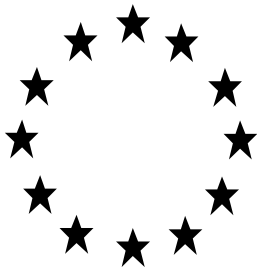
Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products

Evaluation of active substances

Assessment Report



Chlorocresol (CMK)

Product-type PT 6
(Preservatives for products during storage)

April 2016 ; Revised November 2017

France

CONTENTS

1 STATEMENT OF SUBJECT MATTER AND PURPOSE

1.1 Procedure followed

This assessment report has been established as a result of the evaluation of the active substance chlorocresol (also referred to as p-chloro-m-cresol or CMK) as product-type 6 (preservatives for products during storage), carried out in the context of the work programme for the review of existing active substances provided for in Article 89 of Regulation (EU) No 528/2012, with a view to the possible approval of this substance.

Chlorocresol (CAS no. 59-50-7) was notified as an existing active substance, by LANXESS Deutschland GmbH hereafter referred to as the applicant, in product-type 6.

Commission Regulation (EC) No 1062/2014 of 4 August 2014[1] lays down the detailed rules for the evaluation of dossiers and for the decision-making process.

On 27th of July 2007, French competent authorities received a dossier from LANXESS Deutschland GmbH. The Rapporteur Member State accepted the dossier as complete for the purpose of the evaluation on 5th of February 2008.

On 18th of December 2013, the Rapporteur Member State submitted to the Agency (ECHA) and the applicant a copy of the evaluation report, hereafter referred to as the competent authority report.

In order to review the competent authority report and the comments received on it, consultations of technical experts from all Member States (peer review) were organised by the the "Agency" (ECHA). Revisions agreed upon were presented at the Biocidal Products Committee and its Working Groups meetings and the competent authority report was amended accordingly.

1.2 Purpose of the assessment report

The aim of the assessment report is to support the opinion of the Biocidal Products Committee and a decision on the approval of p-chloro-m-cresol for product-type 6, and, should it be approved, to facilitate the authorisation of individual biocidal products. In the evaluation of applications for product-authorisation, the provisions of Regulation (EU) No 528/2012 shall be applied, in particular the provisions of Chapter IV, as well as the common principles laid down in Annex VI.

For the implementation of the common principles of Annex VI, the content and conclusions of this assessment report, which is available from the Agency web-site shall be taken into account.

However, where conclusions of this assessment report are based on data protected under the provisions of Regulation (EU) No 528/2012, such conclusions may not be used to the benefit of another applicant, unless access to these data for that purpose has been granted to that applicant.

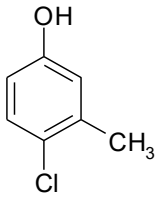
[1] COMMISSION DELEGATED REGULATION (EU) No 1062/2014 of 4 August 2014 on the work programme for the systematic examination of all existing active substances contained in biocidal products referred to in Regulation (EU) No 528/2012 of the European Parliament and of the Council. OJ L 294, 10.10.2014, p. 1

2 OVERALL SUMMARY AND CONCLUSIONS

2.1 Presentation of the Active Substance

2.1.1 Identity

Table 2.1-1: Identification of the active substance

CAS-No.	59-50-7
EINECS-No.	200-431-6
Other No. (CIPAC, ELINCS)	Not allocated
IUPAC Name	4-Chloro-3-methylphenol
CAS Name	Phenol, 4-Chloro-3-methyl-
Common name Synonyms	Common name: chlorocresol EINECS name: Chlorocresol Trade name: Preventol CMK CMK, PCMC
Molecular formula	C_7H_7ClO
SMILES	Oc(ccc(c1C)Cl)c1
Structural formula	
Molecular weight (g/mol)	142.6 g/mol

Chlorocresol (CMK) is an active substance with a specified minimal purity of 99.8%.
The analysis of representative production batches of the active substance were provided.
The relevant impurity m-cresol specification is 0.1%.
Considering classification of m-cresol and its content in the active substance (0.1%), m-cresol is not considered as a substance of concern for toxicological point of view.

The value of dissociation constant of 9.4 indicates that CMK can be found in salt form at higher pH levels. The active substance is the acid form of CMK.

All studies used to set physico-chemical, toxicological and ecotoxicological values were performed on the acid form and are consistent with a purity of production of 99.9% (nominal value found in the 5-batch analysis).

The toxicological and ecotoxicological tests cover the technical specifications. There is no relevant impurity in the technical CMK, except the m-cresol which is not of toxicological concern. Specifications for the reference source are established.

In the text of this report, when p-chloro-m-cresol is mentioned, it refers to the active substance chlorocresol.

2.1.2 Physico-chemical properties

CMK is a nearly white solid with a slightly phenolic odor which melts at 64.2°C and decomposes around 240°C. It has a relative density of 1.335 and a bulk density of 570-670 kg/m^3.

It has a vapor pressure of 1.4×10^{-03} Pa and the Henry's Law Constant is 5.87×10^{-05} $Pa\times m^3\times mol^{-1}$ at pH 7 and 20°C.

CMK has a dissociation constant of 9.4 ± 0.1 at 20 °C and its solubility in water at 20 °C varies from 3.3 g/L at pH 5to 4.1 g/L at pH 9. CMK is also soluble in n heptane (8.5 g/L) and in p-Xylene, 1,2-Dichloroethane, 1-octanol, 2-propanol, acetone and ethyl acetate (> 200g/L).

Log Pow is to be confirmed before product authorization stage. Data were provided in July 2017 by the applicant. The new study performed is acceptable and enables to set a log Pow value of 2.73 at 25°C.

CMK is not highly flammable, does not have oxidizing and explosive properties and does not undergo spontaneous combustion. CMK is not surface active.

CMK is stable in container materials such as paper, glass, PE, steel (zinc coated) and high-grade steel.

2.1.3 Methods of analysis

Adequate methodology exists for the determination of the active substance and the known impurities in the technical active substance.

Adequate methodology exists for the determination of the active substance in soil, water, air.

No analytical method is submitted for the determination of CMK residues in animal and human body fluids and tissues because the active substance is not classified as toxic or highly toxic.

Analytical methods for the determination of CMK in potentially (directly or indirectly) exposed food and feedstuffs will be required when MRL[2] will be set.

2.2 Presentation of the Representative product

2.2.1 Identification of the biocidal product

Table 2.2-1: Identification of the biocidal product

Trade name:	Preventol CMK	
Manufacturer's development code number:	Product number: 430587	
Ingredient of preparation	**Function**	**Content [% (w/w)]**
p-chloro-m-cresol	Active substance	100%
The other ingredients of the biocidal product are confidential.	Please refer to the confidential part of the Competent Authority Report	
Physical state and nature of the preparation:	Nearly white solid pellets with characteristic smell.	
Nature of the preparation:	XX (other)	

Preventol CMK is the active substance as manufactured and contains the active ingredient p-chloro-m-cresol (CMK) with a specified minimal purity of 99.8%.

[2] MLR : Maximum Residue Level

2.2.2 Physico-chemical properties

Preventol CMK is stable at ambient and elevated temperatures (54 °C) over a 14-day period. Its pH is 5.6 at 22.9 °C.

Preventol CMK is not flammable or auto-flammable and has neither oxidizing nor explosive properties.

Technical properties of Preventol CMK are the following:

- Foam stability (Concentration: 0.3% in CIPAC water):

10 s: < 1 mL foam

1, 3 and 12 min: no volume of foam

- Wettability without swirling: < 1 second.
- Optical dust factor: 0.77 (nearly dust free)
- Flowability results:

After 14 days at 35 °C.

Amount remaining on a sieve of mesh size 5 mm:

- 19.4% drop spontaneously through the sieve.
- 60.0% remain on the sieve after 5 liftings
- 3.2% remain on the sieve after 20 liftings

- Amount remaining on a sieve of mesh size 10 mm:

  100% drop spontaneously through the sieve.

- Particle size distribution:

Pellets are usually in the shape of 4-6 mm diameter 1 mm high disk. Some pellets can be misshaped or broken in pieces in the sample.

Particle size distribution data:

< 1 µm: <0.006%

> 2000 µm : 91.7 %

Preventol complete properties studies will have to be submitted at product authorization stage.

2.2.3 Methods of analysis

Adequate methodology exists for the determination of the active substance in the biocidal product.

2.3 Intended Uses and Efficacy

The assessment of the biocidal activity of the active substance demonstrates that it has a sufficient level of efficacy against the target organism(s) and the evaluation of the summary data provided in support of the efficacy of the accompanying product, establishes that the product may be expected to be efficacious. In addition, in order to facilitate the work of Member States in granting or reviewing authorisations, the intended uses of the substance, as identified during the evaluation process, are listed in Appendix II.

2.3.1 Field of use

The intended use of p-chloro-m-cresol (CMK) as PT 6 is:

Main Group 02: Preservative

Product Type 06: In-can preservatives

2.3.2 Function

p-chloro-m-cresol is an antimicrobial preservative for aqueous manufactured products in cans, tanks or other closed containers. The preservative must prevent the bio-deterioration of these systems until they are used.

2.3.3 Mode of action

p-chloro-m-cresol has a multi-site mode of action, with basic activity at the cell wall, disruption of membrane potentials and general membrane permeability of cytoplasmic membrane. At high concentrations, CMK also has an effect on cytoplasm by general coagulation.

2.3.4 Effects on target organisms

The efficacy of Preventol CMK has been achieved against potentially harmful and spoilage microorganisms (bacteria and fungi) for the following applications:

PT6.1.3: Preservatives for detergents used in many applications (e.g.: liquid for manual/machine dishwashing, floor waxes, car polishes, detergents, laundry softeners, etc.). The example selected for the assessment of the active substance is a liquid for manual dishwashing.

PT6.3.1: Preservatives for fluids used in paper production. The example selected for the assessment of the active substance is a polymer emulsion.

Initial claimed application rates for the intended uses were 0.1 to 0.5% w/w a.s.

Organisms and rates for which efficacy of the active substance CMK, has been proved sufficiently are presented below.

Application mode	**Effect**	**Target organisms**	**a.s rate**
Addition to aqueous manufactured products during their production in the manufacturing plant	Preservative antimicrobial efficacy against potentially harmful and spoilage microorganisms	Bacteria Fungi	3000 to 5000 mg/kg (0.3 to 0.5 % w/w)

The submitted tests showed that Preventol CMK has an efficacy that lasts up to 5 weeks. A longer lasting effect should be proven at product authorisation stage as appropriate depending on the label claims made in relation to the product.

2.3.5 Resistance

The literature analysis showed that especially if the concentration of CMK is in the recommended range no acquired resistance occurs. In addition, in regards to the a.s rate of application for bactericidal purposes, the risk of development of cross-resistance or co-resistance is in general low, considering the multi-site activity of CMK. Since it interacts with many different targets of the bacterial cell wall, the risk of developing resistance mechanisms is minimal.

2.4 Classification and Labelling

2.4.1 Current classification of the active substance

The current harmonised classification and labelling of CMK in accordance with Regulation (EC) No 1272/2008 is given in table below:

Classification according to Regulation (EC) No 1272/2008 (CLP)		
Class of danger	Acute Tox. 4	
	Eye Dam. 1	
	Skin Sens 1	
	Aquatic acute 1	
Hazard Statement	H302	Harmful if swallowed.
	H312	Harmful in contact with skin.
	H318	Causes serious eye damage.
	H317	May cause an allergic skin reaction.
	H400	Very toxic to aquatic organisms

2.4.2 Proposed classification for the active substance

2.4.1 Proposed classification for the active substance

According to the conclusion of the 36th RAC meeting (March 2016), amendment to the harmonised classification according to Regulation (EC) No 1272/2008 was adopted for CMK:

Classification according to the RAC opinion adopted at the 36th RAC meeting	
Hazard Class and Category Codes	Acute Tox. 4 STOT SE 3 Skin Corr. 1C Eye Dam. 1 Skin Sens 1B Aquatic acute 1 Aquatic chronic 3
Signal Word	Danger
Hazard Statement	H302 Harmful if swallowed. H335 May cause respiratory irritation. H314 Causes severe skin burns and eye damage H318 Causes serious eye damage H317 May cause an allergic skin reaction. H400 Very toxic to aquatic organisms. H412 Harmful to aquatic life with long lasting effects.
Specific Concentration limits, M-Factors	M factor = 1 (acute)
Labelling based on the RAC opinion adopted at the 36th RAC meeting	
Hazard Class and Category Codes	Acute Tox. 4 STOT SE 3 Skin Corr. 1C Skin Sens 1B Aquatic acute 1 Aquatic chronic 3
Labelling	
Pictogram codes	GHS05

	GHS07 GHS09
Signal Word	Danger
Hazard Statement	H302 Harmful if swallowed. H335 May cause respiratory irritation. H314 Causes severe skin burns and eye damage H317 May cause an allergic skin reaction. H400 Very toxic to aquatic organisms. H412 Harmful to aquatic life with long lasting effects.
Specific Concentration limits, M-Factors	M factor = 1 (acute)

2.4.2 Proposed classification for the product

The biocidal product Preventol CMK contains the active substance CMK with a specified minimal purity of 99.8%. Therefore its classification / labelling is the same as given for the active substance.

No classification is required when considering the dilution form of the product.

2.5 Summary of the Risk Assessment

2.5.1 Human Health Risk Assessment

2.5.1.1 Hazard identification and effects assessment

- **Toxicokinetic**

CMK is rapidly and extensively absorbed in rats following oral administration and is excreted mainly in urine. CMK is also extensively metabolised. The urinary metabolite pattern consists of at least 5 metabolite fractions, among which two fractions are predominant.

CMK induces no accumulation.

From the key study, 85% of the administered dose was recovered in urines 24h after administration. Since it is mentioned in the Manual of Technical Agreements (MOTA) (Version 6, 2013)[3] that an oral absorption of 100% should be considered when experimental data is above 80%, an oral absorption percentage of 100% has been chosen to set the systemic NOAEL.

No key study is identified for dermal absorption percentage. The available studies do not allow a reliable quantification of the permeability coefficient of the tested substance. Therefore, default values from EFSA guidance (2012)[4] will be applied for risk assessment. A value of 25% will be used for concentrated products (> 5% a.s.) and 75% will be used for diluted products (< 5% a.s.).

Absorption by inhalation has not been investigated. Thus a 100% absorption percentage is retained.

- **Acute effects**

The acute oral LD_{50} in the rat is 1830 mg/kg bw (males). CMK is thus classified for its acute oral toxicity as follows: Acute Tox Cat 4 H302: Harmful if swallowed.

No acute toxicity occurred to both male and female rats and rabbits exposed via the *dermal route*. The acute dermal LD_{50} in rat is higher than 2000 mg/kg. In the harmonised

[3] http://echa.europa.eu/documents/10162/19680902/mota_v6_en.doc
[4] EFSA Journal 2012;10(4):2665

classification Acute Tox Cat 4 H312: harmful in contact with skin is set but no data available in this dossier support this classification. Consequently, in the CLH report submitted to ECHA, after a review of the literature, this classification Acute Tox Cat 4 H312 is not proposed anymore. Rac agreed to remove the classification for acute dermal toxicity.

No mortalities occurred in acute studies by *inhalation* performed in rats at doses up to and including 2871 mg/m^3. Further tests on rats exposed to fumes contaminated with CMK support the results. The no-effect level is < 2871 mg/m^3 after 4 hours static spray exposure in rats.

Local effects are observed during the acute toxicity studies, whatever the exposure route. From these observations, a classification Stot SE Cat 3 H335: may cause respiratory irritation is proposed. Moreover, a skin irritation study leads to propose the classification:

Skin Corr Cat 1C H314: Cause severe skin burns and eye damage.

From eye irritation and sensitisation studies, the classification of CMK Eye Dam. Cat 1 H318: causes serious eye damage and Skin Sens Cat 1B H317: May cause an allergic skin reaction is confirmed.

- **Repeated toxicity studies**

Oral application of CMK for 4 weeks to rats caused no adverse effects. Therefore the oral sub-acute NOAEL is 790 and 920 mg/kg/day for males and females, respectively.

4-week *dermal* application of CMK to rats caused moribundity, reduced body weight gain, due to reduced food consumption, increased water intake and urinary tract effects (ureterectasia, blood clots in the bladder), and local skin effects at the application site (erythema, oedema, wounds and crustification, and increase in skin thickness) at 1000 mg/kg bw/day. No effect was observed at the lower dose of 200 mg/kg bw/day which is considered as the sub-acute NOAEL for systemic and local effects to rats.

In another dermal study with rabbits, dermal treatment with CMK for 21 days causes no systemic effects but only local skin reactions at the lower tested dose 10 mg/kg bw/day. Therefore, no NOAEC can be determined for local effects, only a LOAEC of 10 mg/kg/day is retained.

In an *inhalation* study in Wistar rats, focused on respiratory effects, some local effects were observed. The NOAEL and the NOAEC determined from this study are 50 mg/m^3.

Sub-chronic *oral* administration of CMK to rats for 3 months produced no adverse effects at doses up to and including 120 mg/kg bw/day (males) and 170 mg/kg bw/day (females). No NOAEL has been determined in this study.

Dermal application of CMK to rats for 13 weeks causes no effects. The sub-chronic dermal NOEL is considered to be 500 mg/kg bw/day.

- **Combined chronic/carcinogenicity toxicity study**

In the combined chronic/carcinogenicity study in rats exposed via diet, the long-term NOAEL is considered to be 103.1 mg/kg bw/day for males based on delayed body weight development, increased water intakes, effects on kidneys, statistically significant reduced spermatozoa in the epididymides and 134.3 mg/kg bw/day for females based on delayed body weight development, poor general condition, increased water intakes as well as increased relative and absolute kidney weight.

No treatment-related malign tumors were observed. CMK is not considered as carcinogenic and no classification for carcinogenicity is deemed justified.

- **Genotoxicity**

There is no evidence for genotoxicity in a standard battery of *in vitro* tests (Ames test, UDS assay and mutation assay in mammalian cells) and *in vivo* test (micronucleus test in mouse).

Moreover, the carcinogenicity study concluded that CMK is not a mutagenic carcinogen.

- **Reprotoxicity**

No teratogenic effect of CMK was observed in the rat teratogenicity study. The maternal NOAEL is 30 mg/kg bw/day and the developmental NOAEL is 100 mg/kg bw/day.

The waiving for developmental toxicity study in rabbits was discussed at WG V 2015. The WG considered that because there is only information on one species (rat) in the whole data package, an additional assessment factor would normally be required, but not in this specific case because of:

Very low NOAEL (30 mg/kg/d) compared to NOAELs of other studies

Sensitivity of rabbits to antimicrobials

Information on other species with related substances

In the two-generation reproduction study with Wistar rats, a NOAEL for offspring toxicity is 750 ppm (47 mg/kg bw/day) based on effects on pup weights. The parental NOAEL is 750 ppm (90 mg/kg bw/day). This NOAEL is based on a statistical significant decrease in body weight gain noted in lactating (equivalent to 365 mg/kg/day) and on liver and kidney effects. The NOAEL for toxicity on fertility is at 3000 ppm (corresponding to 288 mg/kg bw/day) based on the increased weights of the seminal vesicles effects at 12 000 ppm. In addition, at 12 000 ppm, ovarian atrophy, increased metoestrus, decreased dioestrus and atrophy of the vaginal epithelium appear in F0 and F1 females.

Several published reports and articles mention a potential endocrine disruption activity of CMK especially *in vitro*. These results permit to conclude that CMK possess a slight endocrine disruption potential *in vitro*.

