  |  |  |  |
| **CHARACTARIZATION** |  |  |  |  |
| Characterization of biodegradability |  | Not biodegradable |  | D |
|  |  |  |  |  |
| **STP** |  |  |  |  |
| Degradation calculation method in STP |  | First order, standard OECD/EU tests |  | D |
| Rate constant for biodegradation in STP |  | 1,00E+40 | [d] (DT50) | O |
| Total rate constant for degradation in STP |  | 0 | [d-1] | O |
| Maximum growth rate of specific microorganisms |  | 2 | [d-1] | D |
| Half saturation concentration |  | 0,5 | [g.m-3] | D |
|  |  |  |  |  |
| **WATER/SEDIMENT** |  |  |  |  |
| **WATER** |  |  |  |  |
| Rate constant for hydrolysis in surface water |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for photolysis in surface water |  | 6,93E-07 | [d-1] | O |
| Rate constant for biodegradation in surface water |  | 0 | [d-1] (12[oC]) | O |
| Total rate constant for degradation in bulk surface water |  | 1,39E-06 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in saltwater |  | 0 | [d-1] (12[oC]) | O |
| Total rate constant for degradation in bulk saltwater |  | 1,39E-06 | [d-1] (12[oC]) | O |
|  |  |  |  |  |
| **SEDIMENT** |  |  |  |  |
| Rate constant for biodegradation in aerated sediment |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Total rate constant for degradation in bulk sediment |  | 6,93E-08 | [d-1] (12[oC]) | O |
|  |  |  |  |  |
| **AIR** |  |  |  |  |
| Specific degradation rate constant with OH-radicals |  | 0 | [cm3.molec-1.s-1] | D |
| Rate constant for degradation in air |  | 0 | [d-1] | O |
|  |  |  |  |  |
| **SOIL** |  |  |  |  |
| Rate constant for biodegradation in bulk soil |  | 5,7 | [d] (DT50,12[oC]) | S |
| Total rate constant for degradation in bulk soil |  | 0,122 | [d-1] (12[oC]) | O |
|  |  |  |  |  |
| **REMOVAL RATE CONSTANTS SOIL** |  |  |  |  |
| Total rate constant for degradation in bulk soil |  | 0,122 | [d-1] (12[oC]) | O |
| Rate constant for volatilisation from agricultural soil |  | 7,93E-09 | [d-1] | O |
| Rate constant for leaching from agricultural soil |  | 2,64E-06 | [d-1] | O |
| Total rate constant for removal from agricultural top soil |  | 0,122 | [d-1] | O |
| Rate constant for volatilisation from grassland soil |  | 1,59E-08 | [d-1] | O |
| Rate constant for leaching from grassland soil |  | 5,28E-06 | [d-1] | O |
| Total rate constant for removal from grassland top soil |  | 0,122 | [d-1] | O |
| Rate constant for volatilisation from industrial soil |  | 3,17E-08 | [d-1] | O |
| Rate constant for leaching from industrial soil |  | 1,06E-05 | [d-1] | O |
| Total rate constant for removal from industrial soil |  | 0,122 | [d-1] | O |
|  |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **BIOCIDE SCENARIO INPUT DATA** |  |  |  |  |
| Usage/production title |  |  |  | D |
| Scenario choice for biocides |  | (8) Wood preservatives |  | S |
| Additional scenario information |  | (8.1.3) Industrial process, Vacuum pressure |  | S |
|  |  |  |  |  |
| **INDUSTRIAL USE** |  |  |  |  |
| Emission scenario |  | Local emissions and specific soil concentrations |  | S |
|  |  |  |  |  |
| **INTERMEDIATE RESULTS** |  |  |  |  |
| **RELEASE FRACTIONS AND EMISSION DAYS** |  |  |  |  |
| **INDUSTRIAL USE** |  |  |  |  |
| **INPUT** |  |  |  |  |
| Application rate |  | Solid |  | S |
| Solid application rate applied formulation |  | ?? | [kg.m-2] | D |
| Fluid application rate applied formulation |  | ?? | [m3.m-2] | D |
| Density of product |  | ?? | [kg.m-3] | D |
| Fraction of active ingredient |  | ?? | [-] | D |
| Vacuum pressure or double vacuum? |  | Vacuum pressure |  | D |
| Average daily flux of the active ingredient during storage period |  | ?? | [mg.m-2.d-1] | D |
| Concentration in STP effluent, from processing |  | 0,0102 | [mg.l-1] | O |
| Effluent discharge rate of this STP |  | 2,00E+06 | [l.d-1] | O |
|  |  |  |  |  |
| **PROCESSING** |  |  |  |  |
| Quantity of active ingredient applied per m3 of wood |  | ?? | [kg.m-3] | D |
| Local emission to air during episode |  | 0,0263 | [kg.d-1] | S |
| Local emission to wastewater during episode |  | 0,0788 | [kg.d-1] | S |
| Number of emission days per year |  | 250 | [-] | O |
|  |  |  |  |  |
| **STORAGE** |  |  |  |  |
| Surface area of the storage place |  | 525 | [m2] | O |
| Wet soil mass |  | 4,46E+05 | [kgwwt] | O |
| Local emission to industrial soil |  | ?? | [kg.d-1] | O |
| Concentration of substance in soil, initial period |  | ?? | [mg.kgwwt-1] | O |
| Concentration of substance in soil, longer period |  | ?? | [mg.kgwwt-1] | O |
| Local emission to surface water |  | 0 | [kg.d-1] | D |
| Concentration in surface water during emission episode (dissolved) |  | 9,74E-04 | [mg.l-1] | O |
| Steady state concentration in soil |  | ?? | [mg.kgwwt-1] | O |
| Steady state concentration in soil pore water |  | ?? | [mg.l-1] | O |
| Concentration in industrial/application soil |  | ?? | [mg.kgwwt-1] | O |
| Number of emission days per year |  | 250 | [-] | O |
|  |  |  |  |  |
| **DEFAULTS** |  |  |  |  |
| Effective surface area exposed to rain per unit of storage area |  | 11 | [m2.m-2] | D |
| Volume of wood treated per day |  | 30 | [m3.d-1] | O |
| Storage density of treated wood stacked on storage area |  | 2 | [m3.m-2] | D |
| Depth of receiving soil compartment |  | 0,5 | [m] | D |
| Fraction of rainwater running of storage site |  | 0,5 | [-] | D |
|  |  |  |  |  |
| **DEFAULTS (CONTINUED)** |  |  |  |  |
| Duration of storage of treated wood prior to shipment |  | 35 | [d] | O |
| Number of emission days, initial period |  | 30 | [d] | D |
| Number of emission days, longer period |  | 365 | [d] | D |
| Volume flow rate of creek/river |  | 2,59E+07 | [m3.d-1] | D |
| Fraction of tonnage released to air |  | 1,00E-03 | [-] | O |
| Fraction of tonnage released to wastewater |  | 0,03 | [-] | O |
| Total rate constant for removal from industrial soil |  | 0,122 | [d-1] | O |
| Soil-water partition coefficient |  | 909 | [m3.m-3] | O |
|  |  |  |  |  |
| **LOCAL** |  |  |  |  |
| **[INDUSTRIAL USE]** |  |  |  |  |
| Local emission to air during episode |  | 0,0263 | [kg.d-1] | S |
| Emission to air calculated by special scenario |  | Yes |  | O |
| Local emission to wastewater during episode |  | 0,0788 | [kg.d-1] | S |
| Emission to water calculated by special scenario |  | Yes |  | O |
| Specific biocides scenario available |  | Yes |  | D |
| Show this step in further calculations |  | Yes |  | O |
| Intermittent release |  | No |  | D |
|  |  |  |  |  |
| **DISTRIBUTION** |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **[INDUSTRIAL USE]** |  |  |  |  |
| **INPUT AND CONFIGURATION [INDUSTRIAL USE]** |  |  |  |  |
| **INPUT** |  |  |  |  |
| Use or bypass STP (local freshwater assessment) |  | Use STP |  | D |
| Use or bypass STP (local marine assessment) |  | Bypass STP |  | D |
| Local emission to wastewater during episode |  | 0,0788 | [kg.d-1] | S |
| Concentration in untreated wastewater |  | 0,0394 | [mg.l-1] | O |
| Local emission entering the STP |  | 0,0788 | [kg.d-1] | O |
|  |  |  |  |  |
| **CONFIGURATION** |  |  |  |  |
| Type of local STP |  | With primary settler (9-box) |  | D |
| Number of inhabitants feeding this STP |  | 1,00E+04 | [eq] | O |
| Effluent discharge rate of this STP |  | 2,00E+06 | [l.d-1] | O |
| Calculate dilution from river flow rate |  | No |  | S |
| Flow rate of the river |  | 1,8E+04 | [m3.d-1] | O |
| Dilution factor (rivers) |  | 10 | [-] | O |
| Dilution factor (coastal areas) |  | 100 | [-] | O |
|  |  |  |  |  |
| **OUTPUT [INDUSTRIAL USE]** |  |  |  |  |
| Fraction of emission directed to air by STP |  | 1,46E-05 | [%] | O |
| Fraction of emission directed to water by STP |  | 25,9 | [%] | O |
| Fraction of emission directed to sludge by STP |  | 74,1 | [%] | O |
| Fraction of the emission degraded in STP |  | 0 | [%] | O |
| Total of fractions |  | 100 | [%] | O |
| Local indirect emission to air from STP during episode |  | 1,15E-08 | [kg.d-1] | O |
| Concentration in untreated wastewater |  | 0,0394 | [mg.l-1] | O |
| Concentration of chemical (total) in the STP-effluent |  | 0,0102 | [mg.l-1] | O |
| Concentration in effluent exceeds solubility |  | No |  | O |
| Concentration in dry sewage sludge |  | 74 | [mg.kg-1] | O |
| PEC for micro-organisms in the STP |  | 0,0102 | [mg.l-1] | O |
|  |  |  |  |  |
| **LIFE CYCLE STEPS** |  |  |  |  |
| **[INDUSTRIAL USE]** |  |  |  |  |
| **LOCAL CONCENTRATIONS AND DEPOSITIONS [INDUSTRIAL USE]** |  |  |  |  |
| **AIR** |  |  |  |  |
| Concentration in air during emission episode |  | 7,31E-06 | [mg.m-3] | O |
| Annual average concentration in air, 100 m from point source |  | 5,01E-06 | [mg.m-3] | O |
| Total deposition flux during emission episode |  | 2,62E-04 | [mg.m-2.d-1] | O |
| Annual average total deposition flux |  | 1,79E-04 | [mg.m-2.d-1] | O |
|  |  |  |  |  |
| **WATER, SEDIMENT** |  |  |  |  |
| Concentration in surface water during emission episode (dissolved) |  | 9,74E-04 | [mg.l-1] | O |
| Concentration in surface water exceeds solubility |  | No |  | O |
| Annual average concentration in surface water (dissolved) |  | 6,67E-04 | [mg.l-1] | O |
| Concentration in seawater during emission episode (dissolved) |  | 3,77E-04 | [mg.l-1] | O |
| Annual average concentration in seawater (dissolved) |  | 2,58E-04 | [mg.l-1] | O |
|  |  |  |  |  |
| **SOIL, GROUNDWATER** |  |  |  |  |
| Concentration in agric. soil averaged over 30 days |  | 0,029 | [mg.kgwwt-1] | O |
| Concentration in agric. soil averaged over 180 days |  | 4,97E-03 | [mg.kgwwt-1] | O |
| Concentration in grassland averaged over 180 days |  | 2,00E-03 | [mg.kgwwt-1] | O |
| Fraction of steady-state (agricultural soil) |  | 1 | [-] | O |
| Fraction of steady-state (grassland soil) |  | 1 | [-] | O |
|  |  |  |  |  |
| **LOCAL PECS [INDUSTRIAL USE]** |  |  |  |  |
| **AIR** |  |  |  |  |
| Annual average local PEC in air (total) |  | 5,01E-06 | [mg.m-3] | O |
|  |  |  |  |  |
| **WATER, SEDIMENT** |  |  |  |  |
| Local PEC in surface water during emission episode (dissolved) |  | 9,74E-04 | [mg.l-1] | O |
| Qualitative assessment might be needed (TGD Part II, 5.6) |  | No |  | O |
| Annual average local PEC in surface water (dissolved) |  | 6,67E-04 | [mg.l-1] | O |
| Local PEC in fresh-water sediment during emission episode |  | 0,642 | [mg.kgwwt-1] | O |
| Local PEC in seawater during emission episode (dissolved) |  | 3,77E-04 | [mg.l-1] | O |
| Qualitative assessment might be needed (TGD Part II, 5.6) |  | No |  | O |
| Annual average local PEC in seawater (dissolved) |  | 2,58E-04 | [mg.l-1] | O |
| Local PEC in marine sediment during emission episode |  | 0,248 | [mg.kgwwt-1] | O |
|  |  |  |  |  |
| **SOIL, GROUNDWATER** |  |  |  |  |
| Local PEC in agric. soil (total) averaged over 30 days |  | 0,029 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 180 days |  | 4,97E-03 | [mg.kgwwt-1] | O |
| Local PEC in grassland (total) averaged over 180 days |  | 2,00E-03 | [mg.kgwwt-1] | O |
| Local PEC in pore water of agricultural soil |  | 9,31E-06 | [mg.l-1] | O |
| Local PEC in pore water of grassland |  | 3,74E-06 | [mg.l-1] | O |
| Local PEC in groundwater under agricultural soil |  | 9,31E-06 | [mg.l-1] | O |

### SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 1: EUSES 2.1.2 OUTPUT FILE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section/parameter** |  | **Actual value** | **Unit** | **Stat** |
|  |  |  |  |  |
| **PHYSICO-CHEMICAL PROPERTIES** |  |  |  |  |
| Melting point |  | ?? | [oC] | D |
| Boiling point |  | ?? | [oC] | D |
| Vapour pressure at test temperature |  | 1,00E-06 | [Pa] | S |
| Temperature at which vapour pressure was measured |  | 20 | [oC] | S |
| Vapour pressure at 25 [oC] |  | 1,41E-06 | [Pa] | O |
| Water solubility at test temperature |  | 6,1 | [mg.l-1] | S |
| Temperature at which solubility was measured |  | 23 | [oC] | S |
| Water solubility at 25 [oC] |  | 6,27 | [mg.l-1] | O |
| Octanol-water partition coefficient |  | 2,6 | [log10] | S |
| Henry's law constant at 25 [oC] |  | 7,88E-05 | [Pa.m3.mol-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| Tonnage of substance in Europe |  | 0 | [tonnes.yr-1] | O |
| Regional production volume of substance |  | 0 | [tonnes.yr-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[1 "", IC=15/UC=39]** |  |  |  |  |
| Industry category |  | 15/0 Others |  | D |
| Use category |  | 39 Biocides, non-agricultural |  | D |
| Fraction of tonnage for application |  | 1 | [-] | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[SERVICE LIFE]** |  |  |  |  |
| Use specific emission scenario |  | Yes |  | D |
| Emission tables |  | No applicable emission tables |  | S |
| Emission scenario |  | Local wastewater emission and application soil concentration |  | S |
| Scenario choice for biocides |  | (8) Wood preservatives |  | S |
| Additional scenario information |  | (8.2.2) Treated wood, noise barrier |  | S |
| Fraction of tonnage released to air |  | 0 | [-] | O |
| Fraction of tonnage released to wastewater |  | 0,7 | [-] | O |
| Fraction of tonnage released to surface water |  | 0 | [-] | O |
| Fraction of tonnage released to industrial soil |  | 0,3 | [-] | O |
| Fraction of tonnage released to agricultural soil |  | 0 | [-] | O |
| Fraction of the main local source |  | 0 | [-] | O |
| Number of emission days per year |  | 30 | [-] | O |
| Local emission to air during episode |  | 0 | [kg.d-1] | O |
| Local emission to wastewater during episode |  | 1,85E-04 | [kg.d-1] | O |
| Intermittent release |  | No |  | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **TOTAL REGIONAL EMISSIONS TO COMPARTMENTS** |  |  |  |  |
| Total regional emission to air |  | 0 | [kg.d-1] | O |
| Total regional emission to wastewater |  | 0 | [kg.d-1] | O |
| Total regional emission to surface water |  | 0 | [kg.d-1] | O |
| Total regional emission to industrial soil |  | 0 | [kg.d-1] | O |
| Total regional emission to agricultural soil |  | 0 | [kg.d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **PARTITION COEFFICIENTS** |  |  |  |  |
|  |  |  |  |  |
| Organic carbon-water partition coefficient |  | 3,03E+09 | [l.kg-1] | S |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION** |  |  |  |  |
| Characterization of biodegradability |  | Not biodegradable |  | D |
| Degradation calculation method in STP |  | First order, standard OECD/EU tests |  | D |
| Rate constant for biodegradation in STP |  | 0 | [d-1] | O |
| Rate constant for biodegradation in surface water |  | 0 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in aerated sediment |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for hydrolysis in surface water |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for photolysis in surface water |  | 6,93E-07 | [d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **LOCAL STP [1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| **OUTPUT** |  |  |  |  |
| Fraction of emission directed to air by STP |  | 1,46E-05 | [%] | O |
| Fraction of emission directed to water by STP |  | 25,9 | [%] | O |
| Fraction of emission directed to sludge by STP |  | 74,1 | [%] | O |
| Fraction of the emission degraded in STP |  | 0 | [%] | O |
| Concentration in untreated wastewater |  | 9,24E-05 | [mg.l-1] | O |
| Concentration of chemical (total) in the STP-effluent |  | 2,39E-05 | [mg.l-1] | O |
| Concentration in effluent exceeds solubility |  | No |  | O |
| Concentration in dry sewage sludge |  | 0,173 | [mg.kg-1] | O |
| PEC for micro-organisms in the STP |  | 2,39E-05 | [mg.l-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DISTRIBUTION** |  |  |  |  |
| **LOCAL SCALE** |  |  |  |  |
| **[1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| Concentration in air during emission episode |  | 7,52E-15 | [mg.m-3] | O |
| Annual average concentration in air, 100 m from point source |  | 6,18E-16 | [mg.m-3] | O |
| Concentration in surface water during emission episode (dissolved) |  | 2,28E-06 | [mg.l-1] | O |
| Annual average concentration in surface water (dissolved) |  | 1,88E-07 | [mg.l-1] | O |
| Local PEC in surface water during emission episode (dissolved) |  | 2,28E-06 | [mg.l-1] | O |
| Annual average local PEC in surface water (dissolved) |  | 1,88E-07 | [mg.l-1] | O |
| Local PEC in fresh-water sediment during emission episode |  | 1,51E-03 | [mg.kgwwt-1] | O |
| Concentration in seawater during emission episode (dissolved) |  | 8,84E-07 | [mg.l-1] | O |
| Annual average concentration in seawater (dissolved) |  | 7,26E-08 | [mg.l-1] | O |
| Local PEC in seawater during emission episode (dissolved) |  | 8,84E-07 | [mg.l-1] | O |
| Annual average local PEC in seawater (dissolved) |  | 7,26E-08 | [mg.l-1] | O |
| Local PEC in marine sediment during emission episode |  | 5,82E-04 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 30 days |  | 2,54E-03 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 180 days |  | 2,54E-03 | [mg.kgwwt-1] | O |
| Local PEC in grassland (total) averaged over 180 days |  | 1,01E-03 | [mg.kgwwt-1] | O |
| Local PEC in groundwater under agricultural soil |  | 4,75E-06 | [mg.l-1] | O |

### SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 2: EUSES 2.1.2 OUTPUT FILE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section/parameter** |  | **Actual value** | **Unit** | **Stat** |
|  |  |  |  |  |
| **PHYSICO-CHEMICAL PROPERTIES** |  |  |  |  |
| Melting point |  | ?? | [oC] | D |
| Boiling point |  | ?? | [oC] | D |
| Vapour pressure at test temperature |  | 1,00E-06 | [Pa] | S |
| Temperature at which vapour pressure was measured |  | 20 | [oC] | S |
| Vapour pressure at 25 [oC] |  | 1,41E-06 | [Pa] | O |
| Water solubility at test temperature |  | 6,1 | [mg.l-1] | S |
| Temperature at which solubility was measured |  | 23 | [oC] | S |
| Water solubility at 25 [oC] |  | 6,27 | [mg.l-1] | O |
| Octanol-water partition coefficient |  | 2,6 | [log10] | S |
| Henry's law constant at 25 [oC] |  | 7,88E-05 | [Pa.m3.mol-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| Tonnage of substance in Europe |  | 0 | [tonnes.yr-1] | O |
| Regional production volume of substance |  | 0 | [tonnes.yr-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[1 "", IC=15/UC=39]** |  |  |  |  |
| Industry category |  | 15/0 Others |  | D |
| Use category |  | 39 Biocides, non-agricultural |  | D |
| Fraction of tonnage for application |  | 1 | [-] | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[SERVICE LIFE]** |  |  |  |  |
| Use specific emission scenario |  | Yes |  | D |
| Emission tables |  | No applicable emission tables |  | S |
| Emission scenario |  | Local wastewater emission and application soil concentration |  | S |
| Scenario choice for biocides |  | (8) Wood preservatives |  | S |
| Additional scenario information |  | (8.2.2) Treated wood, noise barrier |  | S |
| Fraction of tonnage released to air |  | 0 | [-] | O |
| Fraction of tonnage released to wastewater |  | 0,7 | [-] | O |
| Fraction of tonnage released to surface water |  | 0 | [-] | O |
| Fraction of tonnage released to industrial soil |  | 0,3 | [-] | O |
| Fraction of tonnage released to agricultural soil |  | 0 | [-] | O |
| Fraction of the main local source |  | 0 | [-] | O |
| Number of emission days per year |  | 30 | [-] | O |
| Local emission to air during episode |  | 0 | [kg.d-1] | O |
| Local emission to wastewater during episode |  | 1,62E-04 | [kg.d-1] | O |
| Intermittent release |  | No |  | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **TOTAL REGIONAL EMISSIONS TO COMPARTMENTS** |  |  |  |  |
| Total regional emission to air |  | 0 | [kg.d-1] | O |
| Total regional emission to wastewater |  | 0 | [kg.d-1] | O |
| Total regional emission to surface water |  | 0 | [kg.d-1] | O |
| Total regional emission to industrial soil |  | 0 | [kg.d-1] | O |
| Total regional emission to agricultural soil |  | 0 | [kg.d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **PARTITION COEFFICIENTS** |  |  |  |  |
|  |  |  |  |  |
| Organic carbon-water partition coefficient |  | 3,03E+09 | [l.kg-1] | S |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION** |  |  |  |  |
| Characterization of biodegradability |  | Not biodegradable |  | D |
| Degradation calculation method in STP |  | First order, standard OECD/EU tests |  | D |
| Rate constant for biodegradation in STP |  | 0 | [d-1] | O |
| Rate constant for biodegradation in surface water |  | 0 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in aerated sediment |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for hydrolysis in surface water |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for photolysis in surface water |  | 6,93E-07 | [d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **LOCAL STP [1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| **OUTPUT** |  |  |  |  |
| Fraction of emission directed to air by STP |  | 1,46E-05 | [%] | O |
| Fraction of emission directed to water by STP |  | 25,9 | [%] | O |
| Fraction of emission directed to sludge by STP |  | 74,1 | [%] | O |
| Fraction of the emission degraded in STP |  | 0 | [%] | O |
| Concentration in untreated wastewater |  | 8,09E-05 | [mg.l-1] | O |
| Concentration of chemical (total) in the STP-effluent |  | 2,09E-05 | [mg.l-1] | O |
| Concentration in effluent exceeds solubility |  | No |  | O |
| Concentration in dry sewage sludge |  | 0,152 | [mg.kg-1] | O |
| PEC for micro-organisms in the STP |  | 2,09E-05 | [mg.l-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DISTRIBUTION** |  |  |  |  |
| **LOCAL SCALE** |  |  |  |  |
| **[1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| Concentration in air during emission episode |  | 6,58E-15 | [mg.m-3] | O |
| Annual average concentration in air, 100 m from point source |  | 5,41E-16 | [mg.m-3] | O |
| Concentration in surface water during emission episode (dissolved) |  | 2,00E-06 | [mg.l-1] | O |
| Annual average concentration in surface water (dissolved) |  | 1,64E-07 | [mg.l-1] | O |
| Local PEC in surface water during emission episode (dissolved) |  | 2,00E-06 | [mg.l-1] | O |
| Annual average local PEC in surface water (dissolved) |  | 1,64E-07 | [mg.l-1] | O |
| Local PEC in fresh-water sediment during emission episode |  | 1,32E-03 | [mg.kgwwt-1] | O |
| Concentration in seawater during emission episode (dissolved) |  | 7,74E-07 | [mg.l-1] | O |
| Annual average concentration in seawater (dissolved) |  | 6,36E-08 | [mg.l-1] | O |
| Local PEC in seawater during emission episode (dissolved) |  | 7,74E-07 | [mg.l-1] | O |
| Annual average local PEC in seawater (dissolved) |  | 6,36E-08 | [mg.l-1] | O |
| Local PEC in marine sediment during emission episode |  | 5,1E-04 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 30 days |  | 2,22E-03 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 180 days |  | 2,22E-03 | [mg.kgwwt-1] | O |
| Local PEC in grassland (total) averaged over 180 days |  | 8,84E-04 | [mg.kgwwt-1] | O |
| Local PEC in groundwater under agricultural soil |  | 4,15E-06 | [mg.l-1] | O |