Based on the sub-chronic studies (oral and dermal), teratogenicity and combined chronic/carcinogenicity studies, no changes in endocrine function are observed. In addition, the two-generations study carried out in rat, showing no indication for an endocrine disrupting activity of CMK, confirmed the result of non-endocrine disrupter activity of CMK. Therefore these results do not lead to consider that the active substance fulfills the exclusion criteria as defined in article 5 d) of regulation ((EU) n°528/2012.

- **Determination of AEL/AEC/ADI/ARfD**

The lowest NOAEL is 30 mg/kg bw/day, obtained in the rat developmental toxicity study. The The lowest NOAEL is 30 mg/kg bw/day, obtained in the rat developmental toxicity study. The NOAEL from this study is therefore considered conservative for setting of AELs.

An oral absorption percentage of 100 % will be used to set the systemic NOAEL.

The safety factors (SF) are 10 for the inter-species variations and 10 for intra-species variation. The SF is therefore 100 for acute-term, medium-term and long-term exposure.

An acute-term, medium-term and long-term AEL of 0.30 mg/kg bw/day is proposed.

As the concentrated product Preventol CMK is classified for respiratory irritation, for uses under some product types where exposure via inhalation is relevant, an inhalation AEC is set at least for the scenario where the concentrated product is handled.

The NOAEC of 50 mg/m^3 from the 14-day inhalation rat study will be used to set the inhalation AEC.

Concerning the local effects (inhalation route) the default factor of 10 to assess the intra-species variation, is not subjected to modification. However, a reduced factor of 2.5 for inter-species variations will be applied. In addition, SF to consider longer exposure will be added.

The assessment factor proposed is thus 25 for acute exposure, 75 for medium-term and 150 for long-term respiratory exposure.

An acute respiratory AEC of 2 mg/m^3 is proposed.

A medium-term respiratory AEC of 0.7 mg/m^3 is proposed.

A long-term respiratory AEC of 0.3 mg/m^3 is proposed.

An ARfD and an ADI of 0.30 mg/kg is proposed.

Summary of the reference values is reported below:

	AEL/AEC/ARfD/ADI	**SF**
Local effects by inhalation	**AEC [mg/m^3]**	**[-]**
acute	**2**	25
medium-term	**0.7**	75
long-term	**0.3**	150
Systemic effects	**AEL [mg/kg bw/d]**	**[-]**
acute- medium- long- term	0.30	100
	ARfD – ADI [mg/kg bw/d]	**[-]**
	0.30	100

2.5.1.2 Exposures assessment and risks characterisation

The biocidal product is intended to be used for preservatives in products during their storage.

The table below presents the exposure paths to Preventol CMK:

Exposure path	Industrial use	Professional use	General public	Via the environment
Inhalation	Yes	Yes	No	Negligible
Dermal	Yes	Yes	Yes	Negligible
Oral	No	No	Yes	Negligible

Based on the Guidance for human health risk assessment, volume III, part B, version 2, October 2015; local risk assessment has been conducted qualitatively for dermal effects and quantitatively for respiratory effects because the product is classified for local effects.

2.5.1.2.1 Primary Exposure (professional users)

2.5.1.2.1.1 Formulation of biocidal product into end-use applications (addition of biocides into products to be preserved)

➔ **Scenarios**

Preventol CMK is an in-can preservative product for use in a variety of end-use products, at concentrations up to 0.5% CMK.

The primary exposure scenario identified for the uses of PT06.3.1 products (preservatives for fluids used in paper production), is described as follows:

1) Preparation of pre-mix 25% CMK solution (mixing): the biocidal product is added directly to the sump or is diluted to obtain a pre-mix 25%-CMK solution.
   Due to the large amount of handled active substance, the hypothesis of loading CMK from a big bag was chosen. The dermal exposure was assessed in qualitative way, with support from applicant's information proposing suitable risk management measures to suppress the generation on aerosols during handling of big bags.

2) Addition of the pre-mix 25 % CMK solution (loading):

- Addition of pre-mix 25 % CMK solution into product to be preserved: The scenario for the pumping of liquids is adopted using the maximum final concentration CMK of 0.5 % in the product (e.g.: detergent solution) to be preserved.
- Addition of pre-mix 25 % CMK solution to paper additives (coating):

According to the recommendation from the Human Exposure Expert Group (HEEG), the most relevant model for simple manual loading of liquids is the Model 7, TNsG part.2[5] (Professional pouring and pumping liquid, and dumping solids into systems).

[5] Technical notes for guidance: Human exposure to biocidal products- guidance on exposure estimation 2002. As proposed in the HEEG Opinion 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 (adopted at the EU technical meeting TM I08 in 2008).

Table 2.5-2: Formulation into product to be preserved – professional primary exposure summary (Chronic exposure)

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Preparation of the pre-mix at 25 % – Mixing and loading phase**			
Tier 1: Without PPE, big bag automated loading (low level of containment 90% reduction)	6.94×10^{-3}	-*	-*	6.94×10^{-3}
Task:	**Addition of the pre-mix in the product – Mixing and loading phase**			
Tier 1: Without PPE	1.63×10^{-3}	7.51×10^{-3}	6.31	6.31
Tier 2: Gloves and protective clothes	1.63×10^{-3}	7.51×10^{-3}	6.31×10^{-2}	6.48×10^{-2}
Task:	**Combined exposure for the mixing/loading: Preparation of pre-mix and Addition of the pre-mix into detergent product**			
Tier 1: Without PPE	8.57×10^{-3}	Not relevant	6.31	6.32
Tier 1: Preparation of pre-mix: without PPE Tier 2: Addition of pre-mix into detergent products: Gloves and protective clothes	8.57×10^{-3}	Not relevant	6.31×10^{-2}	7.17×10^{-2}

*Considered negligible due to RMMs against local effects

➔ **Risk characterisation for formulation into product to be preserved**

Summaries of the risk characterisation for formulation of Preventol CMK into PT 6 products for the professional user scenarios are shown in the following tables.

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-3: Summary of risk assessment for professionals during the formulation of biocidal product into product to be preserved.

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Preparation of the pre-mix at 25 % – Mixing phase**					
Tier 1: Without PPE, big bag automated loading (low level of containment 90% reduction)	6.94×10^{-3}	30.00	100	4320	3×10^{-1}	**2%**
Task:	**Addition of the pre-mix into the product –loading phase**					
Tier 1: Without PPE	**6.31**	30.00	100	5	0.30	**2103**
Tier 2: Gloves and impermeable coverall	**6.48×10^{-2}**	30.00	100	463	0.30	22
Task:	**Combined exposure for the mixing/loading: Preparation of pre-mix and Addition of the premix into detergent product**					
Tier 1: Without PPE and big bag automated loading (low level of containment 90% reduction)	**6.32**	30.00	100	4.75	0.3	**2105**
Tier 1: Preparation of pre-mix: Without PPE, big bag automated loading (low level of containment 90% reduction) Tier 2: Addition of pre-mix into detergent products: Gloves and protective clothes	**7.17×10^{-2}**	30.00	100	419	0.3	**24**

The risk for combined systemic exposure during preparation of the pre-mix without PPE and impermeable coveralls during addition of the pre-mix into the product to be preserved) with a MOE (457) higher than MOE_{ref} (100) and a %AEL (24%) below 100%.

- **Quantitative risk assessment for inhalation local effect for the preparation of the pre-mix 25%-CMK solution**

The estimated exposure is compared to the AEC long-term, to derive a fraction of the AEC (expressed as % AEC), for risk characterization for respiratory local effects.

The Preventol CMK is classified STOT SE 3 H335: May cause respiratory irritation. A quantitative risk assessment for local effects by inhalation was performed.

Table 2.5-1: Summary of risk assessment for professionals – local effects via inhalation

	Inhalation exposure (mg/m^3)	AEC long term (mg/m^3)	% AEC	Conclusion of local risk assessment by inhalation
Task:		**Primary exposure (**Preparation of pre-mix 25%-CMK solution**)**		
Tier 1 big bag automated loading (low level of containment 90% reduction) (without mask)	4	3.0×10^{-1}	1300%	Unacceptable
Tier 2 (with mask FFP3)	2×10^{-1}		67%	Acceptable

FFP3 Mask: protection factor 20

An acceptable risk has been identified for professionals with the wear of respiratory protection equipment (FFP3 mask) during the dilution of the product by unloading big bags with a low containment level.

- **Quantitative risk assessment for inhalation local effect for** addition of the pre-mix into the product

Pre-mix 25%-CMK solution is classified STOT SE 3 H335: May cause respiratory irritation. A quantitative risk assessment for local effects by inhalation was performed.

Table 2.5-4: Summary of risk assessment for professionals – local effects via inhalation

	Inhalation exposure (mg/m^3)	AEC long term (mg/m^3)	% AEC	Conclusion of local risk assessment by inhalation
Task:	**Primary exposure (**addition of the pre-mix into the product**)**			
Tier 1 (without mask)	2.35×10^{-1}	3.0×10^{-1}	78	Acceptable

An acceptable risk has been identified for professionals without the wear of respiratory protection equipment during the addition of the pre-mix into the product.

- **Qualitative risk assessment for dermal local effects for the preparation of the pre-mix 25%-CMK solution**

The product is classified Skin sens and Eye dam 1. However, this risk of skin sensitization and eye damage from CMK active substance is readily controllable through the use of proper risk mitigation measures when handling CMK based products. Besides, the use of concentrated formulations is restrained to professional operators, the occurrence of exposure should be considered as accidental and manageable as such.

- **Qualitative risk assessment for dermal local effects for addition of the pre-mix into the product**

The product is classified Skin sens and eye dam 1. However, this risk of skin sensitization and eye damage from CMK active substance is readily controllable through the use of proper risk mitigation measures when handling formulations. Besides, the use of concentrated formulations is restrained to professional operators, the occurrence of exposure should be considered as accidental and manageable as such.

Therefore, packaging, equipments and procedures, e.g. **automated dosing systems**, should be designed to prevent exposure as much as possible. Moreover, effective skin protection such as gloves, goggles, protective overalls and boots is required under all the identified scenarios for use of CMK based products. MSDS and product use instructions shall inform the users of the potential risks and prevention measures.

By using adapted processes, protective equipment and respecting good professional practices, the exposure potential to CMK based products can be avoided and the risk of adverse local effects can be reduced to an acceptable level.

2.5.1.2.1.2 Professional user's application in paper production

In the paper industry, additives are added continuously in the dry end of the manufacturing system. This manufacturing process is automated, exposure during this phase was considered negligible.
During the same working day, a professional can perform several operations such as mixing and loading (which is considered as the application phase) of additives containing the active substance and post–application tasks (corresponding to cleaning phase). Considering a "worst case" situation, exposures due to the mixing and loading tasks and the cleaning of pumps tasks were added.

Coating for paper is presented as an example for paper additive

2.5.1.2.1.2.1 Mixing and loading exposure

It is considered that exposure during injection of the paper additives (coating at 0.5%) into paper process step is covered by the exposure assessment for addition of 25 % CMK pre-mix into the coating product.
In the paper mill, the paper additives are added either in the wet-end (mixing chest) or in the dry-end (coating press); the addition of the additives is continuous. Normally there is no addition of CMK to the paper additives in the paper mill.

2.5.1.2.1.2.2 Application exposure

No specific assessment for human exposure has been made, since the application is the mixing and loading phase of the product. Then, it has been determined that the mixing and loading and the application would be considered as only one task.

2.5.1.2.1.2.3 Post-application exposure

Post-application scenario corresponds to the cleaning of the dispensing pumps.
No relevant model was found in TNsG (2002) to estimate the exposure rate associated with this scenario. The closest model found in the BEAT database (2008)[6] is 'Cleaning of spray equipment', which includes rinsing and rubbing (with paper, rag or brush) tasks, which are similar in cleaning dispensing pumps or fouled system. The inhalation exposure is estimated

[6] Bayesian Exposure Assessment Toolkit database of the Technical notes for guidance: Human exposure to biocidal products-guidance on exposure estimation 2008.

from the saturated vapour pressure.

2.5.1.2.1.2.4 Combined exposure

Injection of the paper additives (coating at 0.5%) into paper process is covered by the addition of the pre-mix 25% CMK solution into the additives (i.e. mixing and loading phase).

Table 2.5-5: Combined exposure for primary exposure for workers in-can preservatives for fluids used in paper production

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Application: Addition of coating (0.5%) in the system (loading phase)**			
Tier 1: Without PPE	1.63×10^{-3}	7.51×10^{-3}	6.31	6.31
Tier 2: Gloves and protective clothes	1.63×10^{-3}	7.51×10^{-3}	6.31×10^{-2}	6.48×10^{-2}
Task:	**Pump cleaning- Post application**			
Tier 1: Without PPE	5.69×10^{-4}	4.26×10^{-3}	6.88×10^{-2}	6.93×10^{-2}
Tier 2: gloves and cotton coverall	5.69×10^{-4}	4.26×10^{-5}	1.05×10^{-2}	1.10×10^{-2}
Task:	**Professional– Total combined exposure (Application and post application)**			
Tier 1: Without PPE	2.20×10^{-3}	Not relevant*	6.37	6.38
Tier 1 (post application): Without PPE Tier 2 (addition of the pre-mix in the product): gloves and protective clothes	2.20×10^{-3}	Not relevant*	1.32×10^{-1}	1.34×10^{-1}

*As for local dermal effect it is the concentration of the CMK during the event of contact that is relevant, combined exposures have only been assessed for systemic exposure.

➔ **Risk characterisation for workers using in-can preservatives for fluids in paper production**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-6: Summary of risk assessment for systemic effects

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Application: Addition of coating (0.5%) in the system (loading phase)**					
Tier 1: Without PPE	6.31	30.00	100	4.75	3.00×10^{-1}	**2103**
Tier 2: Gloves and protective clothes	6.48×10^{-2}	30.00	00	463	3.00×10^{-1}	22
Task:	**Pump cleaning- Post application**					
Tier 1: Without PPE	6.88×10^{-2}	30.00	100	433	3.00×10^{-1}	23
Tier 2: gloves and cotton coverall	1.05×10^{-2}	30.00	100	2727	1.50×10^{-1}	4
Task:	**Professional– Total combined exposure (application and post application)**					
Tier 1: Without PPE	6.37	30.00	100	5	3.00×10^{-1}	**2127**
Tier 1 (post application): Without PPE Tier 2 (addition of the pre-mix in the product): gloves and protective clothes	1.34×10^{-1}	30.00	100	224	3.00×10^{-1}	45

When operators wear gloves and protective clothes during addition of the coating in the system, the risk for systemic effects is considered to be acceptable, since the MOE (224) is higher than the MOE_{ref} and the % AEL (45) is below 100 %.

- **Quantitative risk assessment for inhalation exposure**

Pre-mix 25%-CMK solution was classified STOT SE 3 H335: May cause respiratory irritation. A quantitative risk assessment for local effects by inhalation was performed.

Table 2.5-7: Summary of risk assessment for professionals – local effects via inhalation

	Inhalation exposure (mg/m^3)	AEC long term (mg/m^3)	% AEC	Conclusion of local risk assessment by inhalation
Task:	**PT6-Primary exposure (**addition of the pre-mix into the product**)**			
Tier 1 (without mask)	2.35×10^{-1}	3.0×10^{-1}	78	Acceptable

An acceptable risk has been identified for professionals without the wear of respiratory protection equipment during the addition of the pre-mix into the product.

- **Qualitative risk assessment for dermal and eye local effects**

The product is classified Skin sens and eye dam 1. However, this risk of skin sensitization and eye damage from CMK active substance is readily controllable through the use of proper risk mitigation measures when handling formulations. Besides, the use of concentrated formulations is restrained to professional operators, the occurrence of exposure should be considered as accidental and manageable as such.

Therefore, packaging, equipments and procedures, e.g. **automated dosing systems**, should be designed to prevent exposure as much as possible. Moreover, effective skin protection such as gloves, goggles, protective overalls and boots is required under all the identified scenarios for use of CMK based products. MSDS and product use instructions shall inform the users of the potential risks and prevention measures.

By using adapted processes, protective equipments and respecting good professional practices, the exposure potential to CMK based products can be avoided and the risk of adverse local effects can be reduced to an acceptable level.

2.5.1.2.1.3 Professional user's applications of liquid detergent

Professional user's applications have been identified as follow:

- Using liquid detergents for hand wash or machine laundry
- Using liquid detergents for pre-treatment of clothes
- Using liquid detergents for hand or machine dishwashing
- Using liquid detergents for surface cleaning (household)

The risk characterisations for the relevant end use applications are provided below for CMK.

2.5.1.2.1.3.1 Liquid detergents for laundry, pre-treatment of clothes and dishwashing – professional exposure

Preventol CMK is incorporated into liquid detergents at a maximum final active substance concentration of up to 0.5 %. Exposure to CMK may occur when individuals use liquid detergent products containing the active substance. For these scenarios, the use of gloves is not assumed.

For the purposes of this assessment, potential exposures to CMK for professional users were calculated using the software ConsExpo 4.1[7].

Whereas ConsExpo was developed for non-professional users, the methods and most of the parameters are applicable for professional users. As no specific data and models can be found in TNsG, ConsExpo is the best available tool for the assessment of professionals using liquid

[7] http://www.rivm.nl/en/Topics/C/ConsExpo.

detergents, provided some parameters (from ConsExpo's Cleaning product factsheet, RIVM 2006) are modified as explained for each scenarios according the Technical Meeting II 2008 conclusion and the HEEG opinion.

Exposure following incidental splash and spillage of concentrates, as mentioned in TNsG 2002[8] (part 3 p.4), is assessed by the scenario pre-treatment of clothes.

The first approach is an estimation of the exposure with the highest claimed concentration of CMK into detergent (0.5%) and the second one corresponds to the exposure with the lowest efficacious concentration of CMK into detergent (0.3%).

Table 2.5-8: Liquid detergents uses by professional - primary exposure summary (0.5% of CMK into detergent)

Tier	**Inhalation exposure**	**Dermal exposure**		**Total exposure**
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Professional hand washing laundry/machine wash – Mixing and loading phase**			
Tier 1: Without PPE	7.85×10^{-7}	2.33×10^{-4}	1.00×10^{-2}	1.02×10^{-2}
Task:	**Professional hand washing laundry – Application phase**			
Tier 1: Without PPE	8.17×10^{-8}	5.00×10^{-4}	1.90×10^{-1}	1.90×10^{-1}
Task:	**Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)**			
Tier 1: Without PPE	8.67×10^{-6}	Not relevant*	2.00×10^{-1}	2.00×10^{-1}
Task:	**Professional spot pre-treatment of clothes – application phase**			
Tier 1: Without PPE	negligible	7.56×10^{-4}	6.50×10^{-2}	6.50×10^{-2}
Task:	**Professional hand dishwashing/machine wash – mixing and loading phase**			
Tier 1: Without PPE	4.72×10^{-7}	2.33×10^{-4}	1.50×10^{-2}	1.50×10^{-2}
Task:	**Professional hand dishwashing – application phase**			
Tier 1: Without PPE	1.20×10^{-7}	7.00×10^{-5}	1.81×10^{-2}	1.81×10^{-2}
Task:	**Professional hand dishwashing – combined exposure (M&L + application phase)**			
Tier 1: Without PPE	5.92×10^{-7}	Not relevant*	3.31×10^{-2}	3.31×10^{-2}
Task:	**Professional– Combined exposure (hand washing clothes + spot pre-treatment)**			
Tier 1: Without PPE	8.67×10^{-7}	Not relevant*	2.65×10^{-1}	2.65×10^{-1}

[8] Technical notes for guidance: Human exposure to biocidal products- guidance on exposure estimation 2002.

*As for local dermal effect it is the concentration of the CMK during the event of contact that is relevant, combined exposures have only been assessed for systemic exposure.

Table 2.5-9: Liquid detergents uses professional primary exposure summary (0.3% of CMK into detergent)

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Professional hand washing laundry/machine wash – Mixing and loading phase**			
Tier 1: Without PPE	4.70×10^{-7}	1.40×10^{-4}	6.00×10^{-3}	6.00×10^{-3}
Task:	**Professional hand washing laundry – Application phase**			
Tier 1: Without PPE	4.90×10^{-8}	3.00×10^{-4}	1.14×10^{-1}	1.14×10^{-1}
Task:	**Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)**			
Tier 1: Without PPE	5.19×10^{-6}	Not relevant*	1.20×10^{-1}	1.20×10^{-1}
Task:	**Professional spot pre-treatment of clothes – application phase**			
Tier 1: Without PPE	negligible	4.53×10^{-4}	3.90×10^{-2}	3.90×10^{-2}
Task:	**Professional hand dishwashing/machine wash – mixing and loading phase**			
Tier 1: Without PPE	2.83×10^{-7}	1.40×10^{-4}	9.00×10^{-3}	9.00×10^{-3}
Task:	**Professional hand dishwashing – application phase**			
Tier 1: Without PPE	7.22×10^{-9}	4.50×10^{-4}	1.08×10^{-2}	1.08×10^{-2}
Task:	**Professional hand dishwashing – combined exposure (M&L + application phase)**			
Tier 1: Without PPE	2.90×10^{-7}	Not relevant*	1.98×10^{-2}	1.98×10^{-2}
Task:	**Professional– Combined exposure (hand washing clothes + spot pre-treatment)**			
Tier 1: Without PPE	5.19×10^{-7}	Not relevant*	1.59×10^{-1}	1.59×10^{-1}

*As for local dermal effect it is the concentration of the CMK during the event of contact that is relevant, combined exposures have only been assessed for systemic exposure.

➔ **Risk characterisation for liquid detergents for laundry, pre-treatment of clothes and dishwashing**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-10: Summary of risk assessment for professional using liquid detergents at 0.5% of CMK

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Professional hand washing laundry/machine wash – Mixing and loading phase**					
Tier 1 : Without PPE	1.02×10^{-2}	30.00	100	2941	3.0×10^{-1}	3
Task:	**Professional hand washing laundry – Application phase**					
Tier 1: Without PPE	1.90×10^{-1}	30.00	100	158	3.0×10^{-1}	63
Task:	**Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)**					
Tier 1: Without PPE	2.00×10^{-1}	30.00	100	150	3.0×10^{-1}	67
Task:	**Professional spot pre-treatment of clothes – application phase**					
Tier 1 : Without PPE	6.50×10^{-2}	30.00	100	462	3.0×10^{-1}	22
Task:	**Professional hand dishwashing/machine wash – mixing and loading phase**					
Tier 1 : Without PPE	1.50×10^{-2}	30.00	100	1657	3.0×10^{-1}	5
Task:	**Professional hand dishwashing – application phase**					
Tier 1 : Without PPE	1.81×10^{-2}	30.00	100	1657	3.0×10^{-1}	6
Task:	**Professional hand dishwashing – combined exposure (M&L + application phase)**					
Tier 1 : Without PPE	3.31×10^{-2}	30.00	100	906	3.0×10^{-1}	11
Task:	**Professional– Total combined exposure (hand washing clothes + spot pre-treatment)**					
Tier 1 : Without PPE	2.65×10^{-1}	30.00	100	461	3.0×10^{-1}	88

The risk is considered to be acceptable for professionals without gloves for all tasks:

- Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)
- Professional spot pre-treatment of clothes – application phase
- Professional hand dishwashing – combined exposure (M&L + application phase)
- Professional– Total combined exposure (hand washing clothes + spot pre-treatment)

Exposure when considering washing with washing machine is limited to the exposure during

detergent loads (mixing loading phase). Therefore, the risk for systemic effects is considered to be acceptable for professionals if washing machine laundry and dishwashings machine are considered.

Table 2.5-11: Summary of risk assessment for professional using liquid detergents at 0.3% of CMK

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Professional hand washing laundry/machine wash – Mixing and loading phase**					
Tier 1 : Without PPE	6.00×10^{-3}	30.00	100	5000	3.0×10^{-1}	2
Task:	**Professional hand washing laundry – Application phase**					
Tier 1: Without PPE	1.14×10^{-1}	30.00	100	263	3.0×10^{-1}	38
Task:	**Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)**					
Tier 1: Without PPE	1.20×10^{-1}	30.00	100	250	3.0×10^{-1}	40
Task:	**Professional spot pre-treatment of clothes – application phase**					
Tier 1 : Without PPE	3.90×10^{-2}	30.00	100	769	3.0×10^{-1}	13
Task:	**Professional hand dishwashing/machine wash – mixing and loading phase**					
Tier 1 : Without PPE	9.00×10^{-3}	30.00	100	3333	3.0×10^{-1}	3
Task:	**Professional hand dishwashing – application phase**					
Tier 1 : Without PPE	1.08×10^{-2}	30.00	100	2778	3.0×10^{-1}	1
Task:	**Professional hand dishwashing – combined exposure (M&L + application phase)**					
Tier 1 : Without PPE	1.98×10^{-2}	30.00	100	1515	3.0×10^{-1}	3
Task:	**Professional– Total combined exposure (hand washing clothes + spot pre-treatment)**					
Tier 1 : Without PPE	1.59×10^{-1}	30.00	100	189	3.0×10^{-1}	53

The systemic risk is considered to be acceptable for professionals without gloves for all tasks:

- Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)
- Professional spot pre-treatment of clothes – application phase
- Professional hand dishwashing – combined exposure (M&L + application phase)

- Professional– Total combined exposure (hand washing clothes + spot pre-treatment)

Exposure when considering washing with washing machine is limited to the exposure during detergent loads (mixing loading phase). Therefore, the risk for systemic effects is considered to be acceptable for professionals if washing machine laundry and dishwashings machine dishwashings are considered.

- **Quantitative risk assessment for local effects**

Inhalation exposure
As the liquid detergent is not classified for respiratory irritation, no inhalation risk assessment was performed.

- **Qualitative risk assessment for dermal and eye local effects**

As the liquid detergent is not classified for dermal and eye irritation, no risk assessment was performed for dermal and eye local effects.

2.5.1.2.1.3.2 Household (HH), and industrial and institutional (I&I) uses – professional exposure

CMK is used at a maximal concentration of 0.5 % a.s. to control the growth of bacteria and fungi in products used for car care, floor care, waxes, hard surface cleaners, pre-moistened sponges or mops, and the surfactants used in these types of products.
The representative use for this kind of products is wiping or mopping hard surfaces such as floors.
The respective exposure can be assessed using the surface disinfection models from the TNsG (models 1 and 3, TNsG (2002) pages 175 and 177, User guidance page 27). These models include exposure during diluting and mixing the surfactant in water and wiping surfaces using a rung cloth or a mop.

These models give indicative values expressed as mg of the diluted solution, i.e. actually applied by wiping or mopping[9].

The first approach is an estimation of the exposure with the highest claimed concentration of CMK into detergent (0.5%) and the second approach is an estimation of the exposure with the lowest efficacious concentration of CMK into detergent (0.3%).

Table 2.5-12: Households and Industrial and Institutional uses professional primary exposure summary (0.5 % of CMK into liquid detergent)

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Professionals wiping surfaces with preserved product**			
Tier 1: Without PPE no RPE	7.16×10^{-4}	1.67×10^{-1}	1.78×10^{-1}	1.78×10^{-1}
Tier 2: With gloves, no RPE	7.16×10^{-4}	1.67×10^{-1}	6.09×10^{-2}	6.16×10^{-2}

[9] As confirmed by the HEEG opinion, agreed at TM of December 2007.

Table 2.5-13: Households and Industrial and Institutional uses professional primary exposure summary (0.3 % of CMK into liquid detergent)

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Professionals wiping surfaces with preserved product**			
Tier 1: Without PPE no RPE	4.29×10^{-4}	1.07×10^{-1}	1.78×10^{-1}	1.07×10^{-1}
Tier 2: With gloves, no RPE	4.29×10^{-4}	1.67×10^{-1}	3.65×10^{-2}	3.69×10^{-2}

➔ **Risk characterisation for Household (HH), and industrial and institutional (I&I) uses**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-14: Summary of risk assessment for professionals wiping surfaces with preserved product (0.5 % of CMK into liquid detergent)

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Professionals wiping surfaces with preserved product**					
Tier 1 : Without PPE	1.78×10^{-1}	30.00	100	169	3.00×10^{-1}	59
Tier 2: With gloves, coated coveralls	6.16×10^{-2}	30.00	100	487	3.00×10^{-1}	21

An acceptable risk has been identified for professionals wiping surfaces without PPE, since MOE is higher than MOE_{ref} (100) and associated %AEL is below 100%, for the systemic effects.

Table 2.5-15: Summary of risk assessment for professionals wiping surfaces with preserved product (0.3 % of CMK into liquid detergent)

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Professionals wiping surfaces with preserved product**					
Tier 1 : Without PPE	1.07×10^{-1}	30.00	100	169	3.00×10^{-1}	36
Tier 2: With gloves, coated coveralls	3.69×10^{-2}	30.00	100	487	3.00×10^{-1}	12

An acceptable risk has been identified for professionals wiping surfaces without PPE, since MOE is higher than MOE_{ref} (100) and associated %AEL is below 100%, for the systemic effects.

- **Quantitative risk assessment for local effects**

Inhalation exposure
As the liquid detergent is not classified for respiratory irritation, no inhalation risk assessment was performed.

- **Qualitative risk assessment for dermal and eye local effects**

As the liquid detergent is not classified for dermal and eye irritation, no risk assessment was performed for dermal and eye local effects.

2.5.1.2.1.4 Overall assessment of the risk for the professional use of the active substance in biocidal product (primary exposure)

Formulation of the preserved product

The risk for systemic effect for the formulation of the preserved product is acceptable when gloves and impermeable coverall are worn during the addition of the pre-mix 25% CMK solution into the product to be preserved.

The dermal exposure was assessed in qualitative way and can be considered acceptable only when proper risk mitigation measures to suppress the generation on aerosols during handling of big bags are in place. The local risk for inhalation is considered to be acceptable with the wear of respiratory mask for the preparation of the pre-mix 25% CMK solution

Preservatives for fluids used in paper production

When operators wear gloves and protective clothes during addition of pre-mix into the product, the local and systemic risk are considered to be acceptable.

Liquid detergent

Use of detergent containing 0.5 % of CMK or 0.3% of CMK

The systemic and local risk is considered to be acceptable for professionals without gloves for all tasks:

- Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)

- Professional spot pre-treatment of clothes – application phase
- Professional hand dishwashing – combined exposure (M&L + application phase)
- Professional– Total combined exposure (hand washing clothes + spot pre-treatment)

Exposure when considering washing with washing machine is limited to the exposure during detergent loads (mixing loading phase). Therefore, the risk for systemic effects is considered to be acceptable for professionals if washing machine laundry and dishwashings machine are considered.

Wiping surface

Acceptable local and systemic risk has been identified for professionals wiping surface with a detergent at 0.3% and 0.5 % of CMK (without PPE).

2.5.1.2.2 Primary exposure (non-professional users)

Non-professionals may be exposed to CMK when using products preserved with the biocidal product Preventol CMK.

Non-professional user's applications have been identified as follow:

- Using liquid detergents for hand or machine wash laundry
- Using liquid detergents for pre-treatment of clothes
- Using liquid detergents for hand or machine dishwashing
- Using liquid detergents for surface cleaning (household)

The risk characterisations for the relevant end use applications of CMK are provided below.

Relevant exposure paths

The most relevant paths of exposure to CMK for non-professional uses are from the dermal and inhalation routes as quantified by total systemic exposure. The oral route is considered negligible. For non-professional exposure, wearing PPE is not assumed.

2.5.1.2.2.1 Liquid detergents – non-professional exposure

Preventol CMK is incorporated into liquid detergents at a maximum final CMK a.s. concentration of 0.5%. The first approach is an estimation of the exposure with the highest claimed concentration of CMK into detergent (0.5%) and the second one corresponds to the exposure with the lowest efficacious concentration of CMK into detergent (0.3%).

Exposure to CMK may occur when individuals use liquid detergent products containing the active substance.

Table 2.5-16: Liquid detergents uses non-professional primary exposure summary (0.5% of CMK into liquid detergent)

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose

	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Non-professional hand washing laundry/machine wash – Mixing and loading phase**			
Tier 1: Without PPE	4.90×10^{-8}	2.33×10^{-4}	6.25×10^{-4}	6.25×10^{-4}
Task:	**Non-professional hand washing laundry – Application phase - daily**			
Tier 1: Without PPE	9.14×10^{-9}	5.00×10^{-4}	1.19×10^{-2}	1.19×10^{-2}
Task:	**Non-professional hand washing laundry – combined exposure (mixing and loading phase + application phase)**			
Tier 1: Without PPE	5.81×10^{-8}	Not relevant	1.25×10^{-2}	1.25×10^{-2}
Task :	**Non-professional spot pre-treatment of clothes – application phase**			
Tier 1: Without PPE	Negligible	7.56×10^{-4}	4.06×10^{-3}	4.06×10^{-3}
Task:	**Non-professional hand dishwashing/machine wash – mixing and loading phase**			
Tier 1: Without PPE	2.29×10^{-8}	2.33×10^{-4}	7.29×10^{-4}	7.29×10^{-4}
Task:	**Non-professional hand dishwashing – application phase**			
Tier 1: Without PPE	9.29×10^{-11}	7.00×10^{-5}	8.78×10^{-4}	8.78×10^{-4}
Task:	**Non-professional hand dishwashing – combined exposure (M&L + application phase)**			
Tier 1: Without PPE	2.30×10^{-8}	Not relevant*	1.61×10^{-3}	1.61×10^{-3}
Task:	**Non-professional hand dishwashing – Total combined exposure (hand washing clothes + spot pre-treatment + hand dishwashing)**			
Tier 1: Without PPE	8.11×10^{-8}	Not relevant*	1.82×10^{-2}	1.82×10^{-2}

*As for local dermal effect it is the concentration of the CMK during the event of contact that is relevant, combined exposure have only been assessed for systemic exposure.

Table 2.5-17: Liquid detergents uses non-professional primary exposure summary (0.3% of CMK into liquid detergent)

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Non-professional hand washing laundry/machine wash – Mixing and loading phase**			
Tier 1: Without PPE	2.94×10^{-8}	1.44×10^{-4}	3.75×10^{-4}	3.75×10^{-4}
Task:	**Non-professional hand washing laundry – Application phase - daily**			
Tier 1: Without PPE	5.48×10^{-9}	3.00×10^{-4}	7.12×10^{-3}	7.13×10^{-3}
Task:	**Non-professional hand washing laundry – combined exposure (mixing and loading phase + application phase)**			
Tier 1: Without PPE	3.49×10^{-8}	Not relevant	7.50×10^{-3}	7.51×10^{-3}
Task :	**Non-professional spot pre-treatment of clothes – application phase**			
Tier 1: Without PPE	Negligible	4.53×10^{-4}	2.44×10^{-3}	2.44×10^{-3}
Task:	**Non-professional hand dishwashing/machine wash – mixing and loading phase**			
Tier 1: Without PPE	1.37×10^{-8}	1.40×10^{-4}	4.37×10^{-4}	4.37×10^{-4}
Task:	**Non-professional hand dishwashing – application phase**			
Tier 1: Without PPE	5.58×10^{-11}	4.20×10^{-5}	5.27×10^{-4}	5.27×10^{-4}
Task:	**Non-professional hand dishwashing – combined exposure (M&L + application phase)**			
Tier 1: Without PPE	1.38×10^{-8}	Not relevant*	9.64×10^{-4}	9.64×10^{-4}
Task:	**Non-professional hand dishwashing – Total combined exposure (hand washing clothes + spot pre-treatment + hand dishwashing)**			
Tier 1: Without PPE	4.86×10^{-8}	Not relevant*	1.09×10^{-2}	1.09×10^{-2}

*As for local dermal effect it is the concentration of the CMK during the event of contact that is relevant, combined exposure have only been assessed for systemic exposure.

➔ **Risk characterisation for liquid detergents**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-18: Summary of risk assessment for non-professional using liquid detergents at 0.5 % of CMK

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Non-Professional hand washing laundry/machine wash– mixing and loading phase**					
Tier 1 : Without PPE	6.25×10^{-4}	30	100	48000	0.30	< 1
Task:	**Non-Professional hand washing laundry – application phase**					
Tier 1: Without PPE	1.19×10^{-2}	30	100	2521	0.30	4
Task:	**Non-Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)**					
Tier 1: Without PPE	1.25×10^{-2}	30	100	2395	0.30	4
Task:	**Non-Professional spot pre-treatment of clothes – application phase**					
Tier 1 : Without PPE	4.06×10^{-3}	30	100	7389	0.30	1
Task:	**Non-Professional hand dishwashing/machine wash – mixing and loading phase**					
Tier 1 : Without PPE	7.29×10^{-4}	30	100	41152	0.30	< 1
Task:	**Non-Professional hand dishwashing – application phase**					
Tier 1 : Without PPE	8.78×10^{-4}	30	100	34169	0.30	< 1
Task:	**Non-Professional hand dishwashing – combined exposure (mixing and loading + application phase)**					
Tier 1 : Without PPE	1.61×10^{-3}	30	100	18668	0.30	1
Task:	**Non-Professional– Total combined exposure (hand washing clothes + spot pre-treatment + hand dishwashing)**					
Tier 1 : Without PPE	1.82×10^{-2}	30	100	1649	0.30	6

Acceptable risk has been identified for non-professionals during hand dishwashing, hand washing laundry, since MOEs are higher than MOE_{ref} (100) and associated %AELs are below 100%, for the systemic effects during application.

Table 2.5-19: Summary of risk assessment for non-professional using liquid detergents at 0.3 % of CMK

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Non-Professional hand washing laundry/machine wash– mixing and loading phase**					
Tier 1 : Without PPE	3.75×10^{-4}	30	100	80000	0.30	< 1
Task:	**Non-Professional hand washing laundry – application phase**					
Tier 1: Without PPE	7.13×10^{-3}	30	100	4208	0.30	2
Task:	**Non-Professional hand washing laundry – combined exposure (mixing and loading phase + application phase)**					
Tier 1: Without PPE	7.51×10^{-3}	30	100	3997	0.30	2
Task:	**Non-Professional spot pre-treatment of clothes – application phase**					
Tier 1 : Without PPE	2.44×10^{-3}	30	100	12295	0.30	1
Task:	**Non-Professional hand dishwashing/machine wash – mixing and loading phase**					
Tier 1 : Without PPE	4.37×10^{-4}	30	100	68650	0.30	< 1
Task:	**Non-Professional hand dishwashing – application phase**					
Tier 1 : Without PPE	5.27×10^{-4}	30	100	56926	0.30	< 1
Task:	**Non-Professional hand dishwashing – combined exposure (mixing and loading + application phase)**					
Tier 1 : Without PPE	9.64×10^{-4}	30	100	31120	0.30	< 1
Task:	**Non-Professional– Total combined exposure (hand washing clothes + spot pre-treatment + hand dishwashing)**					
Tier 1 : Without PPE	1.09×10^{-2}	30	100	2750	0.30	4

Acceptable risk has been identified for non-professionals during hand dishwashing, hand washing laundry, since MOEs are higher than MOE_{ref} (100) and associated %AELs are below 100%, for the systemic effects during application.

- **<u>Quantitative risk assessment for local effects</u>**

Inhalation exposure
As the liquid detergent is not classified for respiratory irritation, no inhalation risk assessment was performed.