### SCENARIO [2B]: TREATED WOOD, NOISE BARRIER, TIME 3: EUSES 2.1.2 OUTPUT FILE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section/parameter** |  | **Actual value** | **Unit** | **Stat** |
|  |  |  |  |  |
| **PHYSICO-CHEMICAL PROPERTIES** |  |  |  |  |
| Melting point |  | ?? | [oC] | D |
| Boiling point |  | ?? | [oC] | D |
| Vapour pressure at test temperature |  | 1,00E-06 | [Pa] | S |
| Temperature at which vapour pressure was measured |  | 20 | [oC] | S |
| Vapour pressure at 25 [oC] |  | 1,41E-06 | [Pa] | O |
| Water solubility at test temperature |  | 6,1 | [mg.l-1] | S |
| Temperature at which solubility was measured |  | 23 | [oC] | S |
| Water solubility at 25 [oC] |  | 6,27 | [mg.l-1] | O |
| Octanol-water partition coefficient |  | 2,6 | [log10] | S |
| Henry's law constant at 25 [oC] |  | 7,88E-05 | [Pa.m3.mol-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| Tonnage of substance in Europe |  | 0 | [tonnes.yr-1] | O |
| Regional production volume of substance |  | 0 | [tonnes.yr-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[1 "", IC=15/UC=39]** |  |  |  |  |
| Industry category |  | 15/0 Others |  | D |
| Use category |  | 39 Biocides, non-agricultural |  | D |
| Fraction of tonnage for application |  | 1 | [-] | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **[SERVICE LIFE]** |  |  |  |  |
| Use specific emission scenario |  | Yes |  | D |
| Emission tables |  | No applicable emission tables |  | S |
| Emission scenario |  | Local wastewater emission and application soil concentration |  | S |
| Scenario choice for biocides |  | (8) Wood preservatives |  | S |
| Additional scenario information |  | (8.2.2) Treated wood, noise barrier |  | S |
| Fraction of tonnage released to air |  | 0 | [-] | O |
| Fraction of tonnage released to wastewater |  | 0,7 | [-] | O |
| Fraction of tonnage released to surface water |  | 0 | [-] | O |
| Fraction of tonnage released to industrial soil |  | 0,3 | [-] | O |
| Fraction of tonnage released to agricultural soil |  | 0 | [-] | O |
| Fraction of the main local source |  | 0 | [-] | O |
| Number of emission days per year |  | 30 | [-] | O |
| Local emission to air during episode |  | 0 | [kg.d-1] | O |
| Local emission to wastewater during episode |  | 9,98E-06 | [kg.d-1] | O |
| Intermittent release |  | No |  | D |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **RELEASE ESTIMATION** |  |  |  |  |
| **TOTAL REGIONAL EMISSIONS TO COMPARTMENTS** |  |  |  |  |
| Total regional emission to air |  | 0 | [kg.d-1] | O |
| Total regional emission to wastewater |  | 0 | [kg.d-1] | O |
| Total regional emission to surface water |  | 0 | [kg.d-1] | O |
| Total regional emission to industrial soil |  | 0 | [kg.d-1] | O |
| Total regional emission to agricultural soil |  | 0 | [kg.d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **PARTITION COEFFICIENTS** |  |  |  |  |
|  |  |  |  |  |
| Organic carbon-water partition coefficient |  | 3,03E+09 | [l.kg-1] | S |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DEGRADATION AND TRANSFORMATION** |  |  |  |  |
| Characterization of biodegradability |  | Not biodegradable |  | D |
| Degradation calculation method in STP |  | First order, standard OECD/EU tests |  | D |
| Rate constant for biodegradation in STP |  | 0 | [d-1] | O |
| Rate constant for biodegradation in surface water |  | 0 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in bulk soil |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for biodegradation in aerated sediment |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for hydrolysis in surface water |  | 6,93E-07 | [d-1] (12[oC]) | O |
| Rate constant for photolysis in surface water |  | 6,93E-07 | [d-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **SEWAGE TREATMENT** |  |  |  |  |
| **LOCAL STP [1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| **OUTPUT** |  |  |  |  |
| Fraction of emission directed to air by STP |  | 1,46E-05 | [%] | O |
| Fraction of emission directed to water by STP |  | 25,9 | [%] | O |
| Fraction of emission directed to sludge by STP |  | 74,1 | [%] | O |
| Fraction of the emission degraded in STP |  | 0 | [%] | O |
| Concentration in untreated wastewater |  | 4,99E-06 | [mg.l-1] | O |
| Concentration of chemical (total) in the STP-effluent |  | 1,29E-06 | [mg.l-1] | O |
| Concentration in effluent exceeds solubility |  | No |  | O |
| Concentration in dry sewage sludge |  | 9,37E-03 | [mg.kg-1] | O |
| PEC for micro-organisms in the STP |  | 1,29E-06 | [mg.l-1] | O |
|  |  |  |  |  |
| **ENVIRONMENT-EXPOSURE** |  |  |  |  |
| **DISTRIBUTION** |  |  |  |  |
| **LOCAL SCALE** |  |  |  |  |
| **[1 "", IC=15/UC=39][SERVICE LIFE]** |  |  |  |  |
| Concentration in air during emission episode |  | 4,06E-16 | [mg.m-3] | O |
| Annual average concentration in air, 100 m from point source |  | 3,34E-17 | [mg.m-3] | O |
| Concentration in surface water during emission episode (dissolved) |  | 1,23E-07 | [mg.l-1] | O |
| Annual average concentration in surface water (dissolved) |  | 1,01E-08 | [mg.l-1] | O |
| Local PEC in surface water during emission episode (dissolved) |  | 1,23E-07 | [mg.l-1] | O |
| Annual average local PEC in surface water (dissolved) |  | 1,01E-08 | [mg.l-1] | O |
| Local PEC in fresh-water sediment during emission episode |  | 8,13E-05 | [mg.kgwwt-1] | O |
| Concentration in seawater during emission episode (dissolved) |  | 4,77E-08 | [mg.l-1] | O |
| Annual average concentration in seawater (dissolved) |  | 3,92E-09 | [mg.l-1] | O |
| Local PEC in seawater during emission episode (dissolved) |  | 4,77E-08 | [mg.l-1] | O |
| Annual average local PEC in seawater (dissolved) |  | 3,92E-09 | [mg.l-1] | O |
| Local PEC in marine sediment during emission episode |  | 3,15E-05 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 30 days |  | 1,37E-04 | [mg.kgwwt-1] | O |
| Local PEC in agric. soil (total) averaged over 180 days |  | 1,37E-04 | [mg.kgwwt-1] | O |
| Local PEC in grassland (total) averaged over 180 days |  | 5,45E-05 | [mg.kgwwt-1] | O |
| Local PEC in groundwater under agricultural soil |  | 2,56E-07 | [mg.l-1] | O |

#### Refined PECsed calculation (i.e. including adsorption of Cu on suspended particles)

##### Assessed substance: Copper

### Bridge over pond scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Variable/parameter*** | | | ***Symbol*** | ***Value*** | ***Unit*** | ***S/D/O/P*** |
|  | | |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | | | Qleach,TIME1 | 2,24E+02 | mg | S |
|  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assess-ment period | | | Qleach,TIME2 | 2,32E+03 | mg | S |
|  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | | | Qleach,TIME2 | 2,32E+03 | mg | S |
|  |  |  |  |  |  |  |
| Concentration of suspended matter in the surface water | | | SUSPwater | 15 | mg.L-1 | D |
|  |  |  |  |  |  |  |
| Water volume under bridge | | | Vwater | 1000 | m3 | D |
|  |  |  |  |  |  |  |
| Surface of stagnant surface water (bridge over pond) | | | AREAwater | 1000 | m2 |  |
|  |  |  |  |  |  |  |
| Default depth of the deposited matter layer | | | DEPTHsusp dep | 0,003 | m |  |
|  |  |  |  |  |  |  |
| Vsusp dep = DEPTHsusp dep \* AREAwater | | |  |  |  |  |
|  |  |  |  |  |  |  |
| Volume of deposited suspended matter | | | Vsusp dep | 3 | m3 | O |
|  |  |  |  |  |  |  |
| Solids-water partitioning coefficient for suspended matter | | | Kpsusp | 30246 | L.kg-1 | S |
|  |  |  |  |  |  |  |
| Bulk density of (wet) suspended matter | | | RHOsusp | 1150 | kg.m-3 | D |
|  |  |  |  |  |  |  |
| Density of solid phase | | | RHOsolid | 2500 | kg.m-3 | D |
|  |  |  |  |  |  |  |
| Volume fraction water in susp. matter | | | Fwater-susp | 0,9 | m3.m-3 | D |
|  |  |  |  |  |  |  |
| Volume fraction solids in susp. Matter | | | Fsolid-susp | 0,1 | m3.m-3 | D |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Suspended matter-water partition coefficient | | | Ksusp-water | 7562,4 | m3.m-3 | O |
|  |  |  |  |  |  |  |
| Clocalwater,TIME1= Qleach,TIME1 /((1+Ksusp-water\* SUSPwater\*0,000001)\*(1000\*Vwater +1000\*Vsusp dep\*Ksusp-water) | | | | | | |
|  |  |  |  |  |  |  |
| Environmental concentration in water TIME1 | | | Clocalwater,TIME1 | 6,51E-06 | mg.L-1 | O |
|  |  |  |  |  |  |  |
| Environmental concentration in water TIME2 | | | Clocalwater,TIME2 | 6,74E-05 | mg.L-1 | O |
|  |  |  |  |  |  |  |
| Environmental concentration in water TIME3 | | | Clocalwater,TIME3 | 6,74E-05 | mg.L-1 | O |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Predicted environmental concentration in sediment TIME1 | | | PEClocalsed,TIME1 | 4,28E-02 | mg.kg-1wwt | O |
|  |  |  |  |  |  |  |
| Predicted environmental concentration in sediment TIME2 | | | PEClocalsed,TIME2 | 4,43E-01 | mg.kg-1wwt | O |
|  |  |  |  |  |  |  |
| Predicted environmental concentration in sediment TIME3 | | | PEClocalsed,TIME3 | 4,43E-01 | mg.kg-1wwt | O |