2.5.1.2.2.2 Household (HH) uses – non-professional exposure

CMK is used at a maximal concentration of 0.5% to control the growth of bacteria and fungi in products used for car care, floor care, waxes, hard surface cleaners, pre-moistened sponges or mops, and the surfactants used in these types of products. The first approach is an estimation of the exposure with the highest claimed concentration of CMK into detergent (0.5%) and the second one corresponds to the exposure with the lowest efficacious concentration of CMK into detergent (0.3%).

The representative use for this kind of products is wiping or mopping hard surfaces such as floors.

ConsExpo 4.1 was used to estimate the exposure while cleaning surfaces with liquid detergents. The default assumptions reported in the Cleaning products fact sheet (RIVM, 2007) for the application of "Floor, carpet and furniture products – Floor cleaning liquid" were used. This approach was chosen since exposure values calculated with ConsExpo 4.1 are higher than those calculated using the surface disinfection models from the TNsG (models 1 and 3, TNsG (2002) pages 175 and 177, User guidance page 27) with similar assumptions.

Table 2.5-20: Households and Industrial and Institutional uses professional primary exposure summary (0.5% of CMK into liquid detergent)

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Non-professionals wiping surfaces with preserved product– mixing and loading phase**			
Tier 1: Without PPE	1.20×10^{-8}	2.33×10^{-4}	6.25×10^{-4}	6.25×10^{-4}
Task:	**Non-professionals wiping surfaces with preserved product – application phase**			
Tier 1: Without PPE	1.16×10^{-7}	2.50×10^{-3}	5.94×10^{-2}	5.94×10^{-2}
Task:	**Non-professionals wiping surfaces with preserved product – combined exposure (mixing and loading + application phase)**			
Tier 1: Without PPE	1.28×10^{-7}	Not relevant*	6.00×10^{-2}	6.00×10^{-2}

*As for local dermal effect it is the concentration of the CMK during the event of contact that is relevant, combined exposure has only been assessed for systemic exposure.

Table 2.5-21: Households and Industrial and Institutional uses professional primary exposure summary (0.3% of CMK into liquid detergent)

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Non-professionals wiping surfaces with preserved product– mixing and loading phase**			
Tier 1: Without PPE	2.14×10^{-5}	1.40×10^{-4}	3.75×10^{-4}	2.15×10^{-5}
Task:	**Non-professionals wiping surfaces with preserved product – application phase**			
Tier 1: Without PPE	6.96×10^{-8}	1.50×10^{-3}	3.56×10^{-2}	3.60×10^{-2}
Task:	**Non-professionals wiping surfaces with preserved product – combined exposure (mixing and loading + application phase)**			
Tier 1: Without PPE	2.15×10^{-5}	Not relevant*	3.56×10^{-2}	3.60×10^{-2}

*As for local dermal effect it is the concentration of the CMK during the event of contact that is relevant, combined exposure has only been assessed for systemic exposure

➔ **Risk characterisation for Household (HH) uses**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-22: Summary of risk assessment for non-professional wiping surfaces with preserved product at 0.5% of CMK

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Non-professionals wiping surfaces with preserved product– mixing and loading phase**					
Tier 1 : Without PPE	6.25×10^{-4}	30.00	100	48000	0.30	<1
Task:	**Non-professionals wiping surfaces with preserved product – application phase**					
Tier 1 : Without PPE	5.94×10^{-2}	30.00	100	505	0.30	20
Task:	**Non-professionals wiping surfaces with preserved product – combined exposure (mixing and loading + application phase)**					
Tier 1 : Without PPE	6.00×10^{-2}	30.00	100	500	0.30	20

Acceptable risk has been identified for the non-professionals wiping surfaces with preserved product, since MOE is higher than MOE_{ref} (100) and associated %AEL is lower than 100%, for the systemic effects during application.

Table 2.5-23: Summary of risk assessment for non-professional wiping surfaces with preserved product at 0.3% of CMK

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Non-professionals wiping surfaces with preserved product– mixing and loading phase**					
Tier 1 : Without PPE	2.15×10^{-5}	30.00	100	843	0.30	<1
Task:	**Non-professionals wiping surfaces with preserved product – application phase**					
Tier 1 : Without PPE	3.60×10^{-2}	30.00	100	75758	0.30	12
Task:	**Non-professionals wiping surfaces with preserved product – combined exposure (mixing and loading + application phase)**					
Tier 1 : Without PPE	3.60×10^{-2}	30.00	100	833	0.30	12

Acceptable risk has been identified for the non-professionals wiping surfaces with preserved product, since MOE is higher than MOE_{ref} (100) and associated %AEL is lower than 100%, for the systemic effects during application.

- **<u>Quantitative risk assessment for local effects</u>**

Inhalation exposure

As the liquid detergent is not classified for respiratory irritation, no inhalation risk assessment was performed

2.5.1.2.2.3 Overall assessment of the risk for the non-professional uses of the active substance in biocidal products

Liquid detergent

Acceptable risk has been identified for non-professionals during hand dishwashing, hand washing laundry and spot pre-treatment of clothes, for the local and systemic effects.

Surface wiping

Acceptable risk has been identified for the non-professionals wiping surfaces with preserved product, for the local and systemic effects.

2.5.1.2.3 Indirect exposure as a result of use

Relevant exposure paths

The most relevant paths of exposure to CMK from non-professional use are from the dermal, oral and inhalation routes as quantified by total systemic exposure.

2.5.1.2.3.1 Indirect exposure – preservative in paper industry: Dermal exposure from contact with paper (handling of dry paper)

This scenario assesses the exposure from dry paper through sampling and handling of the paper rolls. In the paper mill plant workers will be in contact of the paper in which CMK can be present since the pulp is made with water treated with this biocidal product.

The systemic inhalation exposure, the deposit concentration (considering that the subsequent deposits accumulate over the day) and systemic dermal exposure to CMK from the scenario described above are summarised below:

Table 2.5-24: Summary of secondary exposure from contact with paper

Tier	Inhalation exposure	Dermal exposure		Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Dermal exposure from contact with paper (handling of dry paper)- Professionals**			
Tier 1: Without PPE	Not relevant	2.4×10^{-2}	2.5×10^{-2}	2.5×10^{-2}

➔ **Risk characterisation for indirect exposure of dry paper**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-25: Summary of risk assessment for indirect exposure of dry paper (chronic exposure)

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Dermal exposure from contact with paper – Chronic dermal exposure**					
Tier 1 : Without PPE	0.025	30	100	1200	0.30	8

Acceptable risk has been identified for the indirect exposure for liquid detergents, since MOE is higher than MOE_{ref} (100) and associated %AEL is below 100%, for systemic effects.

2.5.1.2.3.2 Indirect exposure – Accidental ingestion of paper by infant

Indirect or secondary oral exposure may be possible for an infant or child who intentionally ingests paper manufactured in a process that uses CMK. In order to determine which dose would not lead to systemic effects a reverse scenario was used:

The estimated of amount of active substance present in the paper after CMK treatment is 1.0 x 10^{-3} mg/cm².

Table 2.5-26: Exposure Assumptions – Secondary Exposure from accidental ingestion of paper by infant

Estimated of amount of active substance present in the paper after CMK treatment	1.0 x 10^{-3} mg/cm²
Oral absorption value	100 %
infant body weight (TNsG, 2002)	10 kg
child body weight (TNsG, 2002)	15 kg
Short-term systemic AEL	0,30 mg/kg bw/day

The reverse worst-case exposure scenario is calculated as follows:
Infant: 0.30 mg a.s./kg bw/d x 10 kg / [(1.0 x 10^{-3} mg a.s./cm² paper) x 100% absorp.] = **3000 cm².**

Child: 0.30 mg a.s./kg bw/d x 15 kg / (1.0 x 10^{-3} mg a.s./cm² paper) / 100% absorp. = **4500 cm².**

Then, it is considered as highly unrealistic that an unacceptable risk occurred concerning paper ingestion by infants and children.

2.5.1.2.3.3 Indirect exposure – Liquid detergent: Dermal exposure from washed dish

Starting from AEL, a reverse scenario of exposure has been established. It has allowed calculating the maximum area of utensils that could be rubbed daily without risk of systemic effects. Assuming a scenario of 100% migration from the utensils onto the skin and assuming no rinse-off or drying step of utensils and a body weight of 60 kg, the maximum rubbed area without risk of systemic effects would be:

$$Area_{max} = [0.30 \times 60/75\%] / 5.50 \times 10^{-1} \times 0.5\% \times 0.14\ \% = 6.24 \times 10^{+6}\ cm^2/d.$$
$$Area_{max} = 624\ m^2/d$$

The situation where a person rubbes 624 m^2 of utensils daily is unrealistic. Therefore, the risk for direct contact with residues on utensils is considered to be acceptable.

Considering an effective dose of 0.3% of CMK into detergent, the maximum area of utensils is 1248 m²/d.

2.5.1.2.3.4 Indirect exposure – Liquid detergent: Dermal exposure from wearing clothes

Exposure to residual CMK may be possible due to indirect or secondary exposure from clothes cleaning with detergents containing CMK. Residues of components of laundry detergents may remain on textiles after washing and could come in contact with the skin via migration from textile to skin.

Considering the highest claimed concentration of 0.5% CMK in detergent, the estimated indirect dermal exposure for an adult with body weight 60 kg is:

Fraction of active substance in the textile: 23 mg a.s./kg

Systemic dose: 0.144 mg a.s./kg bw/day

Deposit on the skin: 7.41 x 10^{-4} mg a.s./cm²

Based on the fact of an adult wears 1 kg of textile, it is considered that a child of 15 kg wears 0.25 kg of textile.

The same calculations can be done for a child with body weight 15 kg.

Fraction of active substance in the textile: 23 mg a.s./kg

Systemic dose: 0.144 mg a.s./kg bw/day

Deposit on the skin: 5.96 x 10^{-4} mg a.s./cm²

Considering an efficacious concentration of 0.3% of CMK into detergent, the estimated indirect dermal exposure for an adult is:

Fraction of active substance in the textile: 23 mg a.s./kg

Systemic dose: 6.9 x 75% / 60 = 8.63 x 10^{-2} mg a.s./kg bw/day

Deposit on the skin: 6.9/ 19400 x 80% = 4.45 x 10^{-4} mg a.s./cm²

The same calculations can be done for a child:

Fraction of active substance in the textile: 6.9 mg a.s./kg

Systemic dose: 6.9 x 0.25 x 75% / 15 = 8.63 x 10^{-2} mg a.s./kg bw/day

Deposit on the skin: 3.58 x 10^{-4} mg a.s./cm²

➔ **Risk characterisation for indirect exposure of liquid detergents**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-27: Summary of risk assessment for indirect exposure of liquid detergents at 0.5% and 0.3% of CMK (chronic exposure)

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Adult/Child in contact with textile cleaned with liquid detergent at 0.5% of CMK – Chronic dermal exposure**					
Tier 1 : Without PPE	1.44 x 10^{-1}	30	100	208	0.30	48
Task:	**Adult/Child in contact with textile cleaned with liquid detergent at 0.3% of CMK– Chronic dermal exposure**					
Tier 1 : Without PPE	8.63 x 10^{-2}	30	100	348	0.30	27

Acceptable risk has been identified for the adults and children in contact with textile cleaned with liquid detergent, since MOE is higher than MOE_{ref} (100) and associated %AEL is below 100%, for systemic effects.

2.5.1.2.3.5 Indirect exposure - Household (HH) uses

Indirect exposure following use of preserved surface cleaner occurs when an infant is crawling on a surface cleaned with treated product (oral, dermal and respiratory exposures).

Table 2.5-28: Household (HH) uses indirect exposure summary (0.5% of CMK into detergent)

Tier	Inhalation exposure	Dermal exposure		Oral exposure	Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Infant crawling on surface cleaned with treated detergent- Chronic dermal exposure**				
Tier 1: Without PPE	8.75×10^{-2}	7.5×10^{-4}	0.3	4.50×10^{-2}	4.33×10^{-1}

Considering an efficacious concentration of 0.3% of CMK into detergent, the estimated exposure is presented in the following table:

Table 2.5-29: Household (HH) uses indirect exposure summary (0.3% of CMK into detergent)

Tier	Inhalation exposure	Dermal exposure		Oral exposure	Total exposure
PPE	Systemic dose	Deposit on skin (hands)	Systemic dose	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg/cm²	mg a.s. / kg bw /day	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Infant crawling on surface cleaned with treated detergent- Chronic dermal exposure**				
Tier 1: Without PPE	8.75×10^{-2}	4.5×10^{-4}	0.16	2.70×10^{-2}	2.75×10^{-1}

➔ **Risk characterisation for indirect exposure for Household (HH) uses.**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table2.5-1: Summary of risk assessment for indirect exposure for an infant crawling on a surface cleaned with treated product (0.5% of CMK into liquid detergent)

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Infant crawling on surface cleaned with treated detergent-**					
Tier 1 : Without PPE	4.33×10^{-1}	30.00	100	69	0.30	**144**

Unacceptable risk has been identified for the indirect exposure of an infant crawling on a surface cleaned with preserved product, since MOE lower than MOE_{ref} (100) and associated %AEL is above 100%, for the systemic effects.

Table 2.5-30: Summary of risk assessment for indirect exposure for an infant crawling on a surface cleaned with treated product (0.3% of CMK into liquid detergent)

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Infant crawling on surface cleaned with treated detergent-**					
Tier 1 : Without PPE	2.75×10^{-1}	30.00	100	109	0.30	91

Acceptable risk has been identified for the indirect exposure of an infant crawling on a surface cleaned with preserved product, since MOE higher than MOE_{ref} (100) and associated %AEL is below 100%, for the systemic effects.

2.5.1.2.3.6 Indirect exposure via food (oral exposure)

2.5.1.2.3.6.1 Exposure assessment

- **LIQUID DETERGENTS**

Potential oral exposures to CMK can occur from residues remaining on eating utensils, dishes and surfaces washed with dishwashing detergents preserved with CMK at a maximal final a.s. concentration of 5000 ppm (0.5% w/w).

Exposure from dishware

The daily exposure to CMK from eating with utensils and dishware that have been washed with hand dishwashing detergents preserved with 5000 ppm CMK was estimated following the default values of ConsExpo 4.1 for post application (Cleaning and washing product/Dishwashing products/Hand dishwashing liquid/Post-application Fact Sheet). In CONSEXPO Model "cleaning and washing product/Dishwashing products/Hand dishwashing liquid/Post-application" an assumption of 10% residues after rinse is automatically included in the amount ingested. Considering the hydrosolubility of CMK (3.4 g/L at 20°C at pH 7), a rinsing step is expected to be efficient and sufficient to reduce the exposure by 10. Results of exposure scenario are presented in the table below.

Table 2.5-31: Exposure scenario from dishware cleaned with liquid detergents containing 0.5% CMK

Population	**Exposure with a rinse (mg/kg bw/d)**	**Exposure without rinse (mg/kg bw/d)**
Adult	3.5×10^{-5}	3.5×10^{-4}
Child	2.1×10^{-4}	2.1×10^{-3}

Exposure from cleaned surfaces

An example of calculation for ingestion of residues of a biocidal active substance following contact with surface residues is found in Appendix 6.1 (pg 36) of Part 3 of the TnGs (2002) (Example 4). Although this example in the TnGs is intended for Product Type 4 (Food and Feed Area Disinfectants), it is also relevant for Product Type 6 (In Can Preservation) preservation of detergents used for surface cleaning. The same approach has been used in the ARTFood Draft Guidance (ARTFood 2015[10]). Moreover, considering that the detergent product containing 0.5% CMK is diluted by factor 20 in the bucket[11] (i.e. 250 mL in 5 litres), the concentration of CMK in diluted solution is 0.025%.

The assumptions (as modified from Example 4) are as follows:

A hard-surface cleaner or detergent film is 0.1 mm (0.01 cm) thick and contains 250 ppm (0.025 %) of CMK.

100% of CMK residues are transferred to food in contact with the surface.

default value for contaminated surface area in contact with food (that represents daily exposure of consumer): 0.2 m^2 (acute and chronic)

Incidental Oral Exposure (mg/kg/day) = 2000 cm^2 x 0.01 cm = 20 cm^3 or 20 ml product. 20 ml x 250 µg/ml x 100% = 5 mg CMK.

For a 12kg child, this equals to an exposure of 0.42 mg/kg bw/d.

For a 60kg adult, this equals to an exposure of 0.083 mg/kg bw/d.

Exposure via food contact material

CMK may be used in the preservation of variety of industrial and consumer products. Among the preserved industrial products, some can be used as raw materials for the manufacturing of food contact materials like for example: mineral slurries which can be used in paper coating.

There is thus a slight potential for the active substance to migrate from the packaging material into food which is then ingested by humans.

For the purposes of assessing a maximum loading of CMK in food packaging and subsequent migration into food, a scenario was derived based on the applicant data.

Results of exposure scenario are presented below in below.

Table 2.5-32: Exposure from migration of CMK from paper used as food packaging into food (100% migration and no degradation)

Scenario	Dose of CMK (ppm)	Concentration in paper (mg/kg)	Concentration in food (mg/kg)	Exposure (mg/kg bw/d)
Adult (60 kg)	5000	100	0.6	1.0×10^{-2}
Child (12 kg)	5000	100	0.6	5.0×10^{-2}

2.5.1.2.3.6.2 Risk characterization for indirect exposure via food scenarios

For food risk characterisation, an acceptable daily intake (ADI) of 0.3 mg/kg bw/d and an ARfD of 0.3 mg/kg bw have been defined (see ADI and ARfD part).

[10] ARTfood (formerly DRAWG) : Draft guidance on estimating dietary risk from transfer of biocidal active substances into foods – non-professional uses (ARTFood Project 2) – pilot project published in June 2015.
[11] Default value from ConsExpo Cleaning Products Fact Sheet

- **LIQUID DETERGENTS**

The results of risk characterization for exposure are presented in the tables below:

Table 2.5-33: Risk characterisation from dishware

Scenario	Population	Exposure (mg/kg/day)	Fraction of ADI (%)
Oral exposure from residues on dishware with rinse	Adult	3.5×10^{-5}	0.012
Oral exposure from residues on dishware without rinse	Adult	3.5×10^{-4}	0.12
Oral exposure from residues on dishware with rinse	Child	2.1×10^{-4}	0.07
Oral exposure from residues on dishware without rinse	Child	2.1×10^{-3}	0.7

Regarding indirect oral exposure, exposure represents less than 0.7 % of both the ADI and the ARfD. No unacceptable risk is associated with indirect exposure to CMK in hand dishwashing detergent from residues on dishware.

Table 2.5-34: Risk characterisation from residues on cleaned surfaces

Scenario	Population	Exposure (mg/kg/day)	Fraction of ADI (%)
Oral exposure from food contaminated by surface cleaning (2000 cm^2) – without rinse	Adult	8.3×10^{-2}	28
Oral exposure from food contaminated by surface cleaning (2000 cm^2) – without rinse	Child	4.2×10^{-1}	**140**
Oral exposure from food contaminated by surface cleaning (2000 cm^2) – with rinse	Adult	8.3×10^{-3}	2.8
Oral exposure from food contaminated by surface cleaning (2000 cm^2) – with rinse	Child	4.2×10^{-2}	14

The fraction of ADI is below 100% for adult (without and with a rinsing step) and for child only with a rinsing step, indicating no unacceptable risk is associated with the indirect exposure to 5000 ppm of CMK in liquid detergents used with a dilution of a factor 20 to clean surfaces. The highest exposure is noticed for the child in relation to food contaminated by surface cleaning with the default surface area of 2000 cm^2.

The fraction of ADI is above 100% for child with the first approach. Consequently and with the data currently available, a rinsing step is necessary and might be sufficient to consider as acceptable for all general public the use by surface cleaned with detergent containing CMK.