### Jetty in a lake

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Variable/parameter*** | | | ***Symbol*** | | ***Value*** | | ***Unit*** | | ***S/D/O/P*** | |
|  |  |  | |  | |  | |  | |  |
| Cumulative quantity of substance, leached over the initial assessment period | | | | Qleach,TIME1 | | 3740,0 | | mg | | S |
|  |  |  | |  | |  | |  | |  |
| Cumulative quantity of substance, leached over the intermediate assess-ment period | | | | Qleach,TIME2 | | 11100,0 | | mg | | S |
|  |  |  | |  | |  | |  | |  |
| Cumulative quantity of substance, leached over a longer assessment period | | | | Qleach,TIME2 | | 13100,0 | | mg | | S |
|  |  |  | |  | |  | |  | |  |
| Concentration of suspended matter in the surface water | | | | SUSPwater | | 15 | | mg.L-1 | | D |
|  |  |  | |  | |  | |  | |  |
| Water volume under bridge | | | | Vwater | | 1,60E+04 | | m3 | | D |
|  |  |  | |  | |  | |  | |  |
| Surface of stagnant surface water (letty) | | | | AREAwater | | 7854 | | m2 | |  |
|  |  |  | |  | |  | |  | |  |
| Default depth of the deposited matter layer | | | | DEPTHsusp dep | | 0,003 | | m | | D |
|  |  |  | |  | |  | |  | |  |
| Vsusp dep = DEPTHsusp dep \* AREAwater | | | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
| Volume of deposited suspended matter | | | | Vsusp dep | | 23,6 | | m3 | | O |
|  |  |  | |  | |  | |  | |  |
| Solids-water partitioning coefficient for suspended matter | | | | Kpsusp | | 30246 | | L.kg-1 | | S |
|  |  |  | |  | |  | |  | |  |
| Bulk density of (wet) suspended matter | | | | RHOsusp | | 1150 | | kg.m-3 | | D |
|  |  |  | |  | |  | |  | |  |
| Density of solid phase | | | | RHOsolid | | 2500 | | kg.m-3 | | D |
|  |  |  | |  | |  | |  | |  |
| Volume fraction water in susp. matter | | | | Fwater-susp | | 0,9 | | m3.m-3 | | D |
|  |  |  | |  | |  | |  | |  |
| Volume fraction solids in susp. Matter | | | | Fsolid-susp | | 0,1 | | m3.m-3 | | D |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
| Suspended matter-water partition coefficient | | | | Ksusp-water | | 7562,4 | | m3.m-3 | | O |
|  |  |  | |  | |  | |  | |  |
| Clocalwater,TIME1= Qleach,TIME1 /((1+Ksusp-water\* SUSPwater\*0,000001)\*(1000\*Vwater +1000\*Vsusp dep\*Ksusp-water) | | | | | | | | | | |
|  |  |  | |  | |  | |  | |  |
| Environmental concentration in water TIME1 | | | | Clocalwater,TIME1 | | 1,32E-05 | | mg.L-1 | | O |
|  |  |  | |  | |  | |  | |  |
| Environmental concentration in water TIME2 | | | | Clocalwater,TIME2 | | 3,93E-05 | | mg.L-1 | | O |
|  |  |  | |  | |  | |  | |  |
| Environmental concentration in water TIME3 | | | | Clocalwater,TIME3 | | 4,64E-05 | | mg.L-1 | | O |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
| Predicted environmental concentration in sediment TIME1 | | | | PEClocalsed,TIME1 | | 8,71E-02 | | mg.kg-1wwt | | O |
|  |  |  | |  | |  | |  | |  |
| Predicted environmental concentration in sediment TIME2 | | | | PEClocalsed,TIME2 | | 2,59E-01 | | mg.kg-1wwt | | O |
|  |  |  | |  | |  | |  | |  |
| Predicted environmental concentration in sediment TIME3 | | | | PEClocalsed,TIME3 | | 3,05E-01 | | mg.kg-1wwt | | O |

### Sheet piling in a waterway

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Variable/parameter*** | | | ***Symbol*** | | ***Value*** | | ***Unit*** | | ***S/D/O/P*** | |
|  |  |  | |  | |  | |  | |  |
| Cumulative quantity of substance, leached over the initial assessment period | | | | Qleach,TIME1 | | 9,88E+02 | | mg | | S |
|  |  |  | |  | |  | |  | |  |
| Cumulative quantity of substance, leached over the intermediate assess-ment period | | | | Qleach,TIME2 | | 1,28E+02 | | mg | | S |
|  |  |  | |  | |  | |  | |  |
| CuCumulative quantity of substance, leached over a longer assessment period | | | | Qleach,TIME2 | | 8,39E+00 | | mg | | S |
|  |  |  | |  | |  | |  | |  |
| Concentration of suspended matter in the surface water | | | | SUSPwater | | 15 | | mg.L-1 | | D |
|  |  |  | |  | |  | |  | |  |
| Water volume per m waterway length | | | | Vwater | | 7,5 | | m3 | | D |
|  |  |  | |  | |  | |  | |  |
| Solids-water partitioning coefficient for suspended matter | | | | Kpsusp | | 30246 | | L3.kg-1 | | S |
|  |  |  | |  | |  | |  | |  |
| Bulk density of (wet) suspended matter | | | | RHOsusp | | 1150 | | kg.m-3 | | D |
|  |  |  | |  | |  | |  | |  |
| Density of solid phase | | | | RHOsolid | | 2500 | | kg.m-3 | | D |
|  |  |  | |  | |  | |  | |  |
| Volume fraction water in susp. matter | | | | Fwater-susp | | 0,9 | | m3.m-3 | | D |
|  |  |  | |  | |  | |  | |  |
| Volume fraction solids in susp. Matter | | | | Fsolid-susp | | 0,1 | | m3.m-3 | | D |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
| Suspended matter-water partition coefficient | | | | Ksusp-water | | 7562,4 | | m3.m-3 | | O |
|  |  |  | |  | |  | |  | |  |
| Clocalwater,TIME1= Qleach,TIME1 /((1+Ksusp-water\* SUSPwater\*0,000001)\*(1000\*Vwater) | | | | | | | | | | |
|  |  |  | |  | |  | |  | |  |
| Environmental concentration in water TIME1 | | | | Clocalwater,TIME1 | | 9,06E-02 | | mg.L-1 | | O |
|  |  |  | |  | |  | |  | |  |
| Environmental concentration in water TIME2 | | | | Clocalwater,TIME2 | | 1,17E-02 | | mg.L-1 | | O |
|  |  |  | |  | |  | |  | |  |
| Environmental concentration in water TIME3 | | | | Clocalwater,TIME3 | | 7,70E-04 | | mg.L-1 | | O |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
|  |  |  | |  | |  | |  | |  |
| Predicted environmental concentration in sediment TIME1 | | | | PEClocalsed,TIME1 | | 5,96E+02 | | mg.kg-1wwt | | O |
|  |  |  | |  | |  | |  | |  |
| Predicted environmental concentration in sediment TIME2 | | | | PEClocalsed,TIME2 | | 7,72E+01 | | mg.kg-1wwt | | O |
|  |  |  | |  | |  | |  | |  |
| Predicted environmental concentration in sediment TIME3 | | | | PEClocalsed,TIME3 | | 5,06E+00 | | mg.kg-1wwt | | O |