In addition, the risk related to contamination of food in contact with a surface cleaned with a detergent containing the lowest efficacious concentration of CMK (0.3%) has been calculated. The fraction of ADI is equal to **84%**. In this case, the risk for children without rinse is acceptable.

- **PRESERVATIVE IN PAPER**

The results of risk characterization are presented in table below.

Table 2.5-35: Chronic risk characterisation for worst-case migration of CMK from food packaging (100% migration and no degradation)

Indirect Food Contact Scenario	Exposure (mg/kg bw/day)	Fraction of ADI (%)
Adult	1.0×10^{-2}	3.3
Child	5.0×10^{-2}	16.7

The dietary exposure represents 3.3 % of the ADI or ARfD. The result for child is presented for information only since it seems unlikely that a 12 kg child eat 1kg of packaged food per day.

- **COMBINED DIETARY EXPOSURE**

Consumers can be exposed to CMK via food from cleaned surfaces, dishware and food contact material. Results of combined dietary exposure calculated with worst cases of each scenario are presented in the tables below.

Table 2.5-36: Combined dietary exposure resulting of uses of CMK in TP6 – without rinse (0.5% of CMK in detergent)

Scenario	Adult exposure (mg/kg bw/d)	Child exposure (mg/kg bw/d)
Residues on dishes	3.5×10^{-4}	1.7×10^{-4}
Paper used as food packaging	1.0×10^{-2}	5.0×10^{-2}
Cleaned surface	8.3×10^{-2}	4.2×10^{-1}
Total dietary exposure	9.3×10^{-2}	4.7×10^{-1}
	Fraction of ADI (adult)	**Fraction of ADI (child)**
% ADI	31	**157**

The combined dietary exposure represents 31 % and 157 % of the ADI, respectively for adult and child. The dietary risk resulting from TP6 end-uses of CMK is not acceptable for child because of the surfaces cleaning use.

Table 2.5-37: Combined dietary exposure resulting of uses of CMK in TP6 – with rinse (0.5% of CMK in detergent)

Scenario	Adult exposure (mg/kg bw/d)	Child exposure (mg/kg bw/d)
Residues on dishes	3.5×10^{-4}	1.7×10^{-4}
Paper used as food packaging	1.0×10^{-2}	5.0×10^{-2}
Cleaned surface with rinse	8.3×10^{-3}	4.2×10^{-2}
Total dietary exposure	1.9×10^{-2}	9.2×10^{-2}
	Fraction of ADI (adult)	**Fraction of ADI (child)**
% ADI	6.3	31

Consequently, with the data currently available a rinsing step is necessary. Considering the hydrosolubility of CMK (3.4 g/L at 20°C at pH 7), a rinsing step is expected to be efficient and sufficient to reduce the exposure by 10.

Conclusion of dietary exposure

Concerning the secondary exposure via ingesting food placed on cleaned surfaces, the fraction of ADI is above 100% for child without a rinsing step of cleaned surfaces when considering highest claimed concentration of CMK in detergent (0.5%) only. Considering the lowest efficacious concentration (0.3%) the risk for children without rinse is acceptable. At product authorisation stage, more refinement and information are necessary to properly address the risk and particularly the relevance and effectiveness of a rinsing step to refine the risk for children.

Concerning the secondary exposure via ingestion of food packaged with paper containing CMK and food in contact with dishes washed with dishwashing liquid containing CMK, the risks are acceptable.

2.5.1.2.3.7 Combined exposure during detergent use

Combined exposure related to the use of detergent:

- Use of washing detergent
- Use of spot prewashing
- Use of wiping detergent
- Skin contact with residual detergent on the cloth
- Skin contact with residual detergent on dishes (considered to be negligible)

a. <u>Combined exposure estimated on the basis of the efficacy dose of 0.5 % w/w of CMK</u>

Table 2.5-38: Combined exposure summary (medium term exposure) with an efficacy dose of 0.5 % w/w of CMK

Tier	Inhalation exposure	Dermal exposure	Total exposure
PPE	Systemic dose	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Non-professional combined exposure (hand washing clothes + spot pre-treatment + hand dishwashing)**		
Tier 1: Without PPE	8.11×10^{-8}	1.82×10^{-2}	1.82×10^{-2}
Task:	**Non-professional wiping surfaces with preserved products**		
Tier 1: Without PPE	1.28×10^{-7}	6.00×10^{-2}	6.00×10^{-2}
Task:	**Dermal adult exposure from wearing clothes**		
Tier 1: Without PPE	-	1.44×10^{-1}	1.44×10^{-1}

Tier	Inhalation exposure	Dermal exposure	Total exposure
PPE	Systemic dose	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Total combined exposure for non-professional (adult)**		
Tier 1: Without PPE	2.09×10^{-7}	2.22×10^{-1}	2.22×10^{-1}

➔ **Risk characterisation for combined exposure for detergent uses**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-39: Summary of risk assessment for combined detergent use (0.5 % a.s.)

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Total combined exposure for non-professional (adult)**					
Tier 1 : Without PPE	2.22×10^{-1}	30.00	100	135	0.30	73

Acceptable risk has been identified for the combined exposure of non-professional since MOE higher than MOE_{ref} (100) and associated %AEL is below 100%, for the systemic effects.

b. Combined exposure estimated on the basis of the efficacy dose of 0.3 % w/w of CMK

The use level of 0.3 % w/w of CMK is also claimed, combined exposure related to the use of detergent containing 0.3% w/w of CMK was then estimated.

Table 2.5-40: Combined exposure summary (medium term exposure) with an efficacy dose of 0.3 % w/w of CMK

Tier	Inhalation exposure	Dermal exposure	Total exposure
PPE	Systemic dose	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Non-professional combined exposure (hand washing clothes + spot pre-treatment + hand dishwashing)**		
Tier 1: Without PPE	4.86×10^{-8}	9.64×10^{-4}	9.64×10^{-4}

Tier	Inhalation exposure	Dermal exposure	Total exposure
PPE	Systemic dose	Systemic dose	Systemic dose
	mg a.s. / kg bw /day	mg a.s. / kg bw /day	mg a.s. / kg bw /day
Task:	**Non-professional wiping surfaces with preserved products**		
Tier 1: Without PPE	2.15×10^{-7}	3.60×10^{-2}	3.60×10^{-2}
Task:	**Dermal adult exposure from wearing clothes**		
Tier 1: Without PPE	-	8.63×10^{-2}	8.63×10^{-2}
Task:	**Total combined exposure for non-professional (adult)**		
Tier 1: Without PPE	2.46×10^{-7}	1.23×10^{-1}	1.23×10^{-1}

➔ **Risk characterisation for combined exposure for detergent uses**

Each estimated exposure is compared to the NOAEL and to the AEL, to derive a MOE and a fraction of the AEL (expressed as % AEL), respectively, for risk characterisation.

- **Quantitative risk assessment for systemic effects**

Table 2.5-41: Summary of risk assessment for combined detergent use (0.3% a.s.)

	Total exposure (mg a.s./kg bw/d)	Relevant NOAEL (mg a.s./kg bw/d)	MOE_{ref} (sum of AFs)	MOE	AEL (mg a.s./kg bw/d)	%AEL
Task:	**Total combined exposure for non-professional (adult)**					
Tier 1 : Without PPE	1.23×10^{-1}	30.00	100	244	0.30	41

Acceptable risk has been identified for the combined exposure of non-professional since MOE higher than MOE_{ref} (100) and associated %AEL is below 100%, for the systemic effects.

2.5.2 Overall conclusion for human health

Uses	Primary exposure		Secondary exposure	Combined exposure to detergents (primary and secondary exposure)
Formulation of biocidal product into product to be preserved (professionals)	Acceptable with the wear of appropriate protective equipment (gloves and protecting clothes, goggles, respiratory mask) and low containment level for the automated loading by big bags.		NR	NR
Fluids used in paper production (professionals)				
Preservation of fluids used in paper production and use of these fluids	Acceptable with the wear of appropriate protective equipment (gloves and protecting clothes and goggles)		Dermal contact with paper: **acceptable** Ingestion of paper: acceptable Food contact paper: acceptable	NR
Detergents (professionals and non-professionals)	**0.5% CMK in detergents**	**0.3% CMK in detergents**		
Laundry washing	Acceptable)	Acceptable	Dermal contact with washed textiles: acceptable	Not acceptable if detergent contains 0.5% CMK Acceptable if detergent contains 0.3% CMK
Spot pre-treatment	Acceptable	Acceptable		
Combined use: laundry washing + spot pre-treatment	Acceptable	Acceptable		
Dishwashing	Acceptable	Acceptable	Dermal contact with washed dishes: acceptable Oral exposure via food in contact with washed dishes: acceptable	
Household use: surface cleaning	Acceptable	Acceptable	Infant crawling on surface cleaned with treated detergent: Acceptable if detergent contains 0.3% CMK Unacceptable if detergent contains 0.5% CMK Oral exposure via food in contact with cleaned surfaces: acceptable if the	

			surface is rinsed**	

NR: Non relevant

** If the surface is not rinsed, risk is not acceptable for children considering the claimed concentration of CMK in detergent (0.5%) but is acceptable with the lowest efficacious concentration (0.3%). At product authorization stage, more refinement and information are necessary to properly address the risk and particularly the relevance and effectiveness of a rinsing step to refine the risk for children.

2.5.3 Environmental Risk Assessment

2.5.3.1 Fate and distribution in the environment

2.5.3.1.1 Abiotic degradation

2.5.3.1.1.1 Hydrolysis as a function of pH

CMK is stable to hydrolysis at pH values of 4, 7 and 9 (50° C). Therefore, it is not to be expected that hydrolytic processes will contribute to the degradation of CMK in the aquatic environment.

2.5.3.1.1.2 Photolysis in water

A photodegradation study has been provided but it has not been considered acceptable by RMS due to numerous deficiencies such as the absence of irradiation apparatus description. Nevertheless, according to absorbance properties (maximum absorbance at 228 and 281 nm), p-chloro-m-cresol is expected to be stable to the photolysis in water.

2.5.3.1.1.3 Photolysis in air

Calculations of the chemical lifetime in the troposphere by the AOPWIN program[12] resulted in a half-life of 0.625 days, corresponding to 14.995 hours, considering an OH-radicals concentration of 0.5 $x10^6$ molec.cm^{-3} and 24 hour). Therefore, CMK should be rapidly degraded by photochemical processes and neither accumulation in the air nor transport over longer distances is expected.

2.5.3.1.2 Biodegradation

No key study dealing with the degradation of CMK in STP has been provided. However supportive simulation studies, monitoring reports and publications indicate that an efficient elimination of CMK occurs in industrial as in domestic STPs. Considering that CMK is readily biodegradable (10-day window fulfilled), a half-life of 0.03 days has been applied for STP compartment for the exposure calculation.

Two studies concerning the biodegradation in water sediment systems have been provided. The first one shows that the dissipation of CMK is rapid in the whole system ($DT_{50,\ 12°C} \leq 3.6$ d) as in the water phase ($DT_{50,\ 12°C} \leq 3.3$ d). The mineralization rate was over 20% and the bound residues remained below 55%. This first study clearly indicates that no extractable metabolite occurred over 10% in the sediment. As the picture was less clear for the metabolite in the water phase, a further study has been provided in order to better separate and quantify the metabolites. This second study allows confirming that no metabolite of concern occurred in the water phase, the only metabolite near the threshold of 10% being phenol (9.9 % of applied

[12] v. 1.91, 2000, US-EPA

radioactivity). A non-key laboratory study and analysis of sediment and water in German rivers support the high aerobic biodegradation rate in aquatic compartment. Additionally, several insights dealing with the metabolic pathway of CMK in water have been provided.

Only supportive data have been provided for the assessment of the degradation of CMK in soil and default degradation value from the TGD[13] for a readily biodegradable substance has been therefore applied to calculate concentrations of CMK in soil (DT_{50}: 30 days).

2.5.3.1.3 Mobility

A batch equilibrium study allows to derive an organic carbon-water partition coefficient (Koc) value of 195.6 $L.kg^{-1}$ (arithmetic mean Koc value for the tested soils where the recovery was sufficient, which was supported by an HPLC test (Koc = 158.5 $L.kg^{-1}$).

Besides, a publication indicates a low leaching ability of CMK in soil, (CMK found in only one of 41 soil pore samples from three sites in USA).

2.5.3.1.4 Bioaccumulation

For CMK, a log Kow value of 3.02 at 22 ± 1°C has been determined. Calculating the BCF for CMK on the basis of this partition coefficient n-octanol/water according to the Guidance document on Risk Assessment, a BCF_{fish} of 73.6 was assessed. This value is in good accordance with the supportive experimental data (5.5-121 $L.kg^{-1}$). These results indicate a low potential of CMK to bioaccumulate in the aquatic food chain. For the terrestrial compartment, a $BCF_{earthworm}$ of 13.41 has been calculated according to the Guidance document on Risk Assessment.

Taking into consideration these low bioconcentration factors, no food chain concern is expected.

2.5.3.2 Hazard identification and effects assessment

2.5.3.2.1 Sewage treatment plant

In an activated sludge respiration inhibition test, an EC10 of 5.7 mg CMK .L-1 was obtained for micro-organisms. According to the Guidance document for Risk Assessment for such tests an assessment factor of 10 should be applied to the available EC10, resulting in a PNECmicroorganisms of 0.57 mg.L-1.

2.5.3.2.2 Aquatic compartment

Acute toxicity of CMK has been investigated in fish (*Oncorhynchus mykiss*), invertebrates (*Daphnia magna*) and algae (*Desmodesmus subspicatus*). Fish were found to be the most sensitive species (LC_{50} = 0.92 mg CMK. L^{-1}).
A fish (*Oncorhynchus mykiss*) juvenile growth test has also been conducted. The NOEC was determined to be 0.15 mg $CMK.L^{-1}$.
As NOECs for species representing three trophic levels, fish and algae, are available, an assessment factor of 10 was applied on the most sensitive NOEC resulting in a PNEC of 15 $\mu g.L^{-1}$.

[13] European Commission (2003): Technical Guidance Document on Risk Assessment. European Commission Joint Research Centre, EUR 20418

2.5.3.2.3 Sediment

The $PNEC_{sed}$ was calculated using the equilibrium partitioning method according to the Guidance document on Risk Assessment. The $PNEC_{sed}$ was determined to be 75.5 µg CMK.kg^{-1} susp. sed (wet weight).

2.5.3.2.4 Terrestrial compartment

The effects of CMK to terrestrial non-target organisms have been tested in earthworms, soil micro-organisms and plants.

Soil micro-organisms study can be considered as a long term study and could be retained to derive the $PNEC_{soil}$, applying an assessement factor of 100 according to the Guidance document. However, the EC_{50} (531 mg kg^{-1}dw) from the soil microorganism study is far higher than the EC_{50} from the acute study performed on plant (54.3 mg kg^{-1}dw). Therefore, an assessment factor of 1000 has been applied to this EC_{50} from the plant study, dealing to a $PNEC_{soil}$ value of 5.43 x 10^{-2} mg CMK $kg^{-1}_{dry\ soil}$. The **$PNEC_{soil}$ value for CMK of 4.81 x 10^{-2} mg $kg^{-1}_{wet\ soil}$** is calculated taking into account a conversion factor for soil concentration wet-dry weight soil of 1.13, according to the Guidance document. (equation 82b).

2.5.3.2.5 Non-compartment specific effects relevant to the food chain (secondary poisoning)

A short-term dietary study with the bobwhite quail (*Colinus virginianus*) resulted in a LC_{50} > 2995 mg CMK.kg^{-1} food. Applying an assessment factor of 3000, the $PNEC_{oral,\ birds}$ is calculated to be 0.998 mg.kg^{-1} food.

For mammals, a NOAEL of 103 mg a.s./kg bw/day was obtained from a chronic, 105 week dietary study with rats, which corresponds to a NOEC of 2000 mg CMK.kg^{-1} food. The $PNEC_{oral,\ mammals}$ of 66.7 mg CMK.kg^{-1} food is derived by applying an assessment factor of 30 to the calculated NOEC of 2000 mg CMK.kg^{-1} food.

2.5.3.2.6 Summary of PNEC values

Summary of the selected PNEC values used for the risk characterisation:

ENVIRONMENTAL COMPARTMENT	PNEC	Unit
$PNEC_{water}$	15	µg CMK.L^{-1}
$PNEC_{stp}$	0.57	mg CMK.L^{-1}
$PNEC_{sed}$	75.5	µg CMK.kg^{-1}_{wwt}
$PNEC_{soil,\ in\ tial}$	48.1	µg CMK.kg^{-1}_{wwt}
$PNEC_{oral,\ birds}$	0.998	mgCMK.kg^{-1} food
$PNEC_{oral,\ mammals}$	66.7	mgCMK.kg^{-1} food

2.5.3.2.7 Environmental effect assessment (product)

No additional data on the environmental effects of the biocidal products were submitted. The risk assessment is based on the effect of the active substance CMK.

2.5.3.3 Environmental Exposure assessment

Definition of the stages of life cycle

CMK is added as in-can preservative before products are used. After this 'Product Formulation' stage, the preserved products may be left on the shelf in the containers for a long period of time. This is effectively the 'Use' stage for CMK since it acts as a biocide in the product containers prior to these being opened and used. The use of products with in-can preservatives could be seen as the disposal phase of CMK since it is no longer required to prevent organisms growing in the container of product. However it is clear that this "disposal phase" for CMK will involve the potential for significant environmental exposure.

Therefore in this assessment the life cycle phases of the ultimate product are those that are considered:

The "re-formulation" of CMK into those products has been termed "**Formulation**";
The use of preserved products has been termed "**Use**".

The term "disposal" is used to denote the disposal of the spent or unused fluid which may also contain some CMK.

Presentation of the intended uses for evaluation

Two exemplary applications have been proposed by the applicant for the environmental assessment of the substance: preservation of detergent (PT6.1.3) and preservation of products used in the paper industry in dry-end paper operations, during coating operations (PT6.3.1).
However, according to the intended tonnage, CMK is used in other applications (paints and coatings (PT6.2), fluids used in textile (PT6.3.2), fluids used in leather production (PT6.3.3), metal working fluid in lubricants (6.4.1) and machine oils (6.4.2), glues and adhesives (6.6), fertilizers (6.7a), ceramic slickers (6.7b), concrete additives (6.7c), wax emulsions (6.7d)).
The applicant has proposed to assess these uses at the product authorisation level. Therefore no information regarding the uses (specific fluid to preserve, intended concentration in the fluids…) have been provided at the substance approval stage and no exposure based on a consumption approach could have been developed. Nevertheless, the dispersive uses (paints and coatings (PT6.2) and glues and adhesives (PT6.6)), for which a tonnage is claimed, have also been taken into account for an aggregative risk assessment for the environment. Preservation of fluids used in other applications has not been considered as dispersive. However, a general dispersive exposure using the whole tonnage has been carried out.

Presentation of the primary compartment of exposure and the used approaches

Since no metabolites of CMK have been found at relevant amounts in environmental fate studies, solely the active compound is considered. In all cases, the STP is the primary compartment of exposure. Once the emissions to the STP have been determined, equations from the TGD[14] were used to calculate the predicted environmental exposure concentrations in the relevant environmental compartments.
Two approaches can be used to conduct the risk assessment: a tonnage approach based on the volume of the active substance used as PT06 put on the European market and a consumption approach considering the specific parameters of the product in link with its intended uses.