#### Assessed substance: 2-Aminoethanol (MEA)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Emission estimation for treated wood in service (ESD § 4.3, p.65) - Emission scenario for UC 3 - Wood not covered, not in contact with ground, exposed to weather or subject to frequent wetting (ESD § 4.3.3, p.68)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) House scenario including removal processes (ESD Table 4.15, p.70, Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Leachable wood area | |  | AREAhouse | 125 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  |  |  |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should **not** be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment  period (service life) | **Vacuum pressure treatment** |  | TIME3 | **7300** | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 227,4 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 1308,4 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 1689,7 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Soil volume (wet) |  |  | Vsoil | 13 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the soil** | | | | | | | |
|  |  |  |  |  |  |  |  |
| removal from soil | |  | k | 9,90E-02 | d-1 | S | LN(2)/DT50 was used |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | **2,84E+04** | mg | O | **Qleach,TIME1** = AREAhouse \* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | **1,64E+05** | mg | O | **Qleach,TIME2** = AREAhouse \* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | **2,11E+05** | mg | O | **Qleach,TIME3**= AREAhouse \* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | Esoil,leach,TIME1 | **9,48E+02** | mg.d-1 | O | **Esoil,leach,TIME1** = AREAhouse \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | Esoil,leach,TIME2 | **4,48E+02** | mg.d-1 | O | **Esoil,leach,TIME2** = AREAhouse \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | Esoil,leach,TIME3 | **2,89E+01** | mg.d-1 | O | **Esoil,leach,TIME3** = AREAhouse \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | Clocalsoil,leach,TIME1 | **1,29E+00** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME1** = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | Clocalsoil,leach,TIME2 | **7,40E+00** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME2** = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | Clocalsoil,leach,TIME3 | **9,56E+00** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME3** = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| **For wood which was treated *in situ* emissions to soil can occur during the application itself and from leaching from treated wood in service. The total local concentration in soil is calculated below.** | | | | | | | |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local soil at the end of the initial assessment period | |  | Clocalsoil,total,TIME1 | **1,29E+00** | mg.kgwwt-1 | O | **Clocalsoil,total,TIME1** = Clocalsoil,brush + Clocalsoil,leach,TIME1 |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local soil at the end of the intermediate assessment period | |  | Clocalsoil,total,TIME2 | **7,40E+00** | mg.kgwwt-1 | O | **Clocalsoil,total,TIME2** = Clocalsoil,brush + Clocalsoil,leach,TIME2 |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local soil at the end of a longer assessment period | |  | Clocalsoil,total,TIME3 | **9,56E+00** | mg.kgwwt-1 | O | **Clocalsoil,total,TIME3** = Clocalsoil,brush + Clocalsoil,leach,TIME3 |
|  |  |  |  |  |  |  |  |
| **Considering removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **ESD Eq. 3.11**) Concentration in local soil after the initial assessment period | |  | Clocalsoil,TIME1 | **4,11E-01** | mg.kgwwt-1 | O | **Clocalsoil,TIME1** = [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k) - Clocalsoil,brush\_house] \* e-TIME1\*k |
|  |  |  |  |  |  |  |  |
| Concentration in local soil over the intermediate assessment period | |  | Clocalsoil,TIME2 | **2,05E-01** | mg.kgwwt-1 | O | **Clocalsoil,TIME2** = [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k) - Clocalsoil,brush\_house] \* e-TIME2\*k |
|  |  |  |  |  |  |  |  |
| **ESD Eq. 3.12**) Concentration in local soil over a longer duration | |  | Clocalsoil,TIME3 | **1,32E-02** | mg.kgwwt-1 | O | **Clocalsoil,TIME3** = [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k) - Clocalsoil,brush\_house] \* e-TIME3\*k |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | | | | | | | |
|  |  |  |  |  |  |  |  |
| **B) Noise barrier scenario including removal processes (ESD Table 4.17, p.74, Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area | |  | AREAnoise-barrier | 3000 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should **not** be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | **Vacuum pressure treatment** |  | TIME3 | **7300** | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 227,4 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 1308,4 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 1689,7 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Soil volume (wet) |  |  | Vsoil | 250 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| Fraction released to soil |  |  | Fsoil | 0,3 | [-] | D |  |
|  |  |  |  |  |  |  |  |
| Fraction released to the STP |  |  | FSTP | 0,7 | [-] | D |  |
|  |  |  |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the soil** | | | | | | |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| removal from soil | |  | k | 0,099021026 | d-1 | S | Value set in table A above. Editable in table A only. |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | **2,05E+05** | mg | O | **Qleach,TIME1** = AREAnoise-barrier \* FSoil \* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | **1,18E+06** | mg | O | **Qleach,TIME2** = AREAnoise-barrier \* FSoil \* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | **1,52E+06** | mg | O | **Qleach,TIME3** = AREAnoise-barrier \* FSoil \* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| **Emissions to soil** |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | Esoil,leach,TIME1 | **6,82E+03** | mg.d-1 | O | **Esoil,leach,TIME1** = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | Esoil,leach,TIME2 | **3,23E+03** | mg.d-1 | O | **Esoil,leach,TIME2** = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | Esoil,leach,TIME3 | **2,08E+02** | mg.d-1 | O | **Esoil,leach,TIME3** = AREAnoise-barrier \* Fsoil \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| **Emissions to STP** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the initial assessment period | |  | ESTP,TIME1 | **1,59E+04** | mg.d-1 | O | **ESTP,TIME1** = AREAnoise-barrier \* FSTP \* Q\*leach,TIME1/TIME1 |
|  |  |  |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the intermediate assessment period | |  | ESTP,TIME2 | **7,53E+03** | mg.d-1 | O | **ESTP,TIME2** = AREAnoise-barrier \* FSTP \* Q\*leach,TIME2/TIME2 |
|  |  |  |  |  |  |  |  |
| Local daily emission rate to the STP following leaching from treated wood during the longer assessment period | |  | ESTP,TIME3 | **4,86E+02** | mg.d-1 | O | **ESTP,TIME3** = AREAnoise-barrier \* FSTP \* Q\*leach,TIME3/TIME3 |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | Clocalsoil,leach,TIME1 | **4,82E-01** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME1** = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | Clocalsoil,leach,TIME2 | **2,77E+00** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME2** = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | Clocalsoil,leach,TIME3 | **3,58E+00** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME3** = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| **Considering removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **ESD Eq. 3.11**) Concentration in local soil after the initial assessment period | |  | Clocalsoil,TIME1 | **1,54E-01** | mg.kgwwt-1 | O | **Clocalsoil,TIME1** = [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] \* e-TIME1\*k |
|  |  |  |  |  |  |  |  |
| Concentration in local soil over the intermediate assessment period | |  | Clocalsoil,TIME2 | **7,67E-02** | mg.kgwwt-1 | O | **Clocalsoil,TIME2** = [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] \* e-TIME2\*k |
|  |  |  |  |  |  |  |  |
| **ESD Eq. 3.12**) Concentration in local soil over a longer duration | |  | Clocalsoil,TIME3 | **4,95E-03** | mg.kgwwt-1 | O | **Clocalsoil,TIME3** = [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] \* e-TIME3\*k |
| *1) S: data set; D: default; O: output; P: pick list* | | | | | | | |
|  |  |  |  |  |  |  |  |
| **C) Bridge over pond scenario including removal processes (ESD Table 4.18, p.76 and Table 3.8, p.31/32)** | | | | | | | |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| **For wood which is treated *in situ* emissions to soil can occur during the application itself and from leaching from the treated wood in service. Select below whether the scenario should cover *in situ* treatment or only leaching from wood in service. If *in situ* treatment is to be covered the emissions from application need to be calculated in advance (spreadsheet "PT8-prof&amateur in situ treatm"). Please note that *in situ* brushing is not possible for the noise barrier scenario.** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Cover *in situ* treatment ? | **No** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the day of application | |  | Clocalwater,brush\_bridge | **0,00E+00** | mg.l-1 | O | If *in situ* treatment is covered, this value has to be calculated in advance in the spreadsheet "PT8-prof&amateur in situ treatm"; once calculated, the value is automatically copied here. |
|  |  |  |  |  |  |  |  |
| Leachable wood area | |  | AREAbridge | 10 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period not dependent of the service life | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should **not** be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | **Vacuum pressure treatment** |  | TIME3 | **7300** | d | D/P | Pick-list: ESD § 4.3.2 (default values for service life of treated wood depend on the application method/process) |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 227,4 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 1308,4 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 1689,7 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Water volume under bridge |  |  | Vwater | 1000 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the water body** | | | | | |  |  |
|  |  |  |  |  |  |  |  |
| removal from water | |  | k | 4,62E-02 | d-1 | S | LN(2)/DT50 was used |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | **2,27E+03** | mg | O | **Qleach,TIME1** = AREAbridge \* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | **1,31E+04** | mg | O | **Qleach,TIME2** = AREAbridge \* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | **1,69E+04** | mg | O | **Qleach,TIME3** = AREAbridge \* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the initial assessment period | |  | Ewater,leach,TIME1 | **7,58E+01** | mg.d-1 | O | **Ewater,leach,TIME1** = AREAbridge \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over the intermediate assessment period | |  | Ewater,leach,TIME2 | **3,58E+01** | mg.d-1 | O | **Ewater,leach,TIME2** = AREAbridge \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission due to leaching over a longer duration | |  | Ewater,leach,TIME3 | **2,31E+00** | mg.d-1 | O | **Ewater,leach,TIME3** = AREAbridge \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the initial assessment period | |  | Clocalwater,leach,TIME1 | **2,27E-03** | mg.l-1 | O | **Clocalwater,leach,TIME1** = Qleach,TIME1 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of the intermediate assessment period | |  | Clocalwater,leach,TIME2 | **1,31E-02** | mg.l-1 | O | **Clocalwater,leach,TIME2** = Qleach,TIME2 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| Concentration in local water at the end of a longer assessment period | |  | Clocalwater,leach,TIME3 | **1,69E-02** | mg.l-1 | O | **Clocalwater,leach,TIME3** = Qleach,TIME3 \* 0.001 / Vwater |
|  |  |  |  |  |  |  |  |
| **For wood which was treated *in situ* emissions to water can occur during the application itself and from leaching from treated wood in service. The total local concentration in water is calculated below.** | | | | | | | |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local water at the end of the initial assessment period | |  | Clocalwater,total,TIME1 | **2,27E-03** | mg.l-1 | O | **Clocalwater,total,TIME1** = Clocalwater,brush+Clocalwater,leach,TIME1 |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local water at the end of the intermediate assessment period | |  | Clocalwater,total,TIME2 | **1,31E-02** | mg.l-1 | O | **Clocalwater,total,TIME2** = Clocalwater,brush+Clocalwater,leach,TIME2 |
|  |  |  |  |  |  |  |  |
| TOTAL concentration in local water at the end of a longer assessment period | |  | Clocalwater,total,TIME3 | **1,69E-02** | mg.l-1 | O | **Clocalwater,total,TIME3** = Clocalwater,brush+Clocalwater,leach,TIME3 |
|  |  |  |  |  |  |  |  |
| **Considering removal processes in the water body (Table 3.8, p.31/32)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **ESD Eq. 3.16)** Time weighted concentration in local water over the initial assessment period | |  | Clocalwater,TIME1 | **7,53E-04** | mg.l-1 | O | **Clocalwater,TIME1** = [Ewater,leach,TIME1/(Vwater\*k\*1000)] \* [1-(1-e-TIME1\*k)/(k\*TIME1)] |
|  |  |  |  |  |  |  |  |
| Time weighted concentration in local water over the intermediate assessment period | |  | Clocalwater,TIME2 | **7,30E-04** | mg.l-1 | O | **Clocalwater,TIME2** = [Ewater,leach,TIME2/(Vwater\*k\*1000)] \* [1-(1-e-TIME2\*k)/(k\*TIME2)] |
|  |  |  |  |  |  |  |  |
| **ESD Eq. 3.17)** Time weighted concentration in local water over a longer duration | |  | Clocalwater,TIME3 | **4,99E-05** | mg.l-1 | O | **Clocalwater,TIME3** = [Ewater,leach,TIME3/(Vwater\*k\*1000)] \* [1-(1-e-TIME3\*k)/(k\*TIME3)] |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Emission estimation for treated wood in service (ESD § 4.3, p.65) - Emission scenario for UC 4a - Wood in contact with the ground (ESD § 4.3.4, p.76)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **A) Transmission pole (ESD Table 4.19 p.78, Table 3.5, p.28 and Table 3.6, p.29)** | | | |  |  |  |  |
| **Input** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Leachable wood area above soil | |  | AREApole,above | 5,5 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Leachable wood area below soil |  |  | AREApole,below | 1,6 | m2 | D |  |
|  |  |  |  |  |  |  |  |
| Duration of the initial assessment period | |  | TIME1 | 30 | d | D |  |
|  | |  |  |  |  |  |  |
| Duration of an intermediate assessment period | |  | TIME2 | 365 | d | D | Follow up of the 2nd EU Leaching workshop: The calculation of Time 2 is currently only used for a validation/impact assessment; it should **not** be used for decision making! |
|  | |  |  |  |  |  |  |
| Duration of a longer assessment period (service life) | |  | TIME3 | 7300 | d | D | ESD § 4.3.2, #213, p.68 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the initial assessment period | |  | Q\*leach,TIME1 | 28559 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over the intermediate assessment period | |  | Q\*leach,TIME2 | 32363 | mg.m-2 | S |  |
|  | |  |  |  |  |  |  |
| Cumulative quantity of substance leached out of 1 m2 of treated wood over a longer assessment period | |  | Q\*leach,TIME3 | 61465 | mg.m-2 | S |  |
|  |  |  |  |  |  |  |  |
| Soil volume (wet) |  |  | Vsoil | 2,97 | m3 | D |  |
|  |  |  |  |  |  |  |  |
| Bulk density of wet soil |  |  | RHOsoil | 1700 | kgwwt.m-3 | D |  |
|  |  |  |  |  |  |  |  |
| **Additional information needed to estimate emissions taking into account removal processes in the soil** | | | | | | | |
|  |  |  |  |  |  |  |  |
| removal from soil | |  | k | 9,90E-02 | d-1 | D | LN(2)/DT50 was used |
|  |  |  |  |  |  |  |  |
| **Output** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Variable/parameter* |  |  | *Symbol* | *Value* | *Unit* | *S/D/O/P 1* | *References / Calculation formulas / Explanations* |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the initial assessment period | |  | Qleach,TIME1 | **2,03E+05** | mg | O | **Qleach,TIME1** = (AREApole,above + AREApole,below)\* Q\*leach,TIME1 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over the intermediate assessment period | |  | Qleach,TIME2 | **2,30E+05** | mg | O | **Qleach,TIME2** = (AREApole,above + AREApole,below)\* Q\*leach,TIME2 |
|  |  |  |  |  |  |  |  |
| Cumulative quantity of substance, leached over a longer assessment period | |  | Qleach,TIME3 | **4,36E+05** | mg | O | **Qleach,TIME3** = (AREApole,above + AREApole,below)\* Q\*leach,TIME3 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the initial assessment period | |  | Esoil,leach,TIME1 | **6,76E+03** | mg.d-1 | O | **Esoil,leach,TIME1** = (AREApole,above + AREApole,below) \* Q\*leach,TIME1 / TIME1 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over the intermediate assessment period | |  | Esoil,leach,TIME2 | **6,30E+02** | mg.d-1 | O | **Esoil,leach,TIME2** = (AREApole,above + AREApole,below) \* Q\*leach,TIME2 / TIME2 |
|  |  |  |  |  |  |  |  |
| Average daily emission of substance due to leaching over a longer duration | |  | Esoil,leach,TIME3 | **5,98E+01** | mg.d-1 | O | **Esoil,leach,TIME3** = (AREApole,above + AREApole,below) \* Q\*leach,TIME3 / TIME3 |
|  |  |  |  |  |  |  |  |
| **Without considering removal processes in the receiving environmental compartments** | | | | | | | |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the initial assessment period | |  | Clocalsoil,leach,TIME1 | **4,02E+01** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME1** = Qleach,TIME1 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of the intermediate assessment period | |  | Clocalsoil,leach,TIME2 | **4,55E+01** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME2** = Qleach,TIME2 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| Concentration in local soil at the end of a longer assessment period | |  | Clocalsoil,leach,TIME3 | **8,64E+01** | mg.kgwwt-1 | O | **Clocalsoil,leach,TIME3** = Qleach,TIME3 / (Vsoil \* RHOsoil) |
|  |  |  |  |  |  |  |  |
| **Considering removal processes in the soil (Table 3.5, p.28 and Table 3.6, p.29)** | | | | | | | |
|  |  |  |  |  |  |  |  |
| **ESD Eq. 3.11**) Concentration in local soil after the initial assessment period | |  | Clocalsoil,TIME1 | **1,32E+01** | mg.kgwwt-1 | O | **Clocalsoil,TIME1** = [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME1/(Vsoil \* RHOsoil \* k)] \* e-TIME1\*k |
|  |  |  |  |  |  |  |  |
| Concentration in local soil after the intermediate assessment period | |  | Clocalsoil,TIME2 | **1,44E+00** | mg.kgwwt-1 | O | **Clocalsoil,TIME2** = [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME2/(Vsoil \* RHOsoil \* k)] \* e-TIME2\*k |
|  |  |  |  |  |  |  |  |
| **ESD Eq. 3.12**) Concentration in local soil over a longer duration | |  | Clocalsoil,TIME3 | **1,31E-01** | mg.kgwwt-1 | O | **Clocalsoil,TIME3** = [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] - [Esoil,leach,TIME3/(Vsoil \* RHOsoil \* k)] \* e-TIME3\*k |
|  |  |  |  |  |  |  |  |
| *1) S: data set; D: default; O: output; P: pick list* | | | | | | | |