- Exposure assessment by Tonnage

The two uses, intended by the applicant for the approval of CMK, have been assessed through a tonnage approach. For these uses (preservation of detergent (PT6.1.3) and preservation of paper coatings (PT6.3.1)), the formulation phase and the use phase have been evaluated. For the in use phase of detergents, emissions from amateur and professional uses have been

[14] Technical guidance document on risk assessment (Part II), European Chemical Bureau, 2003

calculated, and added for the assessment of the risk for the environment (cumulative assessment). Indeed, both sub uses will results in cumulative emissions to the STP.
Additionally, in order to carry out an aggregative risk assessment for the environment, the dispersive uses (paints and coatings (PT6.2) and glues and adhesives (PT6.6)), for which a tonnage is claimed, have been assessed through a tonnage approach for the use phase. At last a general dispersive use scenario has been applied to the total provided tonnage, to assess the exposure of the environment based on the global known tonnage of CMK for PT6 application.

- Exposure assessment by Consumption rate

A more targeted assessment based on consumption parameters was undertaken for the uses of CMK intended for approval of the active substance as PT6. For the product type 6 (In-can preservatives), an ECB Environmental Emission Scenario Document (ESD)[15] is available to address the "use" stage of preserved products. Due to the wide-ranging uses of in-can preservatives, this document is only a framework document and it refers to other ESDs where the use pattern of the product requiring in-can preservation is better described. The use phase of CMK in detergents has been evaluated via the exposure analysis based on the specific Emission Scenario Document for PT2[16] for the professional uses, and on the specific Emission Scenario Document for PT1[17] for amateur uses. For these uses, the update of parameters as agreed at the WG V-2015 has been taken into account. Afterwards, as for the tonnage approach, emissions estimated from the amateur use and the professional use of detergents have been cumulated for the risk assessment. The use phase of CMK in products used in the paper industry has been evaluated via two specific ESD[18,] and the relative EC BAT document[19].

The exposure assessment has been carried out with the lowest and the highest values of the validated dose range (3 and 5 $kg_{a.s.}kg^{-1}$) and two market share values of Preventol CMK amongst all the in-can preservative products potentially applied for this use (1 and 0.5 when relevant).

For the manufacture of CMK, it is anticipated that there will be no emission to air from these processes. The re-formulation (termed 'formulation' for the purposes of this assessment) of CMK, as well as the proposed representative uses of products preserved with CMK is predicted to result in negligible concentrations in air.

Secondary emissions to surface freshwater, sediment, air, soil, groundwater and biota have been calculated according to the equations from the TGD. Indirect contamination of surface water via atmospheric deposition has been deemed negligible considering the low vapour pressure (1.98×10^{-3} Pa) and Henry's law constant (5.87×10^{-5} $Pa.m^3.mol^{-1}$) of CMK. The emission fractions from the STP to the surface water and to the STP sludge have been determined through the SimpleTreat model integrated in EUSES. Considering the ready biodegradation of CMK (10 days time window fulfilled), its physico-chemical characteristics and adsorption properties, emission fractions to surface water of 0.125 and to sludge of 0.018 are predicted. The soil risk assessment is based on time-weighted average concentrations over 30 days (PEC30 d TWA) after 10 years of sludge applications on agricultural soil.

2.5.3.4 Risk characterisation for the Environment

To carry out a quantitative risk assessment for the environment when CMK is used as an in-can preservative, the PEC values were compared to the respective PNEC values for the different compartments, resulting in $PEC_{CMK}/PNEC_{CMK}$ ratios. These ratios are presented below,

[15] European Commission, ESD for Biocides used as In-can Preservatives (Product type 6). January 2004.
[16] Supplement to the methodology for risk evaluation of biocides: Environmental Emission Scenarios for Product Type 2: Private and public health area disinfectants and other biocidal products (sanitary and medical sector) - RIVM. March 2001
[17] Environmental Emission Scenarios for biocides used as human hygiene biocidal products (Product type 1) -European Commission DG ENV/RIVM. January 2004.
[18] OECD (2006): Emission scenario document on non-integrated paper mills.
[19] EC (2001): Integrated Pollution Prevention and Control (IPPC), Reference Document on Best Available Techniques in the Pulp and Paper Industry.

for each of the uses intended for approval of the active substance as PT6 and for the cumulative risk assessment (professional and non-professional uses). For the consumption approach, the assessment has been carried out for two concentrations (3E-03 and 5E-03 kga.s.kg-1) and two market share values (1 for professional uses and 0.5 for non-professional uses).

2.5.3.4.1CMK as preservative in detergent

Table 2.5-42: Risk assessment for the use of CMK as preservative in detergents

Comparment / PEC/PNEC*	STP	Surface water	Sediment	Soil	Ground water, $\mu g.L^{-1}$*	Food chain (birds)**	
						aquatic	terrestrial
Tonnage approach							
Formulation	<1 (and <0.1 $\mu g.L^{-1}$ for groundwater)						
In-use	<1 (and <0.1 $\mu g.L^{-1}$ for groundwater)						
Consumption approach							
Concentration in the fluid $kg_{a.s.}kg^{-1}$	(cumulative risk assessment of professional and non-professional uses)						
3E-03	0.11	0.43	0.43	0.57	<0.1	0.24	1.55E-02
5E-03	0.19	0.71	0.71	0.95	<0.1	0.39	2.58E-02

*For ground water, PEC are compared to the threshold value of 0.1 $\mu g.L^{-1}$.
** as birds are more sensitive than mammals, only results for birds are presented, as a worst case.

The assessment of the risk for the environment of the use of CMK as preservative in detergent indicates acceptable risk for each compartment when assessed through the tonnage and consumption approach

2.5.3.4.2 CMK as preservative in products used in the paper industry (dry-end paper operations, during coating operations)

Table 2.5-43: Risk assessment for the use of CMK as preservative in paper processing fluids in dry-end paper operations, during coating operations

Comparment		STP	Surface water	Sediment	Soil	Ground water	Food chain (birds)**	
							aquatic	terrestrial
Tonnage approach								
Formulation		<1 (and <0.1 $\mu g.L^{-1}$ for groundwater)						
In-use		<1	<1	<1	<1	<0.1	<1	
Consumption approach								
Concentration in the fluid $kg_{a.s.}kg^{-1}$	Market share							

3E-03	1	0.09	0.35	0.35	0.47	<0.1	0.19	1.27E-02
5E-03	1	0.15	0.58	0.58	0.78	<0.1	0.32	2.11E-02
3E-03	0.5	0.05	0.17	0.17	0.23	<0.1	0.10	6.33E-03
5E-03	0.5	0.08	0.29	0.29	0.39	<0.1	0.16	1.06E-02

*For ground water, PEC are compared to the threshold value of 0.1 µg.L^{-1}.
** as the $PNEC_{oral}$ for birds is more conservative than $PNEC_{oral,}$ for mammals , only results for birds are presented, as a worst case.

When assessed through tonnage approach, acceptable risks are predicted for the use of CMK as preservative in paper fluids processing at the formulation step and the in-use step.

With the consumption approach, risks are acceptable whatever the concentrations and the considered compartment for the market share of 0.5 and 1. Risk assessment has been carried out considering an emission of CMK in the effluents of STP of 12.5%. However, although no data have been provided regarding the fate of CMK in a STP connected to a paper industry, data on other industrial STP showed a higher removal of CMK in the effluent, which supports the conclusions of the risk assessment for the aquatic compartment.

2.5.3.4.3 Aggregative assessment for dispersive uses in PT6

Acceptable risks are predicted for all the environmental compartments, for the aggregated known dispersive uses (detergents, paints and coatings and glues and adhesives). Risks for the environment are also acceptable when a general dispersive scenario is applied to the total provided tonnage, to assess the exposure of the environment based on the global known tonnage of CMK for PT6 application.

2.5.4 Overall conclusion for the environment

For the environment, the uses of CMK intended for approval of the active substance have been assessed through tonnage and consumption approaches. For the use of CMK as preservatives in detergent, assessment through the tonnage and consumption approach indicate acceptable risk for the environment. .

According to the assessment, the use of CMK as preservative in paper processing fluids in dry-end paper operations (during coating operations) results in acceptable risk for the environment whatever the approach (consumption or tonnage), the concentration (5E-03 or 3E-03 $kg_{a.s.}kg^{-1}$) and the market share (0.5 or 1) taken into account.

At last, aggregative assessment (detergents, paints and coatings and glues and adhesives)carried out through the tonnage approach, indicate acceptable risk for the environment, whatever the hypothesis taken into account.

2.5.5 PBT and POP assessment

2.5.5.1 PBT assessment

According to the annex XIII of the REACH regulation EC/1907/2006, substances are classified when they fulfil the criteria for all three inherent properties Persistent, Bioaccumulable, Toxic.

Persistence criterion

According to the annex XIII of the REACH regulation EC/1907/2006 , a readily biodegradable substance is considered as not persistent in the PBT assessment. CMK is readily biodegradable

and the P criterion is therefore considered as not fulfilled.

Bioaccumulation criterion

A substance is considered to fulfil the B criterion when the bioconcentration factor (BCF) exceeds a value of 2000 L kg^{-1}. A substance is considered very bioaccumulative (vB) when the BCF exceeds a value of 5000 L kg^{-1}.

For CMK, according to the BCF values calculated from the log Kow, B criterion is not fulfilled for the aquatic and the terrestrial compartment (BCF_{fish} = 73.6 L kg^{-1} and $BCF_{earthworm}$ = 13.4 L kg^{-1}). For the aquatic compartment, the calculated value is in good accordance with supportive data where a maximum BCF value of 121 L kg^{-1} has been reported. Considering these results, CMK is considered as not bioaccumulable (B).

Toxicity criterion

According to the annex XIII of the REACH regulation EC/1907/2006, the toxicity criterion is fulfilled when the chronic NOEC for aquatic organisms is less than 0.01 mg L^{-1} or when the substance is toxic to mammals and classified as Very Toxic or Toxic after oral dosing.

Based on ecotoxicity data on aquatic organisms the lowest NOEC is obtained in the chronic study performed on *Oncorhynchus mykiss* (Growth rate, semi static 28 d, NOEC = 0.15 mg L^{-1}) and is over 0.01 mg L^{-1}. Therefore, T criterion is not fulfilled based on ecotoxicity data. Besides, CMK does not meet criteria for classification as carcinogenic, mutagenic or substance toxic for reproduction. At last, CMK does not meet criteria for STOT RE1 or STOT RE2. Therefore, T criterion is not fulfilled based on the human health data.

Conclusion:

On the basis of the characteristics of the substance, CMK should not be considered as a PBT nor vPvB substance.

2.5.5.2 POP assessment

CMK is readily biodegradable, not bioaccumulable and degrades fast in air. Therefore, according to the screening criteria described in the Annex D of the Stockholm convention, CMK is not considered as a POP.

2.5.6 Assessment of endocrine disruptor properties

According to the human health data, there is slight evidence of endocrine disruption potential of p-chloro-m-cresol *in vitro*. Nevertheless, there were no indications for an endocrine disrupting activity of CMK in a 2 generation study on rats. These results do not lead to consider that the active substance fulfills the exclusion criteria as defined in article 5 d) of regulation (EU)n°528/2012.

2.6 Overall conclusions

The outcome of the assessment for p-chloro-mcresol in product-type 1is specified in the BPC opinion following discussions at the 15th meeting of the Biocidal Products Committee (BPC). The BPC opinion is available from the ECHA website.

SCENARIO	Human primary exposure		Human secondary exposure		Environment					
	Professional	Non professional	Worker	General public	STP	Aquatic compartment	Terrestrial compartment	Groundwater	Air	Secondary poisoning
Formulation of the biocide in product to be preserved	Acceptable (1)	NR	NR	NR	Acceptable					
PT6.1.3: Preservatives for detergents used in many applications (e.g.: liquid for manual/machine dishwashing, floor waxes, car polishes, detergents, laundry softeners, etc.). Bactericide, fungicide : 3000 to 5000 mg/kg (0.3 to 0.5 % w/w)										
Pre-washing treatment of clothes,	Acceptable	Acceptable	NR	NR	Acceptable	Acceptable	Acceptable	Acceptable	NR	Acceptable
Hand wash or machine laundry	Acceptable	Acceptable	Acceptable	Acceptable						
Pre-washing treatment of clothes + laundry washing	Acceptable	Acceptable	NR							
Pre-washing treatment of clothes + laundry washing + secondary exposure	NR	Acceptable								
Hand or machine dishwashing	Acceptable	Acceptable	Acceptable	Acceptable						
Surface cleaning (household)	Acceptable	Acceptable	NR	Acceptable (2)						
PT6.3.1: Preservatives for fluids used in paper production. dry end operation (coating). Bactericide, fungicide: 3000 to 5000 mg/kg (0.3 to 0.5 % w/w)										
Formulation + use of preserved product	Acceptable (1)	NR	Acceptable (		Acceptable	Acceptable	Acceptable	Acceptable	NR	Acceptable

NR: not relevant.

Conditions:

(1) With the wear of appropriate protective equipment (gloves and protecting clothes and RPE).

(2) Dermal exposure: not acceptable due to systemic effects at 0.5% w/w/a.s., acceptable at 0.3%w/w/a.s. Oral exposure via food in contact with cleaned surfaces: acceptable if the surface is rinsed. If the surface is not rinsed, risk is not acceptable for children.

2.7 Requirement for further information related to the reference biocidal product[3]

The RMS considers that the evaluation has shown that sufficient data have been provided to verify the outcome and conclusion of the risk assessment and permit the proposal for the approval of chlorocresol.

However, further information on physico-chemical properties is required on the representative product PREVENTOL and should be submitted at product authorization stage.

2.8 List of endpoints

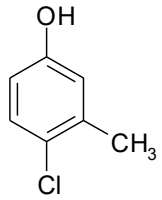
The most important endpoints, as identified during the evaluation process, are listed in Appendix I.

Appendix I: List of endpoints

Chapter 1:Identity, Physical and Chemical Properties, Classification and Labelling

Active substance (ISO Name)	p-chloro-m-cresol
Product-type	Fungicide

Identity

Chemical name (IUPAC)	4-Chloro-3-methylphenol
Chemical name (CA)	Phenol, 4-Chloro-3-methyl-
CAS No	59-50-7
EC No	200-431-6
Other substance No.	Not allocated
Minimum purity of the active substance as manufactured (g/kg or g/l)	≥ 99.8%
Identity of relevant impurities and additives (substances of concern) in the active substance as manufactured (g/kg)	m-cresol<0.1 %
Molecular formula	C_7H_7ClO
Molecular mass	142.6 g/mol
Structural formula	

Physical and chemical properties

Melting point (state purity)	64.2 °C (purity: 99.9%).
Boiling point (state purity)	242 °C (purity: 100%). After boiling the liquid substance change the colour from colourless to yellowish. This is an indication for a beginning decomposition.
Thermal stability / Temperature of decomposition	The active substance decomposes in a minor degree starting at 95 °C. A significant decomposition is observed at a temperature of approx. 240 °C. CMK is stable at normal and elevated temperatures (54 °C).

Appearance (state purity)	Technical substance: Nearly white solid pellets with characteristic smell. Purified substance: Nearly white solid with slight phenolic odour. Nearly dust free.
Relative density (state purity)	1.335 at 20 °C (purity: 99.9%)
Surface tension (state temperature and concentration of the test solution)	61.49 mN/m at 20 °C CMK is not surface active.
Vapour pressure (in Pa, state temperature)	1.4×10^{-03} Pa at 20 °C 6.0×10^{-03} Pa at 25 °C 3.8 Pa at 50 °C
Henry's law constant (Pa m^3 mol^{-1})	Ratio between vapour pressure and water solubility: 6.05×10^{-05} Pa×m^3×mol^{-1} at 20 °C and pH 5 5.87×10^{-05} Pa×m^3×mol^{-1} at 20 °C and pH 7 4.87×10^{-05} Pa×m^3×mol^{-1} at 20 °C and pH 9
	EPIWIN calculation: 4.64×10^{-02} Pa×m^3×mol^{-1} at 25 °C (Bond method) 6.08×10^{-02} Pa×m^3×mol^{-1} at 25 °C (Group method)
Solubility in water (g/l or mg/l, state temperature)	Results at pH 5: 2.5 g/L at 10°C 3.3 g/L at 20°C 4.5 g/L at 30°C
	Results at pH 7: 2.6 g/L at 10°C 3.4 g/L at 20°C 4.6 g/L at 30°C
	Results at pH 9: 3.1 g/L at 10°C 4.1 g/L at 20°C 5.5 g/L at 30°C
Solubility in organic solvents (in g/l or mg/l, state temperature)	n-Heptane: 4.9 g/L at 10 °C 8.5 g/L at 20 °C 15.4 g/L at 30 °C p-Xylene: 147.9 g/L at 10 °C 233.2 g/L at 20 °C > 250 g/L at 30 °C 1,2-Dichloroethane: 205.7 g/L at 10 °C > 250 g/L at 20 °C > 250 g/L at 30 °C The solubilities of CMK in 1-octanol, 2-propanol, acetone and ethyl acetate are > 250 g/L at each temperature.
Stability in organic solvents used in biocidal products including relevant breakdown products	No study is submitted because the active substance CMK as manufactured does not include an organic solvent.

Partition coefficient (log P_{OW}) (state temperature)	To be confirmed before approval of the active substance Data were provided in July 2017 the applicant. The new study performed is acceptable and enables to set a log Pow value of 2.73 at 25°C.
Dissociation constant	pK = 9.4 ± 0.1 at 20 °C
UV/VIS absorption (max.) (if absorption > 290 nm state ε at wavelength)	Maxima at 228 nm (ε = 9625 l mol^{-1} cm^{-1}) Maxima at 281 nm (ε = 2241 l mol^{-1} cm^{-1}) (Acetonitrile was used as solvent)
Flammability or flash point	CMK is not highly flammable, does not liberate gases in hazardous amounts when contact with water, does not deliver indications of pyrophoric properties and does not undergo spontaneous combustion.
Explosive properties	Based on scientific judgement it is certified that due to the structural formula CMK contains no oxidising groups or other chemically instable functional groups. Thus the active substance is incapable of rapid decomposition with evolution of gases or release of heat, i.e. the solid material does not present any risk for explosion.
Oxidising properties	Based on scientific judgement it is certified that due to the structural formula CMK does not contain oxidising groups in its molecular backbone and thus may not react exothermically with a combustible material. Therefore the active substance does not have oxidising properties.
Auto-ignition or relative self-ignition temperature	CMK does not undergo spontaneous combustion.

Classification and proposed labelling

with regard to physical hazards	No classification / labelling results from the physico-chemical properties.
with regard to human health hazards	According to the conclusion of the 36th RAC

	meeting (March 2016), amendment to the harmonised classification according to Regulation (EC) No 1272/2008 was adopted for CMK: Acute Tox. 4 STOT SE 3 Skin Corr. 1C Eye Dam. 1 Skin Sens 1B H302 Harmful if swallowed. H335 May cause respiratory irritation. H314 Causes severe skin burns and eye damage H318 Causes serious eye damage H317 May cause an allergic skin reaction. Signal Word: Danger
with regard to environmental hazards	No classification / labelling results from the fate and behaviour data.
	According to the conclusion of the 36th RAC meeting (March 2016), amendment to the harmonised classification according to Regulation (EC) No 1272/2008 was adopted for CMK: Aquatic acute 1 Aquatic chronic 3 H400 Very toxic to aquatic organisms. H412 Harmful to aquatic life with long lasting effects. M factor = 1 (acute)

Chapter 2:Methods of Analysis

Analytical methods for the active substance

Technical active substance (principle of method)	CMK is separated by means of gas chromatography using flame ionisation detection. The quantitative evaluation is carried out by area normalisation with consideration of water content and unvolatisable components.
Impurities in technical active substance (principle of method)	The analytical method for the determination of impurities in the active substance as manufactured is confidential. This information is provided separately in the confidential part of the dossier.

Analytical methods for residues

Soil (principle of method and LOQ)	HPLC-MS/MS; LOQ = 5 µg/kg
Air (principle of method and LOQ)	GC-MS; LOQ = 0.3 µg/m^3 air

Water (principle of method and LOQ)	HPLC-MS/MS; LOQ = 0.05 µg/L
Body fluids and tissues (principle of method and LOQ)	Not applicable since CMK is not classified as toxic or highly toxic.
Food/feed of plant origin (principle of method and LOQ for methods for monitoring purposes)	Analytical methods will be required when MRL will be set.
Food/feed of animal origin (principle of method and LOQ for methods for monitoring purposes)	Analytical methods will be required when MRL will be set.

Chapter 3:Impact on Human Health

Absorption, distribution, metabolism and excretion in mammals

Rate and extent of oral absorption:	Assumed to be complete: 100% (from study: 85%)
Rate and extent of dermal absorption*:	Default values from EFSA guidance (2012): 25% will be used for concentrated products (> 5% a.s.) and 75% will be used for diluted products (< 5% a.s.).
Distribution:	
Potential for accumulation:	None
Rate and extent of excretion:	Within 24 hours after administration, 85.21% and 84.30% of the administered dose was excreted in urine of male and female rats, respectively
Toxicologically significant metabolite(s)	None

* the dermal absorption value is applicable for the active substance and might not be usable in product authorization

Acute toxicity

Rat LD_{50} oral	1830 mg/kg bw (♂), H302
Rat LD_{50} dermal	> 2000 mg/kg bw (♀), > 5000 mg/kg bw (♂)
Rat LC_{50} inhalation	> 2871 mg/m³ (♂+♀)

Skin corrosion/irritation	Skin corr. 1C H314 Causes severe skin burns and eye damage
Eye irritation	Eye Dam 1 H318 Causes serious eye damage
Respiratory tract irritation	Stot SE 3 H335 May cause respiratory irritation.

Skin sensitisation (test method used and result)	Sensitising (GPMT, LLNA), Skin Sens; 1B H317 May cause an allergic skin reaction.
Respiratory sensitisation (test method used and result)	

Repeated dose toxicity

Short term

Species / target / critical effect	
Relevant oral NOAEL / LOAEL	3-month rat feeding study: NOEL = 1500 ppm ≅ 120/170 mg/kg/day (♂/♀) based on no effect combined chronic/carcinogenicity study : 105-week rat feeding study: NOAEL = 2000 ppm ≅ 103.1/134.3 mg/kg/day (♂/♀) based on delayed bw gain, poor general condition (♀), water intake↑, kidney weight↑, nephrotoxicity (♂), at terminal sacrifice: reduced spermatozoa in the epididymides and increased degeneration of seminiferous tubules (♂). No carcinogenic effects.
Relevant dermal NOAEL / LOAEL	21 days study in rabbit: LOAEC = 10 mg/kg/d 13-week rat dermal study: NOEL = 500 mg/kg/day (♂/♀) No adverse effect
Relevant inhalation NOAEL / LOAEL	14days rat (7 days/week): systemic: 50 mg/m^3 based on thymus effects local : 50 mg/m^3 based on respiratory effects

Subchronic

Species/ target / critical effect	
Relevant oral NOAEL / LOAEL	
Relevant dermal NOAEL / LOAEL	
Relevant inhalation NOAEL / LOAEL	

Long term

Species/ target / critical effect	
Relevant oral NOAEL / LOAEL	
Relevant dermal NOAEL / LOAEL	
Relevant inhalation NOAEL / LOAEL	

Genotoxicity	Negative (*in vitro* + *in vivo*)

Carcinogenicity

Species/type of tumour	Rat: Slightly increased incidence of benign Leydig cell tumours of the testes in males as well as adenomas of the pars distalis of the pituitary glands in both sexes, were within the historical control range. Conclusion: CMK is not considered as having carcinogenic effects and none classification for carcinogenicity is deemed justified.
Relevant NOAEL/LOAEL	

Reproductive toxicity

Developmental toxicity

Species/ Developmental target / critical effect	Rat: reduced foetal weight, increased resorption rate, reduced foetus number. No malformations
Relevant maternal NOAEL	30 mg/kg bw/day
Relevant developmental NOAEL	100 mg/kg bw/day

Fertility

Species/critical effect	Rat: no reproductive effects
Relevant parental NOAEL	parental NOAEL = 750 ppm (90 mg/kg bw/day) based on effects on liver and kidneys and a statistical significant decrease in body weight gain (equivalent to 365 mg/kg/day)
Relevant offspring NOAEL	NOAEL for offspring toxicity = 750 ppm (corresponding to 47 mg/kg bw/day – F1) based on pup weight ↓ (♀) at 3000 ppm (F2b).
Relevant fertility NOAEL	No effects on fertility parameters; NOAEL for toxicity on fertility = 3000 ppm (corresponding to 288 mg/kg bw/day) based on the increased weights of the seminal vesicles effects at 12 000 ppm. In addition, at 12 000 ppm, ovarian atrophy, increased metoestrus, decreased dioestrus and atrophy of the vaginal epithelium appear in F0 and F1 females.

Neurotoxicity

Species/ target/critical effect	Rat: no neurotoxicity observed in subchronic or acute neurotoxicity testing

Developmental Neurotoxicity

Species/ target/critical effect	

Immunotoxicity

Species/ target/critical effect	

Developmental Immunotoxicity

Species/ target/critical effect	

Other toxicological studies

No indications for special concern.

Medical data

Some reports of poisoning with CMK-containing disinfectants with homicidal intent. Corrosive damage to oesophagus/stomach was evident.
Several reports of contact hypersensitivity to CMK-containing products.

Summary

	Value	Study	Safety factor
$AEL_{long\text{-}term}$			
$AEL_{medium\text{-}term}$			
$AEL_{short\text{-}term}$			
ADI[20]	0.3 mg/kg bw/d	Rat developmental study	100
ARfD[8]	0.3 mg/kg bw	Rat developmental study	100

MRLs

Relevant commodities	Not required.

Reference value for groundwater

According to BPR Annex VI, point 68	

Dermal absorption

Study (*in vitro/vivo*), species tested	

[20] If residues in food or feed.

Formulation (formulation type and including concentration(s) tested, vehicle)	
Dermal absorption values used in risk assessment	

Acceptable exposure scenarios (including method of calculation)

Formulation of biocidal product	
Intended uses	
Industrial users	
Professional users	
Non-professional users	
General public	
Exposure via residue in food	Preliminary assessment of indirect exposure via food: based on theoretical data the risk is acceptable for exposure via food in contact with wrapping paper and food in contact with residues on dish/utensils and surfaces cleaned with 0.5% w/w CMK preserved detergent when cleaned surfaces are rinsed.

Chapter 4: Fate and Behaviour in the Environment

Route and rate of degradation in water

Hydrolysis of active substance and relevant metabolites (DT_{50}) (state pH and temperature)	No hydrolysis at 50°C at pH 4, 7 and 9.
pH 5	-
pH 9	-
Other pH: *[indicate the value]*	
Photolytic / photo-oxidative degradation of active substance and resulting relevant metabolites	Not relevant (absorbance < 290 nm)
Readily biodegradable (yes/no)	Yes (4% of degradation at 5 days, 79% at 15 days, 10-day window fulfilled)
Inherent biodegradable (yes/no)	Yes (after 35 days of acclimatation, 78% of degradation reported at 28 days).
Biodegradation in freshwater	No data
Biodegradation in seawater	Not relevant (no use in the marine environment).
Non-extractable residues	<u>Water sediment system</u> maximum 54.2-54.3 % at 28-14 days, 46.4-52.4% at the end of the study (35d)

Distribution in water / sediment systems (active substance)	$DT_{50\ whole\ system}$ = 1.22-1.90 days at 20°C (dissipation) $DT_{50\ whole\ system}$ = 2.31-3.60 days at 12°C (dissipation) Endpoint for the risk assessment (worst case of two values): $DT_{50\ whole\ system}$ = 3.60 days at 12°C
Distribution in water / sediment systems (metabolites)	Not identified radioactivity Water: maximum 27-32.7% at 3-4 days, 2.4-17.8% at the end of the study (35d). A complementary study allowed to state that 7 different metabolites contribute to this not identified radioactivity. Only one metabolite, identified as phenol amounted to 9.9% of the initial applied radioactivity and has been considered as metabolite of concern. Sediment: not relevant (<10%) $DT_{50\ whole\ system}$ = 6.97-36.4 days at 20°C $DT_{50\ whole\ system}$ = 13.22-71.95 days at 12°C

Route and rate of degradation in soil

Mineralization (aerobic)	No key study available
Laboratory studies (range or median, with number of measurements, with regression coefficient)	No key study available. A default value based on the ready biodegradation test is assumed: DT_{50} = 30 days.
DT_{50lab} (20°C, aerobic):	
DT_{90lab} (20°C, aerobic):	
DT_{50lab} (10°C, aerobic):	
DT_{50lab} (20°C, anaerobic):	
degradation in the saturated zone:	
Field studies (state location, range or median with number of measurements)	No key study available
DT_{50f}:	
DT_{90f}:	
Anaerobic degradation	No key study available. An anaerobic biodegradation test with digested sludge revealed the compound not to be susceptible to this degradation mechanism.
Soil photolysis	Photolysis is not a major way of degradation for CMK (see above).
Non-extractable residues	Not determined
Relevant metabolites - name and/or code, % of applied a.i. (range and maximum)	Not determined
Soil accumulation and plateau concentration	Not determined

Adsorption/desorption

Ka , Kd Ka_{oc} , Kd_{oc} pH dependence (yes / no) (if yes type of dependence)	<u>HPLC screening test:</u> Koc = 158.5 (log Koc = 2.21) <u>Batch equilibrium test (four tested soil but only two soil with recovery ≥77%)</u> K'a = 1.9, 7.6 mgL/g K'oc = 160.9, 230.3 mL/g $K_F a$ = 3, 11 $\mu g^{1-1n}(cm^3)^{1/n}g^{-1}$ $K_{oc}a$= 270, 322 $\mu g^{1-1n}(cm^3)^{1/n}g^{-1}$ $K_F d$ = 0.5, 1.8 $\mu g^{1-1n}(cm^3)^{1/n}g^{-1}$ Arithmetic mean of Koc = 195.6 mgL/g. Endpoint selected for the risk assessment.

Fate and behaviour in air

Direct photolysis in air	Not relevant because there is no relevant release of the compound to the air compartment.
Quantum yield of direct photolysis	Not relevant because there is no relevant release of the compound to the air compartment.
Photo-oxidative degradation in air	DT_{50} = 14.995 hours (AOPWIN calculation, considering an OH-radicals concentration of 0.5 $x10^6$ molec.cm^{-3} and 24 hours)
Volatilization	According to the vapour pressure and the Henry's law constant there are no indications for a significant volatilisation of CMK.

Reference value for groundwater

According to BPR Annex VI, point 68	

Monitoring data, if available

Soil (indicate location and type of study)	Not available
Surface water (indicate location and type of study)	Not available
Ground water (indicate location and type of study)	Not available
Air (indicate location and type of study)	Not available

Chapter 5: Effects on Non-target Species

Toxicity data for aquatic species (most sensitive species of each group)

Species	Time-scale	Endpoint	Toxicity
Fish			

Oncorhynchus mykiss	96 hours U.S.-EPA FIFRA § 72-1 Static renewal	Mortality	$LC_{50, 48h}$ = 0.92 mg/L mean measured concentration
Oncorhynchus mykiss	28 days OECD 204 (1984) + 215 (2000) semi static	Mortality, symptoms of intoxication, growth parameters	NOEC = 0.15 mg/L mean measured concentration
Brachydanio rerio	14 days Comparable with OECD 204 (1984) Flow-through	Mortality, sublethal and behaviour response	NOEC = 1.0 mg/L Nominal concentration
Invertebrates			
Daphnia magna	48 hours U.S.-EPA FIFRA § 72-2 static	Mortality; behavioural, sub-lethal effects	$EC_{50, 48h}$: 2.29 mg/L mean measured concentration
Daphnia magna	21 d OECD 211 (1998) Semi static	Survival of parent animals and number of offsprings	NOEC = 0.32 mg/L Nominal concentration
Algae			
Desmodesmus subspicatus	72 hours OECD 201 (2006) static	Growth inhibition	$NOEC_{, 72h}$ = 3.1 mg/L (biomass) $NOEC_{, 72h}$ = 9.8 mg/L (growth rate) $E_bC_{50, 72h}$ = 17.18 mg/L $E_rC_{50, 72h}$ = 30.62 mg/L Nominal concentration
Microorganisms			
Activated sludge	3 hours OECD 209	Respiration inhibition	EC_{10} = 5.7 mg/L

Effects on earthworms or other soil non-target organisms

Acute toxicity to earthworms	OECD 207 (1984); *Eisenia fetida*; Mortality LC_{50} (14 days) = 139.4 mg/kg d.wt. soil (94.8 mg/kg d.wt. soil for an organic matter content of 3.4%)
Reproductive toxicity to earthworms	No study available

Effects on terrestrial plants

Acute toxicity to terrestrial plants (Annex IIIA, point XIII 3.4)	OECD 208 (Draft 2005); *Brassica napus*; Growth reduction EC_{50} (14 days) = 27.7 mg/kg d.wt. soil (54.3 mg/kg d.wt. soil for an organic matter content of 3.4%)

Effects on soil micro-organisms

Nitrogen mineralization	OECD 216 (2000); Nitrate transformation NOEC (28 days) = 30 mg/kg d.wt. soil (40.3 mg/kg d.wt. soil for an organic matter content of 3.4%)
Carbon mineralization	OECD 217 (2000); Respiration EC_{50} (28 days) > 19 mg/kg d.wt. soil (>34.5 mg/kg d.wt. soil for an organic matter content of 3.4%)

Effects on terrestrial vertebrates

Acute toxicity to mammals	1830 mg/kg bw (♂)
Acute toxicity to birds	U.S.-EPA FIFRA 71-1; *Colinus virginianus*, single dose LD_{50} (14 days) > 1449 mg/kg bw
Dietary toxicity to birds	US-EPA FIFRA 71-2 (1982); *Colinus virginianus*, sub-acute toxicity (5 days), LC_{50} > 2995 mg/kg feed mean measured concentration
Reproductive toxicity to birds	No study available

Effects on honeybees

Acute oral toxicity	No study available
Acute contact toxicity	No study available

Effects on other beneficial arthropods

Acute oral toxicity	No study available
Acute contact toxicity	No study available
Acute toxicity to ……..	No study available

Bioconcentration

Bioconcentration factor (BCF)	OECD 305C BCF = 5.5 – 11
Depration time (DT_{50})	Not relevant
Depration time (DT_{90})	Not relevant
Level of metabolites (%) in organisms accounting for > 10 % of residues	No metabolites identified

Chapter 6: Other End Points

None

Appendix II: List of Intended Uses

Object and/or situation	Product name	Organisms controlled	Formulation		Application			Applied amount per treatment			Remarks
			Type	Conc. of as	method kind	number min max	interval between applications (min)	g as/L min max	water L/m^2 min max	g as/m^2 min max	
In-can preservative PT 6	Preventol CMK	Bacteria and fungi	SG Pellets	998 g/kg	addition	–	?	3-5 g/kg (Initially claimed: 1-5 g/kg)	–	–	–

Appendix III: List of studies

Data protection is claimed by the applicant in accordance with Article 60 of Regulation (EU) No 528/2012.