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 280

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : CHATEAUDUN

\* Meteo station : CHAT-M

\* Soil type : CHAT-S\_Soil

\* Crop calendar : CHAT-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : FOCUS

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.115

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 349.647 0.0000006 0.000

2 01-Jan-1908 31-Dec-1908 170.555 0.0000001 0.000

3 01-Jan-1909 31-Dec-1909 321.632 0.0000047 0.001

4 01-Jan-1910 31-Dec-1910 304.898 0.0000085 0.003

5 01-Jan-1911 31-Dec-1911 418.049 0.0000201 0.005

6 01-Jan-1912 31-Dec-1912 259.246 0.0000035 0.001

7 01-Jan-1913 31-Dec-1913 343.074 0.0000040 0.001

8 01-Jan-1914 31-Dec-1914 381.122 0.0000016 0.000

9 01-Jan-1915 31-Dec-1915 199.608 0.0000039 0.002

10 01-Jan-1916 31-Dec-1916 420.177 0.0000026 0.001

11 01-Jan-1917 31-Dec-1917 182.835 0.0000029 0.002

12 01-Jan-1918 31-Dec-1918 225.666 0.0000002 0.000

13 01-Jan-1919 31-Dec-1919 295.403 0.0000003 0.000

14 01-Jan-1920 31-Dec-1920 322.410 0.0000089 0.003

15 01-Jan-1921 31-Dec-1921 147.661 0.0000000 0.000

16 01-Jan-1922 31-Dec-1922 117.497 0.0000000 0.000

17 01-Jan-1923 31-Dec-1923 184.663 0.0000000 0.000

18 01-Jan-1924 31-Dec-1924 225.946 0.0000001 0.000

19 01-Jan-1925 31-Dec-1925 196.551 0.0000005 0.000

20 01-Jan-1926 31-Dec-1926 214.515 0.0000005 0.000

\* The average concentration of MEA closest to the 80th percentile is 0.001782 ug/L

\* End of PEARL REPORT: Leaching

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 281

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : HAMBURG

\* Meteo station : HAMB-M

\* Soil type : HAMB-S\_Soil

\* Crop calendar : HAMB-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : No

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.117

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 61.097 0.0000088 0.014

2 01-Jan-1908 31-Dec-1908 14.547 -0.0000027 0.000

3 01-Jan-1909 31-Dec-1909 197.059 0.0000362 0.018

4 01-Jan-1910 31-Dec-1910 225.661 0.0000362 0.016

5 01-Jan-1911 31-Dec-1911 206.159 0.0000349 0.017

6 01-Jan-1912 31-Dec-1912 415.362 0.0001013 0.024

7 01-Jan-1913 31-Dec-1913 447.797 0.0002099 0.047

8 01-Jan-1914 31-Dec-1914 202.845 0.0000370 0.018

9 01-Jan-1915 31-Dec-1915 266.318 0.0000807 0.030

10 01-Jan-1916 31-Dec-1916 272.402 0.0001236 0.045

11 01-Jan-1917 31-Dec-1917 162.944 0.0000170 0.010

12 01-Jan-1918 31-Dec-1918 137.798 0.0000197 0.014

13 01-Jan-1919 31-Dec-1919 262.216 0.0000686 0.026

14 01-Jan-1920 31-Dec-1920 263.899 0.0000504 0.019

15 01-Jan-1921 31-Dec-1921 101.459 0.0000012 0.001

16 01-Jan-1922 31-Dec-1922 -2.306 -0.0000010 0.000

17 01-Jan-1923 31-Dec-1923 208.543 0.0000315 0.015

18 01-Jan-1924 31-Dec-1924 173.929 0.0000545 0.031

19 01-Jan-1925 31-Dec-1925 347.039 0.0000782 0.023

20 01-Jan-1926 31-Dec-1926 411.646 0.0002276 0.055

\* The average concentration of MEA closest to the 80th percentile is 0.030830 ug/L

\* End of PEARL REPORT: Leaching

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 282

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : JOKIOINEN

\* Meteo station : JOKI-M

\* Soil type : JOKI-S\_Soil

\* Crop calendar : JOKI-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : No

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.242

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 104.163 0.0000104 0.010

2 01-Jan-1908 31-Dec-1908 98.890 0.0000279 0.028

3 01-Jan-1909 31-Dec-1909 186.912 0.0001198 0.064

4 01-Jan-1910 31-Dec-1910 345.861 0.0001167 0.034

5 01-Jan-1911 31-Dec-1911 156.983 0.0000225 0.014

6 01-Jan-1912 31-Dec-1912 198.539 0.0000421 0.021

7 01-Jan-1913 31-Dec-1913 379.139 0.0003239 0.085

8 01-Jan-1914 31-Dec-1914 152.608 0.0000954 0.063

9 01-Jan-1915 31-Dec-1915 292.208 0.0000393 0.013

10 01-Jan-1916 31-Dec-1916 312.571 0.0003486 0.112

11 01-Jan-1917 31-Dec-1917 215.976 0.0000287 0.013

12 01-Jan-1918 31-Dec-1918 86.029 0.0000301 0.035

13 01-Jan-1919 31-Dec-1919 17.532 0.0000035 0.020

14 01-Jan-1920 31-Dec-1920 -3.899 -0.0000026 0.000

15 01-Jan-1921 31-Dec-1921 0.653 -0.0000018 0.000

16 01-Jan-1922 31-Dec-1922 19.910 -0.0000007 0.000

17 01-Jan-1923 31-Dec-1923 361.777 0.0001894 0.052

18 01-Jan-1924 31-Dec-1924 443.310 0.0001556 0.035

19 01-Jan-1925 31-Dec-1925 169.727 0.0000195 0.011

20 01-Jan-1926 31-Dec-1926 83.212 0.0000167 0.020

\* The average concentration of MEA closest to the 80th percentile is 0.057447 ug/L

\* End of PEARL REPORT: Leaching

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 283

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : KREMSMUENSTER

\* Meteo station : KREM-M

\* Soil type : KREM-S\_Soil

\* Crop calendar : KREM-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : No

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.133

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 393.056 0.0000040 0.001

2 01-Jan-1908 31-Dec-1908 266.020 0.0000038 0.001

3 01-Jan-1909 31-Dec-1909 482.235 0.0000224 0.005

4 01-Jan-1910 31-Dec-1910 533.787 0.0000949 0.018

5 01-Jan-1911 31-Dec-1911 479.779 0.0000984 0.021

6 01-Jan-1912 31-Dec-1912 297.239 0.0000053 0.002

7 01-Jan-1913 31-Dec-1913 456.552 0.0000132 0.003

8 01-Jan-1914 31-Dec-1914 316.863 0.0000315 0.010

9 01-Jan-1915 31-Dec-1915 197.373 0.0000067 0.003

10 01-Jan-1916 31-Dec-1916 247.073 0.0000008 0.000

11 01-Jan-1917 31-Dec-1917 319.876 0.0000164 0.005

12 01-Jan-1918 31-Dec-1918 263.488 0.0000070 0.003

13 01-Jan-1919 31-Dec-1919 384.471 0.0000046 0.001

14 01-Jan-1920 31-Dec-1920 218.037 0.0000026 0.001

15 01-Jan-1921 31-Dec-1921 267.841 0.0000023 0.001

16 01-Jan-1922 31-Dec-1922 -1.617 0.0000002 0.000

17 01-Jan-1923 31-Dec-1923 -46.247 -0.0000004 0.000

18 01-Jan-1924 31-Dec-1924 375.384 0.0000253 0.007

19 01-Jan-1925 31-Dec-1925 200.881 0.0000110 0.005

20 01-Jan-1926 31-Dec-1926 249.922 0.0000129 0.005

\* The average concentration of MEA closest to the 80th percentile is 0.006103 ug/L

\* End of PEARL REPORT: Leaching

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 284

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : OKEHAMPTON

\* Meteo station : OKEH-M

\* Soil type : OKEH-S\_Soil

\* Crop calendar : OKEH-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : No

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.134

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 516.408 0.0000402 0.008

2 01-Jan-1908 31-Dec-1908 135.632 0.0000054 0.004

3 01-Jan-1909 31-Dec-1909 401.862 0.0000484 0.012

4 01-Jan-1910 31-Dec-1910 271.998 0.0000382 0.014

5 01-Jan-1911 31-Dec-1911 455.551 0.0001180 0.026

6 01-Jan-1912 31-Dec-1912 458.739 0.0000882 0.019

7 01-Jan-1913 31-Dec-1913 582.500 0.0000606 0.010

8 01-Jan-1914 31-Dec-1914 303.718 0.0000287 0.009

9 01-Jan-1915 31-Dec-1915 256.445 0.0000417 0.016

10 01-Jan-1916 31-Dec-1916 489.267 0.0000553 0.011

11 01-Jan-1917 31-Dec-1917 272.472 0.0000261 0.010

12 01-Jan-1918 31-Dec-1918 437.262 0.0000668 0.015

13 01-Jan-1919 31-Dec-1919 569.851 0.0000811 0.014

14 01-Jan-1920 31-Dec-1920 369.111 0.0000683 0.018

15 01-Jan-1921 31-Dec-1921 302.713 0.0000114 0.004

16 01-Jan-1922 31-Dec-1922 386.288 0.0000440 0.011

17 01-Jan-1923 31-Dec-1923 602.171 0.0000989 0.016

18 01-Jan-1924 31-Dec-1924 520.372 0.0000352 0.007

19 01-Jan-1925 31-Dec-1925 316.136 0.0000321 0.010

20 01-Jan-1926 31-Dec-1926 503.214 0.0002752 0.055

\* The average concentration of MEA closest to the 80th percentile is 0.017454 ug/L

\* End of PEARL REPORT: Leaching

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 285

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : PIACENZA

\* Meteo station : PIAC-M

\* Soil type : PIAC-S\_Soil

\* Crop calendar : PIAC-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : FOCUS

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.103

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 568.118 0.0000537 0.009

2 01-Jan-1908 31-Dec-1908 421.490 0.0000474 0.011

3 01-Jan-1909 31-Dec-1909 402.541 0.0000559 0.014

4 01-Jan-1910 31-Dec-1910 573.892 0.0003369 0.059

5 01-Jan-1911 31-Dec-1911 441.854 0.0000366 0.008

6 01-Jan-1912 31-Dec-1912 365.648 0.0000252 0.007

7 01-Jan-1913 31-Dec-1913 29.635 -0.0000073 0.000

8 01-Jan-1914 31-Dec-1914 803.785 0.0002959 0.037

9 01-Jan-1915 31-Dec-1915 75.617 -0.0000055 0.000

10 01-Jan-1916 31-Dec-1916 467.658 0.0000347 0.007

11 01-Jan-1917 31-Dec-1917 208.980 0.0000503 0.024

12 01-Jan-1918 31-Dec-1918 214.665 0.0000191 0.009

13 01-Jan-1919 31-Dec-1919 166.241 -0.0000027 0.000

14 01-Jan-1920 31-Dec-1920 166.862 0.0000029 0.002

15 01-Jan-1921 31-Dec-1921 109.718 0.0000002 0.000

16 01-Jan-1922 31-Dec-1922 190.802 0.0000124 0.007

17 01-Jan-1923 31-Dec-1923 111.404 -0.0000026 0.000

18 01-Jan-1924 31-Dec-1924 449.764 0.0001012 0.023

19 01-Jan-1925 31-Dec-1925 411.370 0.0000188 0.005

20 01-Jan-1926 31-Dec-1926 513.578 0.0000339 0.007

\* The average concentration of MEA closest to the 80th percentile is 0.018197 ug/L

\* End of PEARL REPORT: Leaching

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 286

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : PORTO

\* Meteo station : PORT-M

\* Soil type : PORT-S\_Soil

\* Crop calendar : PORT-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : FOCUS

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.151

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 577.879 0.0000286 0.005

2 01-Jan-1908 31-Dec-1908 729.397 0.0000448 0.006

3 01-Jan-1909 31-Dec-1909 921.598 0.0002390 0.026

4 01-Jan-1910 31-Dec-1910 774.654 0.0001563 0.020

5 01-Jan-1911 31-Dec-1911 902.974 0.0002324 0.026

6 01-Jan-1912 31-Dec-1912 516.754 0.0000263 0.005

7 01-Jan-1913 31-Dec-1913 485.365 0.0000043 0.001

8 01-Jan-1914 31-Dec-1914 684.566 0.0000514 0.008

9 01-Jan-1915 31-Dec-1915 549.059 0.0000213 0.004

10 01-Jan-1916 31-Dec-1916 842.122 0.0001362 0.016

11 01-Jan-1917 31-Dec-1917 714.370 0.0001157 0.016

12 01-Jan-1918 31-Dec-1918 767.080 0.0001466 0.019

13 01-Jan-1919 31-Dec-1919 916.166 0.0000789 0.009

14 01-Jan-1920 31-Dec-1920 548.145 0.0000738 0.013

15 01-Jan-1921 31-Dec-1921 394.871 0.0000164 0.004

16 01-Jan-1922 31-Dec-1922 574.858 0.0000433 0.008

17 01-Jan-1923 31-Dec-1923 681.308 0.0000750 0.011

18 01-Jan-1924 31-Dec-1924 298.926 0.0000025 0.001

19 01-Jan-1925 31-Dec-1925 352.114 0.0000117 0.003

20 01-Jan-1926 31-Dec-1926 460.780 0.0000071 0.002

\* The average concentration of MEA closest to the 80th percentile is 0.017650 ug/L

\* End of PEARL REPORT: Leaching

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 287

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : SEVILLA

\* Meteo station : SEVI-M

\* Soil type : SEVI-S\_Soil

\* Crop calendar : SEVI-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : FOCUS

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.108

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 136.814 0.0000001 0.000

2 01-Jan-1908 31-Dec-1908 265.780 0.0000013 0.000

3 01-Jan-1909 31-Dec-1909 402.058 0.0000076 0.002

4 01-Jan-1910 31-Dec-1910 264.603 0.0000055 0.002

5 01-Jan-1911 31-Dec-1911 435.399 0.0000138 0.003

6 01-Jan-1912 31-Dec-1912 133.154 -0.0000004 0.000

7 01-Jan-1913 31-Dec-1913 -20.670 -0.0000003 0.000

8 01-Jan-1914 31-Dec-1914 194.839 0.0000006 0.000

9 01-Jan-1915 31-Dec-1915 329.739 0.0000430 0.013

10 01-Jan-1916 31-Dec-1916 283.109 0.0000113 0.004

11 01-Jan-1917 31-Dec-1917 179.595 0.0000069 0.004

12 01-Jan-1918 31-Dec-1918 165.223 0.0000004 0.000

13 01-Jan-1919 31-Dec-1919 314.551 0.0000023 0.001

14 01-Jan-1920 31-Dec-1920 80.796 0.0000001 0.000

15 01-Jan-1921 31-Dec-1921 408.336 0.0000301 0.007

16 01-Jan-1922 31-Dec-1922 266.666 0.0000257 0.010

17 01-Jan-1923 31-Dec-1923 140.641 0.0000006 0.000

18 01-Jan-1924 31-Dec-1924 117.516 -0.0000001 0.000

19 01-Jan-1925 31-Dec-1925 100.845 0.0000000 0.000

20 01-Jan-1926 31-Dec-1926 75.734 0.0000000 0.000

\* The average concentration of MEA closest to the 80th percentile is 0.003925 ug/L

\* End of PEARL REPORT: Leaching

\* PEARL REPORT: Header

\* Results from the PEARL model (c) Alterra, PBL and RIVM

\* PEARL kernel version : 3.1.2

\* SWAP kernel version : swap3234

\* PEARL created on : 18-Feb-2011

\*

\* PEARL was called from : FOCUSPEARL,version 4.4.4

\* Working directory : C:\tools\Pearldb

\* Run ID : 288

\* Input file generated on : 18-01-2021

\* ------------------------------------------------------------------------------

\*

\* Location : THIVA

\* Meteo station : THIV-M

\* Soil type : THIV-S\_Soil

\* Crop calendar : THIV-GRASS

\* Substance : MEA

\* Application scheme : Wolmanit-grass

\* Deposition scheme : No

\* Irrigation scheme : FOCUS

\*

\* End of PEARL REPORT: Header

\* PEARL REPORT: Leaching

\* Start date : 01-Jan-1901

\* End date : 31-Dec-1926

\* Target depth : 1.00 m

\* Annual incorporation at 01-Jan; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Feb; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Mar; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Apr; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-May; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Jun; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Sep; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Oct; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Nov; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Annual incorporation at 01-Dec; dosage = 0.0038 kg.ha-1; depth = 0.10 m

\* Leaching summary for compound MEA

\* Molar mass (g.mol-1) : 61.1

\* Saturated vapour pressure (Pa) : 50.0 ; measured at (C) 20.0

\* Solubility in water (mg.L-1) : 0.100E+07; measured at (C) 20.0

\* Half-life (d) : 7.0; measured at (C) 12.0

\* Kom (coef. for sorption on organic matter) (L.kg-1) : 8.7

\* KF (overall sorption coefficient of the target layer) (L.kg-1) : 0.785E-01

\* Freundlich exponent (-) : 1.00

\* ----------------------------------------------------------------------------------------------------------------------------------

\* Period From To Water percolated Substance leached Average substance

\* number below target depth (mm) below target depth (kg/ha) concentration in water

\* at target depth (ug/L)

\* ----------------------------------------------------------------------------------------------------------------------------------

1 01-Jan-1907 31-Dec-1907 315.830 0.0000031 0.001

2 01-Jan-1908 31-Dec-1908 266.198 0.0000069 0.003

3 01-Jan-1909 31-Dec-1909 72.025 0.0000001 0.000

4 01-Jan-1910 31-Dec-1910 268.084 0.0000017 0.001

5 01-Jan-1911 31-Dec-1911 297.413 0.0000039 0.001

6 01-Jan-1912 31-Dec-1912 174.557 0.0000087 0.005

7 01-Jan-1913 31-Dec-1913 283.168 0.0000012 0.000

8 01-Jan-1914 31-Dec-1914 173.826 0.0000013 0.001

9 01-Jan-1915 31-Dec-1915 321.966 0.0000216 0.007

10 01-Jan-1916 31-Dec-1916 123.852 0.0000130 0.011

11 01-Jan-1917 31-Dec-1917 293.147 0.0000018 0.001

12 01-Jan-1918 31-Dec-1918 188.365 0.0000007 0.000

13 01-Jan-1919 31-Dec-1919 179.958 0.0000002 0.000

14 01-Jan-1920 31-Dec-1920 336.977 0.0000036 0.001

15 01-Jan-1921 31-Dec-1921 15.471 -0.0000001 0.000

16 01-Jan-1922 31-Dec-1922 64.743 -0.0000002 0.000

17 01-Jan-1923 31-Dec-1923 146.214 0.0000005 0.000

18 01-Jan-1924 31-Dec-1924 14.002 0.0000000 0.000

19 01-Jan-1925 31-Dec-1925 49.550 0.0000000 0.000

20 01-Jan-1926 31-Dec-1926 34.810 0.0000000 0.000

\* The average concentration of MEA closest to the 80th percentile is 0.001950 ug/L

\* End of PEARL REPORT: Leaching

## New information on the active substance

No new information available.

## Residue behaviour

No new information available

## Summaries of the efficacy studies (B.6.7-01 - B6.7-09)

The summaries of the efficacy studies are presented in the IUCLID-Dossier for the Wolmanit CX-8WB\_family.

## Confidential annex

Please confer to separate document.

## Other

### **Reference list (excluding list of studies, cf. to chapter 3.1)**

Austria 2013, Assessment Report Cu-HDO, Product type 8, 13th December 2013; Available at: <https://echa.europa.eu/documents/10162/8aa74693-d291-9eb7-ecfe-1a21a4f41cf2>)

Becker G. 1964, Die Wirksamkeit von Schutzmitteln gegen holzzerstörende Käfer und ihre Beständigkeit; Anzeiger für Schädlingskunde, December 1964, Volume 37, Issue 12, pp 177–183

Becker G. 1967, Wirksamkeit von Kupfer-Verbindungen und Kupfer enthaltenden Holzschutz-Salzgemischen gegen Hausbockkäfer-Larven (Efficacy of cupric compounds and cupric preservative salt mixtures against Hylotrupes larvae); (Holz als Roh- und Werkstoff, November 1967, Volume 25, Issue 11, pp 416–421)

Biesinger, K.E., Stokes, G.N., 1986. Effects of synthetic polyelectrolytes on selected aquatic organisms. J. Water Pollut. Control Fed. 58, 207-213.

Boethling, R.S., Nabholz, J.V., 1997. Environmental assessment of polymers under the U.S. Toxic Substances Control Act, in: Hamilton, J.D., Sutcliffe, R. (Eds.), Ecological assessment polymers: Strategies for product stewardship and regulatory programs. Van Nostrand Reinhold, New York, pp. 187-234.

Cary, G.A., McMahon, J.A., Kuc, W.J., 1987. The effect of suspended solids and naturally occurring dissolved organics in reducing the acute toxicities of cationic polyelectrolytes to aquatic organisms. Environ. Toxicol. Chem. 6, 469-474.

Commission Directive 2006/15/EC of 7 February 2006 establishing a second list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Directives 91/322/EEC and 2000/39/EC (Text with EEA relevance) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32006L0015>

Cumming, J., Hawker, D.W., Chapman, H., Nugent, K., 2011. Sorption of quaternary ammonium compounds to humic acid. Water Air Soil Poll. 214, 5-11.

EC 2002, Human Exposure to Biocidal Products (TNsG June 2002), User guidance version 1

EC 2005, Report of the Leaching Workshop (open session), June 2005;

<https://echa.europa.eu/documents/10162/16908203/pt8_leaching_workshop_2005_en.pdf>

EC 2008, HEEG Opinion 1 on the use of available data and models for the assessment of the exposure of operators during the loading of products into vessels or systems in industrial scale

EC 2011, HEEG Opinion 13 Opinion on Assessment of Inhalation Exposure of Volatilised Biocide Active Substance

ECETOC 2010, Guidance on Assessment Factors to Derive a DNEL, Technical Report Nr. 110. Oktober, 2010. ISSN-2079-1526-110

ECHA 2008, Voluntary risk assessment reports - Copper and Copper Compounds

<http://echa.europa.eu/de/copper-voluntary-risk-assessment-reports>

ECHA 2012, Guidance on information requirements and chemical safety assessment. Chapter R.8: Characterisation of dose (concentrations)-response for human health, V 2.1, November 2012

ECHA 2014a, Committee for Risk Assessment RAC, Opinion proposing harmonised classification and labelling at EU level of copper(II) carbonate--copper(II) hydroxide (1:1) Adopted: 04. December 2014; Available at: <https://echa.europa.eu/documents/10162/0e017799-6d68-7498-9aff-799b80ca0475>

ECHA 2014b, Follow-up of the 2nd EU Leaching Workshop on wood preservatives, September 2014

ECHA 2015a, Biocides Human Health Exposure Methodology, Version 1

ECHA, 2015b, HEAdhoc Recommendation no. 5 *Non-professional use of antifouling paints: exposure assessment for a toddler*

ECHA 2017a, Recommendation no. 6 of the BPC Ad hoc Working Group on Human Exposure Methods and models to assess exposure to biocidal

ECHA 2017b, Guidance on the Biocidal Products Regulation, Volume III Human Health - Assessment & Evaluation (Parts B+C) Version 4.0

ECHA 2017c, Guidance on the Biocidal Products Regulation. Volume IV Environment - Assessment and Evaluation (Parts B + C), Version 2.0, ECHA October 2017

ECHA 2018a, Guidance on the Biocidal Products Regulation Volume II Efficacy – Assessment and Evaluation (Parts B+C) Version 3.0 April 2018

ECHA 2018b, Committee for Risk Assessment RAC, Opinion proposing harmonised classification and labelling at EU level of bis(N-hydroxy-N-nitrosocyclohexylaminato-O,O')copper; bis(N-cyclohexyl-diazenium-dioxy)-copper; [Cu-HDO, EC no. 239-703-4], CLH-O-0000001412-86-249/F; Adopted: 30 November 2018; Available at: <https://echa.europa.eu/documents/10162/559efa48-ceaa-65f9-03a4-1a762112e55f>

EFSA 2017, Guidance on dermal absorption, European Food Safety Authority. EFSA Journal 2017;15(6):4873; Available at:

<https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2017.4873>

EFSA 2018, Peer review of the pesticide risk assessment of the active substance copper compounds copper(I), copper(II) variants namely copper hydroxide, copper oxychloride, tribasic copper sulfate, copper(I) oxide, Bordeaux mixtureEFSA Journal banner, Conclusion on Pesticides Peer Review, EFSA Journal, Volume 16, Issue 1, 2018. Available at: https://doi.org/10.2903/j.efsa.2018.5152|

EMA, 2015, Guideline on risk characterisation and assessment of maximum residue limits (MRL) for biocides, Committee for Medicinal Products for Veterinary Use (CVMP)

EMA/CVMP/SWP/90250/2010, 15 January 2015

EMA, 2016, European public MRL assessment report (EPMAR) Copper carbonate (all food producing species) EMA/CVMP/758734/201525 Committee for Medicinal Products for Veterinary Use, May 2016. Available at: https://www.ema.europa.eu/en/documents/mrl-report/copper-carbonate-european-public-maximum-residue-limit-assessment-report-epmar-cvmp\_en.pdf

France 2011, Assessment Report Basic copper carbonate, Product type 8. Available at: http://dissemination.echa.europa.eu/Biocides/ActiveSubstances/0006-08/0006-08\_Assessment\_Report.pdf, 2018-23-04

Goettsche, R., Reuther, W., 1995. Wood preserving agents containing polymeric nitrogen compounds and metal fixing acids (EP0482433B1), European Patent Office.

Goodrich, M.S., Dulak, L.H., Friedman, M.A., Lech, J.J., 1991. Acute and long-term toxicity of water-soluble cationic polyelectrolytes to rainbow trout (Oncorhynchus mykiss) and the modification of toxicity by humic acid. Environ. Toxicol. Chem. 10, 509-515.

Hall, W.S., Mirenda, R.J., 1991. Acute toxicity of wastewater treatment polymers to Daphnia pulex and the fathead minnow (Pimephales promelas) and the effects of humic acid on polymer toxicity. J. Water Pollut. Control Fed. 63, 895-899.

Hamilton, J.D., Reinert, K.H., Freeman, M.B., 1994. Aquatic risk assessment of polymers. Environ. Sci. Technol. 28, 186A-92A.

Harrow K.M. 1954, Toxicity of Boliden Salt BIS-S, Copper Sulphate, and Celcure to the Common House Borer Anobium punctatum De Geer; New Zealand. J. Sci. and Technol., Sect. B36 (1954) S. 277/280

Kroner, S.M., Cozzie, D.A., 1999. Data collection for the hazardous waste identification rule Section 6.0 surface water data. Center for Environmental Analysis, Research Triangle Institute, Under Contract No. 68-W-98-085 for U.S. Environmental Protection Agency. Office of Solid Waste, Washington DC.

Liber, K., Weber, L., Lévesque, C., 2005. Sublethal toxicity of two wastewater treatment polymers to lake trout fry (Salvelinus namaycush). Chemosphere 61, 1123-1133.

Muir, M.M., Kosteretz, K.G., Lech, J.J., 1997. Localization, depuration, bioaccumulation and impairment of ion regulation associated with cationic polymer exposure in rainbow trout (Oncorhynchus mykiss). Xenobiotica 10, 1005-1014.

Narita, T., Ohtakeyama, R., Matsukata, M., Gong, J.P., Osada, Y., 2001. Kinetic study of cell disruption by ionic polymers with varied charge density. Colloid Polym. Sci. 279, 178-183.

Nabholz, J.V., Zeeman, M.G., 1991. Environmental concerns of polymers. Memorandum. Environmental Effects Branch, Health and Environmental Review decision (TS-796). US- Environmental Protection Agency, Washington DC.

Nabholz, J.V., Miller, P., Zeeman. M.G., 1993. Environmental risk assessment of new chemicals under the toxic substances control act (TSCA) section five, in: Landis, W.G., Hughes, J.S., Lewis, M.A. (Eds.), Environmental Toxicology and Risk Assessment: ASTM STP 1179. American Society for Testing and Materials, Philadelphia, pp. 40-55.

Nolte, T.M., Peijnenburg, W.J.G.M., Hendriks, A.J., van de Meent, D., 2017. Quantitative structure-activity relationships for green algae growth inhibition by polymer particles. Chemosphere 179, 49-58.

OECD 2007, Test No. 313: Estimation of Emissions from Preservative - Treated Wood to the Environment: Laboratory Method for Wooden Commodities that are not Covered and are in Contact with Fresh Water or Seawater, OECD Guidelines for the Testing of Chemicals, Section 3, OECD Publishing, Paris

OECD 2013a, OECD Series on Emission Scenario Documents Number 2. Revised Emission Scenario Document for Wood Preservatives, Paris, France.

OECD 2013b, SIDS INITIAL ASSESSMENT PROFILE, 2-Aminoethanol, US/ICCA, CoCAM 5, 15-17 October 2013

Oeztekin, N., Alemdar, A., Guengoer, N., Erim, F.B., 2002. Adsorption of polyethyleneimine from aqueous solutions on bentonite clays. Materials Letters 55, 73-76.

Pirot F., Panisset F., Agache P. & Humbert P. 1996a: Simultaneous Absorption of Copper and Zinc through Human Skin in vitro. Skin Pharmacol. 9: 43-52 (published).

Pirot F., Millet J., Kalia Y.N. & Humbert P., 1996b: In vitro Study of Percutaneous Absorption, Cutaneous Bioavailability and Bioequivalence of Zinc and Copper from Five Topical Formulations. Skin Pharmacol. 9: 259-269 (published).

Podoll, R.T., Irwin, K.C., Brendlinger, S., 1987. Sorption of water‐soluble oligomers on sediments. Environ. Sci. Tech. 21, 562-568.

RAC 2014, RAC Opinion proposing harmonised classification and labelling at EU level of copper(II) carbonate--copper(II) hydroxide (1:1), Committee for Risk Assessment, December, 2014.

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006; <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008R1272-20170101>

Rowland, C.D., Burton, G.A., Morrison S.M., 2000. Implication of polymer toxicity in a municipal wastewater effluent. Environ. Toxicol. Chem. 19, 2136-2139.

Sobek, S., Tranvik, L.J., Prairie, Y.T., Kortelainen, P., Cole, J.J., 2007. Patterns and regulation of dissolved organic carbon: An analysis of 7,500 widely distributed lakes. Limnol. Oceanogr., 52, 1208-1219.

Spain 2017, SUBSTANCE EVALUATION REPORT, 2-Ethylhexanoic acid (2-EHA) EC Number(s): 205-743-6, CAS Number(s): 149-57-5, V3, June 2017

Thurman, F.M., 1985. Organic geochemistry of natural waters. Martinus Nijhoff/Dr. W. Junk Publishers, Boston.

U.S. EPA (United States Environmental Protection Agency)., 1996. Fish Acute Toxicity Mitigated by Humic Acid. Ecological Effects Test Guidelines OPPTS 850.1085. EPA 712–C–96–117

U.S. EPA (United States Environmental Protection Agency)., 2016. Interpretive Assistance Document for Assessment of Polymers. Sustainable Futures Summary Assessment. United States Environmental Protection Agency, Washington.

UK 2016a, SUBSTANCE EVALUATION CONCLUSION DOCUMENT, 2-AMINOETHANOL, EC No 205-483-3, CAS No 141-43-5, September 2016; Available at: <https://echa.europa.eu/documents/10162/19767d4b-853a-9d07-77f0-4b86eaaeca97>, last access 2019-05-8

UK 2016b, SUBSTANCE EVALUATION REPORT, 2-AMINOETHANOL, EC Number(s): 205-483-3, CAS Number(s): 141-43-5, V2, September 2016

LEGAL NORMS:

Regulation (EC) No 1272/2008: Comission Regulation (EU) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging ofsubstances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006; Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008R1272-20170101>

Regulation (EU) No 528/2012: Comission Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products; Available at: <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32012R0528>

Regulation (EU) No 2017/2100 of the European Parliament and of the Council of 04 December 2017 on setting out scientific criteria for the determination of endocrine-disrupting properties pursuant to Regulation (EU) No 528/2012 of the European Parliament and Council; Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2100&from=EN>

1. Calculated from Worker DNEL\_long-term\_inhalation\*human respiration volume under light activity for workers (wRV) of 10 m3/person / body weight of 60 kg. Respiratory volume is taken from ECHA (2012). [↑](#footnote-ref-2)
2. Calculated from general public DNEL\_long-term\_inhalation \*human respiration volume for 24 h of 20 m3/person / body weight of 60 kg. Respiratory volume is taken from ECHA (2012). [↑](#footnote-ref-3)
3. <https://echa.europa.eu/documents/10162/559efa48-ceaa-65f9-03a4-1a762112e55f> [↑](#footnote-ref-4)
4. <https://echa.europa.eu/documents/10162/0e017799-6d68-7498-9aff-799b80ca0475> [↑](#footnote-ref-5)
5. WCCE Cu-Carb.: 0.0048645 mg/kg bw/d or WCCE Cu in Cu-Carb.: 0,00279417 (=0,0048645\*(63,5\*2)/221,1) mg/kg bw/d [↑](#footnote-ref-6)
6. <https://echa.europa.eu/de/ed-assessment> [↑](#footnote-ref-7)
7. <https://echa.europa.eu/de/candidate-list-table> [↑](#footnote-ref-8)
8. <https://echa.europa.eu/pact> [↑](#footnote-ref-9)
9. <https://actor.epa.gov/edsp21/> [↑](#footnote-ref-10)
10. <https://echa.europa.eu/documents/10162/19767d4b-853a-9d07-77f0-4b86eaaeca97> [↑](#footnote-ref-11)
11. <https://hpvchemicals.oecd.org/ui/handler.axd?id=27D71248-4BE0-45AD-81BC-069B0FE7839C> [↑](#footnote-ref-12)
12. <https://actor.epa.gov/dashboard/> [↑](#footnote-ref-13)