List of Submitted Studies - Part A

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A3.10(01) A3.1(01)	Erstling, K.	2001a	Physicochemical properties: Preventol CMK (pellets). Date: 2001-11-15 Amended: 2006-03-29	Bayer AG, ZF-Zentrale Analytik, Leverkusen, Germany	A 01/0108/01 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
A3.10(02)	Ambroz, J.	2000	Determination of the stability of Preventol CMK to normal and elevated temperature. Date: 2000-09-12	ABC Laboratories, Inc., Columbia, Missouri, USA	Study No.: 46189	Yes	No	Yes	LANXESS Deutschland GmbH
A3.10(03)	Königer, A.	2010	Amendment to Physicochemical properties: Preventol CMK (pellets). Date: 2010-02-24	CURRENTA GmbH & Co. OHG, Services Analytik, Leverkusen, Germany	A 01/0108/01 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
A3.11(01)	Heitkamp, D.	2006	Determination of safety-relevant data of Preventol CMK Pastillen. Date: 2006-03-29	Bayer Industry Services GmbH & Co. OHG, Leverkusen, Germany	2006/00416	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A3.13(01)	Olf, G.	2006b	Surface tension, Physical-chemical properties. Date: 2006-03-17 Amended: 2006-05-10	Bayer AG, BTS-PT-RPT-KPM, Leverkusen, Germany	06/002/03	Yes	No	Yes	LANXESS Deutschland GmbH
A3.15(01)	Kraus, H.	2006b	4-Chloro-3-methylphenol / Explosive properties. Date: 2006-03-01	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A3.16(01)	Kraus, H.	2006c	4-Chloro-3-methylphenol / Oxidising properties. Date: 2006-03-03	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A3.17(01)	Kraus, H.	2006d	4-Chloro-3-methylphenol (CMK) / Reactivity towards container material. Date: 2006-06-01	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A3.2(01)	Olf, G.	2006a	Vapour pressure, Physical-chemical properties. Date: 2006-04-25 Amended: 2006-05-10	Bayer AG, BTS-PT-RPT-KPM, Leverkusen, Germany	06/002/01	Yes	No	Yes	LANXESS Deutschland GmbH
A3.2(02)	Beiell, U.	2006	Calculation of Henry's Law Constant of p-chloro-m-cresol (CMK). Date: 2006-05-17	Dr. Knoell Consult GmbH, Leverkusen, Germany	2006/05/17/UB	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A3.2(03)	Wielpütz, T.	2008	4-Chloro-3-methylphenol (Preventol CMK), Batch No.: CHA0152, Vapour pressure A.4 (OECD 104). Date: 2008-08-19	Siemens AG, Prozess-Sicherheit, Industriepark Hoechst, Frankfurt am Main, Germany	20080599.01	Yes	No	Yes	LANXESS Deutschland GmbH
A3.3(01)	Kraus, H.	2006a	4-Chloro-3-methylphenol / Appearance. Date: 2006-05-23	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A3.3(02)	Güldner, W.	2009	Determination of dustiness (optical dust factor) of Preventol CMK pastilles. Date: 2009-09-30	Bayer CropScience AG, Development, Formulation Technology, Monheim, Germany	FM0045(RP00)G01	Yes	No	Yes	Bayer CropScience AG
A3.4(01)	Wesener, J.	2006	Spectra. Date: 2006-03-14 Amended: 2006-04-03	Bayer Industry Services GmbH & Co. OHG, BIS-SUA-Analytics, Leverkusen, Germany	2006/0025/03	No	No	Yes	LANXESS Deutschland GmbH
A3.5(01)	Erstling, K.	2001b	Water solubility. Date: 2001-09-11	Bayer AG, ZF-Zentrale Analytik, Leverkusen, Germany	A 01/0108/02 LEV	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A3.6(01) A3.9(01)	Reusche, W.	1991	Partition coefficient, dissociation constant and pH value, Preventol CMK. Date: 1991-01-07 Amended: 2007-03-06	Bayer AG, ZF-D/ Zentrale Analytik, Leverkusen, Germany	A90/0107/03 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
A3.6(02) A3.9(02)	Erstling, K.	2001c	Partition coefficient (n-octanol/water) / dissociation constant, Preventol CMK (pellets). Date: 2001-10-23 Amended: 2001-11-14 Amended: 2006-03-29	Bayer AG, ZF-Zentrale Analytik, Leverkusen, Germany	A 01/0108/03 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
A3.6(03)	Feldhues, E.	2006a	Statement, Dissociation constant of 4-chloro-3-methylphenol Preventol CMK. Date: 2006-08-31	Bayer Industry Services, BIS-SUA-PUA I, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A3.7(01)	Jungheim, R.	2006a	Solubility of Preventol CMK (pellets) in different organic solvents at 10 °C, 20 °C and 30 °C. Date: 2006-11-30	Bayer Industry Services GmbH & Co. OHG, BIS-SUA-Analytics, Leverkusen, Germany	2006/0025/09	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A3.9(01) A3.6(01)	Reusche, W.	1991	Partition coefficient, dissociation constant and pH value, Preventol CMK. Date: 1991-01-07 Amended: 2007-03-06	Bayer AG, ZF-D/ Zentrale Analytik, Leverkusen, Germany	A90/0107/03 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
A3.9(02) A3.6(02)	Erstling, K.	2001c	Partition coefficient (n-octanol/water) / dissociation constant, Preventol CMK (pellets). Date: 2001-10-23 Amended: 2001-11-14 Amended: 2006-03-29	Bayer AG, ZF-Zentrale Analytik, Leverkusen, Germany	A 01/0108/03 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
A3.9(03)	Jungheim, R.	2006b	Calculation of the partition coefficient (1-octanol/water) at 10 °C, 20 °C and 30 °C based on water solubility and 1-octanol solubility of Preventol CMK (pellets) determined under study number A 01/0108/02 LEV and 2006/0025/09. Date: 2006-12-01	Bayer Industry Services GmbH & Co. OHG, BIS-SUA-Analytics, Leverkusen, Germany	2006/0025/08	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A3.9(04)	Feldhues, E.	2007	Appraisal of the results obtained in Bayer Report A 90/0107/03 LEV, Bayer Report A 01/0108/03 LEV and in Bayer Industry Services Report 2006/0025/08 for the partition coefficient of Preventol CMK. Date: 2007-01-29	Bayer Industry Services, BIS-SUA-PUA I, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A4.1(01)	Jungheim, R.	2006c	Validation of a GC-Method for Preventol CMK (Pellets). Date: 2006-04-21 **CONFIDENTIAL**	Bayer Industry Services GmbH & Co. OHG, BIS-SUA-Analytics, Leverkusen, Germany	Study No.: 2006/0014/01	Yes	No	Yes	LANXESS Deutschland GmbH
A4.2(01)	Brumhard, B.	2006	Analytical method 00998 for the determination of residues of Preventol CMK (4-chloro-3-methylphenol) in soil by HPLC-MS/MS. Date: 2006-08-24	Bayer Crop Science AG, Development, Residues, Operator and Consumer Safety, Monheim am Rhein, Germany	MR-06/102	Yes	No	Yes	LANXESS Deutschland GmbH
A4.2(02)	Feldhues, E.	2006b	Validation of an analytical method for the determination of Preventol CMK in air samples. Date: 2006-08-30	Bayer Industry Services, BIS-SUA-Analytics, Leverkusen, Germany	2006/0014/03	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A4.2(03)	Krebber, R.	2006	Analytical method 01004 for the determination of Preventol CMK (4-chloro-3-methylphenol) in drinking and surface water by HPLC-MS/MS. Date: 2006-09-05	Bayer Crop Science AG, Development, Residues, Operator and Consumer Safety, Monheim am Rhein, Germany	MR-06/112	Yes	No	Yes	LANXESS Deutschland GmbH
A5.3.1	Gerharz, T.	2011a	Determination of disinfectant properties o**f** Preventol® CMK in accordance to EN 1040. Date: 2011-05-26	LANXESS Deutschland GmbH, ACD TM Disinfection & Microbiology, Leverkusen, Germany	None	No	No	Yes	LANXESS Deutschland GmbH
A5.3.1	Gerharz, T.	2011b	Determination of disinfectant properties of Preventol® CMK in accordance to EN 1656 and EN 1657. Date: 2011-05-25	LANXESS Deutschland GmbH, ACD TM Disinfection & Microbiology, Leverkusen, Germany	None	No	No	Yes	LANXESS Deutschland GmbH
A5.3.1(01)	Kugler, M.	2003	Determination of the antimicrobial effects of Preventol CMK against bacteria and fungi. Date: 2003-05-22	Bayer Chemicals AG, Leverkusen, Germany	Report No. 2003-05-21	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.1.1(01)	[redacted]	1988a	Preventol CMK Untersuchung zur akuten oralen Toxizität an männlichen und weiblichen Wistar-Ratten. Date: 1988-08-18	[redacted]	17062	Yes	No	Yes	LANXESS Deutschland GmbH
A6.1.1(02)	[redacted]	1978 and 1992	Preventol CMK Untersuchung zur akuten oralen Toxizität an männlichen und weiblichen Wistar-Ratten. Date: 1992-11-24 (revised report)	[redacted]	21862	No	No	Yes	LANXESS Deutschland GmbH
A6.1.1 Non-key study	[redacted]	1981	Acute Oral Toxicity of PCMC (p-Chloro-m-cresol) to rats. Date: 1981-01-06	[redacted]	80-011-14	No	No	Yes	LANXESS Deutschland GmbH
A6.1.2(01)	[redacted]	1999	Acute Dermal Toxicity Study with Preventol CMK Pastillen in Rats. Date: 1999-10-29	[redacted]	99-A22-FN	Yes	No	Yes	Bayer Corporation

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.1.2 Non key study	[redacted]	1988b	Preventol CMK – Investigation of acute cutaneous toxicity in male and female Wistar rats. Date: 1988-08-18	[redacted]	17063	Yes	No	Yes	LANXESS Deutschland GmbH
A6.1.2 Non-key study	[redacted]	1979	Acute Dermal Administration Study in Male and Female Rabbits. Preventol CMK. Date: 1979-10-12	[redacted]	Project No. 339-108	No	No	Yes	LANXESS Deutschland GmbH
A6.1.3(01)	[redacted]	2003	PREVENTOL CMK Study on Acute Inhalation Toxicity Study in Rats according to OECD No. 403. Date: 2003-01-28	[redacted]	AT00251	Yes	No	Yes	LANXESS Deutschland GmbH
A6.1.3 Non-key study	Thyssen, J.	1981	Preventol CMK, Study for Acute Toxicity of Fumes and Dusts after Inhalation. Date: 1981-10-21	Bayer AG, Institute of Toxicology, Wuppertal, Germany	10282	No	No	Yes	LANXESS Deutschland GmbH
A6.1.4(01)	Lamb, D.W.	1976	Preventol CMK – The eye and dermal irritancy of Mobay sample p-Chloro-m-cresol. Date: 1976-11-30	Chemagro Agricultural Division, Mobay Chemical Corp. R&D	50874	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.1.4 Non-key study	Krötlinger, F.	1991	Preventol CMK. Date: 1991-02-14	Bayer AG, Fachbereich Toxikologie, Wuppertal, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A6.1.4 Non-key study	[redacted]	2006a	Preventol CMK – Acute Skin Irritation/ Corrosion on Rabbits. Date: 2006-07-24	[redacted]	AT03215	No	No	Yes	LANXESS Deutschland GmbH
A6.1.4 Non-key study	[redacted]	2006b	Preventol CMK – T 7053199 – Acute Eye Irritation on Rabbits. Date: 2006-07-24	[redacted]	AT03216	No	No	Yes	LANXESS Deutschland GmbH
A6.1.4 Non-key study	Thyssen, J.	1978	Preventol CMK, Investigation of Skin and Mucous Membrane Tolerance. Date: 1978-09-20 Addendum: 1983-01-11	Bayer AG, Institute of Toxicology, Wuppertal, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A6.1.5(01)	[redacted]	2000	Preventol CMK, Pastillen LOCAL LYMPH NODE ASSAY IN MICE (LLNA/IMDS). Date: 2000-11-13	[redacted]	PH 30408	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.1.5(02)	Bomhard, E. and Löser, E.	1980	Preventol CMK– Investigation of sensitizing effect (Maximisation test after Magnusson and Kligman). Date: 1980-01-23	Bayer AG, Institute of Toxicology, Wuppertal, Germany	8897	No	No	Yes	LANXESS Deutschland GmbH
A6.1.5 Non-key study	Bomhard, E. and Löser, E.	1981	Preventol CMK, Evaluation to determine the sensitisation effect by means of the open epicutaneous test. Date: 1981-09-25	Bayer AG, Institute of Toxicology, Wuppertal, Germany	9447	No	No	Yes	LANXESS Deutschland GmbH
A6.2(01) Non-key study	[redacted]	1980	Excretion kinetics of Preventol CMK after a single oral administration to rats. Date: 1980-12-02	[redacted]	9605	No	No	Yes	LANXESS Deutschland GmbH
A6.2(02) Non-key study	[redacted]	1981	Investigation into the detection of Preventol CMK in fatty tissue and liver tissue in rats. Date: 1981-02-17	[redacted]	9807	No	No	Yes	LANXESS Deutschland GmbH
A6.2(03) Published	Roberts, M.S. *et al.*	1977	Permeability of human epidermis to phenolic compounds.	Pharmacy Dept., Univ. of Sydney, Australia	*J. Pharm. Pharmac.* **29**, 677-683	No	Yes	No	–

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.2(04)	[redacted]	2009	Mass Balance and Metabolism of [14C]-4-Chloro-3-methylphenol in Male and Female Rats After Single Oral Administration. Date: 2009-02-19	[redacted]	C07812	Yes	No	Yes	LANXESS Deutschland GmbH
A6.2 Non-key Published	[redacted]	1998	Comparative metabolism of *ortho*-phenylphenol in mouse, rat and man.	[redacted]	*Xenobiotica* **28**(6), 579-594	No	Yes	No	–
A6.2 Non-key study Published	[redacted]	1986	Permeation of Water Contaminative Phenols Through Hairless Mouse Skin.	[redacted]	*Arch. Environ. Contam. Toxicol*. **15**, 557-566	No	Yes	No	--
A6.2 Non-key study Published	[redacted]	1986	Disposition of *o*-Benzyl-*p*-Chlorophenol in Male Rats	[redacted]	*Journal of Toxicology and Environmental Health*, 18, 441 - 458, 1986	No	Yes	No	–
A6.3.1(01)	[redacted]	1989	Preventol CMK – Range-finding subacute toxicological investigations in Wistar rats for the determination of a maximum tolerable dosage (Administration with food over 4 weeks). Date: 1989-02-20	[redacted]	17739	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.3.2(01)	[redacted]	1993a	PREVENTOL CMK – Preliminary trial for determining the dose for a sub-chronic study on male Wistar rats (dermal treatment for 4 weeks). Date: 1993-10-19	[redacted]	22606	No	No	Yes	LANXESS Deutschland GmbH
A6.3.2(02)	[redacted]	1980	Subchronic Dermal Study in Rabbits. Preventol CMK. Date: 1980-07-31	[redacted]	Project No. 339-109	Yes	No	Yes	LANXESS Deutschland GmbH
A6.3.3	Rajsekhar, P.V.	2011	14-Day Repeated Dose Inhalation Toxicity Study with Preventol CMK	International Institute of Biotechnology and Toxicology (IIBAT), Padappai, Tamil Nadu, India	Report No. 11011	Yes	No	Yes	LANXESS Deutschland GmbH
A6.4.1(01)	[redacted]	1988	Preventol CMK: Subchronic toxicological study in rats (feeding study lasting 3 month). Date: 1988-11-24	[redacted]	17414 (revision of Report No. 10283)	No	No	Yes	LANXESS Deutschland GmbH
A6.4.2(01)	[redacted]	1991	Preventol CMK: Subchronic Toxicity Study in Wistar Rats (Dermal Treatment for 13 Weeks). Date: 1991-08-30	[redacted]	20585	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.4.1 Non-key study	[redacted]	1981	Preventol CMK: Subchronic toxicological test in rats. 3-Month feeding test. Date: 1981-10-21	[redacted]	10283	No	No	Yes	LANXESS Deutschland GmbH
A6.5(01) A6.7(01)	[redacted]	1993b	Preventol CMK: Chronic Toxicity and Carcinogenicity Study in Wistar Rats (Administration in Feed for 105 Weeks). Date: 1993-04-02 Addendum: 1994-12-06	[redacted]	22168	Yes	No	Yes	LANXESS Deutschland GmbH
A6.6.1(01)	Herbold, B.A.	1991	Preventol CMK – Salmonella/Microsome Plate Test. Date: 1991-08-08	Bayer AG, Wuppertal, Germany	20516	Yes	No	Yes	LANXESS Deutschland GmbH
A6.6.2(01)	[redacted]	1988	Mutagenicity Test on Preventol CMK in the Rat Primary Hepatocyte Unscheduled DNA Synthesis Assay. Date: 1988-10-04	[redacted]	R 4545	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.6.3(01)	Lehn, H.	1989	Preventol CMK – Mutagenicity Study For The Detection Of Induced Forward Mutations in the CHO-HGPRT Assay in vitro. Date: 1989-02-22	Bayer AG, Wuppertal, Germany	17755	Yes	No	Yes	LANXESS Deutschland GmbH
A6.6.4(01)	[redacted]	1990	Preventol CMK MICRONUCLEUS TEST ON THE MOUSE. Date: 1990-01-17 Amended: 1991-08-08	[redacted]	18686 Amendment: 18686A	Yes	No	Yes	LANXESS Deutschland GmbH
A6.6.4 Non-key study	[redacted]	1981	Preventol CMK. Micronucleus Test on the Mouse to test for a Mutagenic Effect. Date: 1981-10-16	[redacted]	10255	No	No	Yes	LANXESS Deutschland GmbH
A6.7(01) A6.5(01)	[redacted]	1993b	Preventol CMK: Chronic Toxicity and Carcinogenicity Study in Wistar Rats (Administration in Feed for 105 Weeks). Date: 1993-04-02 Addendum: 1994-12-06	[redacted]	22168	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.8.1(01)	[redacted]	1991	Preventol CMK - Study for embryotoxic effects in rats after oral administration. Date: 1991-11-29	[redacted]	20869	Yes	No	Yes	LANXESS Deutschland GmbH
A6.8.2(01)	[redacted]	2006b	4-Chloro-3-methylphenol – Two-Generation Reproduction Study in Rats by Administration in the Diet. Date: 2006-12-19	[redacted]	AT03531	Yes	No	Yes	LANXESS Deutschland GmbH
A6.8.2 Non-key	[redacted]	2006a	4-Chloro-3-methylphenol (Preventol CMK), One-Generation Reproduction Study in Wistar Rats (Pilot Study for a Two-Generation Reproduction Study with Administration in the Diet). Date: 2006-02-06	[redacted]	AT02804	Yes	No	Yes	LANXESS Deutschland GmbH
A6.9 Non-key study	Leser, K.H.	1992	Preventol CMK (PCMC) / Adverse neurological effects. Date: 1992-09-07	Bayer AG, GB PH/F+E, Institut für Toxikologische Industriechemikalien, Wuppertal, Germany	--	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.10 Non-key study Published	Meiss, R. *et al.*	1981	New aspects of the origin of hepatocellular vacuoles.	Univ. of Münster, Germany	*Exp. Path.* **19**, 239-246	No	Yes	No	–
A6.10 Non-key study Published	[redacted]	1980	Alterations in the Rat Liver Induced by p-Chlor-m-Cresol with Emphasis on the Intercellular Junctions.	[redacted]	*J. Submicrosc. Cytol.* **12**(4), 635-646	No	Yes	No	–
A6.11 Non-key study Published	Wien, R.	1939	The Toxicity of *Para*chloro*meta*cresol and of Phenylmercuric Nitrate.	–	*Q.J. Pharm. Pharmacol.* **12**, 212-229	No	Yes	No	–
A6.12.2(01)	Ainley, E.J., Mackie, I.G. and Macarthur, D.	1977	Adverse reaction to chlorocresol-preserved heparin.	University Hospital of Wales, Cardiff, UK	*Lancet* **1**: 705	No	Yes	No	–
A6.12.2(02) A6.12.6	Hancock, B.W. and Naysmith, A.	1975	Hypersensitivity to Chlorocresol-preserved Heparin. *British Medical Journal:* 746-747, 1975	Royal Hospital, Sheffield, UK	*British Medical Journal*, 746 – 747,	No	Yes	No	--
A6.12.2(03)	Joppich, G.	1960	Tödliche Vergiftung durch Sagrotan bei Säuglingen.	University Children's Hospital Göttingen, Germany	*Deut. Med. J.* **11**; 20 -21	No	Yes	No	--

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.12.2(04) Published	Wiseman, H.M. *et al.*	1980	Acute poisoning to Wright´s Vaporizing Fluid.	National Poisons Information Service, London, UK	*Postgraduate Medical Journal:* 56, 166 - 168 (1980)	No	Yes	No	--
A6.12.2 Non-key Published	Jonsson, J. and Voigt, G.E.	1984	Homicidal intoxications by lye- and parachlorcresol-containing disinfectants.	State Dept. of Forensic Chemistry, Linköping, Sweden	*Am. J. Forensic Med. Pathol.* **5**(1), 57-63	No	Yes	No	--
A6.12.6(01)	Angelini, G. *et al.*	1975	Contact dermatitis in patients with leg ulcers.	Dept. of Dermatology, Univ. of Bari, Italy	*Contact Dermatitis* **1**, 81-87	No	Yes	No	–
A6.12.6(02) published	Oleffe J.A. *et al.*	1979	Allergy to chlorocresol and propylene glycol in a steroid cream to chlorocresol-preserved heparin	–	*Contact Dermatitis* **5**: 53-54	No	Yes	No	--
A6.12.6(03) published	Lewis, P.G. and Emmett, E.A.	1987	Irritant dermatitis from tri-butyl tin oxide and contact allergy from chlorocresol.	Johns Hopkins Medical Institutions, Baltimore, MD, USA	*Contact Dermatitis* **7**: 129-132, 1987	No	Yes	No	--
A6.12.6 Non-key study Published	Andersen, K.E. and Veien, N.K.	1985	Biocide patch tests	Gentofte Hospital, Hellerup, Denmark	*Contact Dermatitis* **12**, 99-103	No	Yes	No	–
A6.12.6 Non-key Published	Archer, C.B. and MacDonald, D.M.	1984	Chlorocresol sensitivity induced by treatment of allergic contact dermatitis with steroid creams.	Dept. of Dermatology, Guy's Hospital, London, UK	*Contact Dermatitis* **11**, 144-145	No	Yes	No	–

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A6.12.6 Non-key study Published	Brasch, J. *et al.*	1993	Patch Test Reactions to a Preliminary Preservative Series.	Information Network of Dermatological Clinics (IVDK)	*Dermatosen* **41**,2; 71-76	No	Yes	No	--
A6.12.6 Non-key study Published	Burry, J.N. *et al.*	1975	Chlorocresol sensitivity	St. Peters, South Australia	*Contact Dermatitis* **1**, 41-42	No	Yes	No	--
A6.12.6 Non-key study Published	de Boer, E.M. *et al.*	1989	Dermatoses in metal workers (II). Allergic contact dermatitis.	Free University Academic Hospital, Amsterdam, The Netherlands	*Contact Dermatitis* **20**, 280-286	No	Yes	No	–
A6.12.6 Non-key study Published	Dooms-Goossen, A. *Et al.*	1981	Chlorocresol and chloracetamide: Allergens in medications, glues, and cosmetics	Dept. Of Dermatology, Academisch Ziekenhuis St.Peter, Leuven, Belgium	*Contact Dermatitis* **7**, 51-52	No	Yes	No	–
A6.12.6 Non-key study Published	Freitas, J.P. and Brandao, F.M.	1986	Contact urticaria to chlorocresol.	Dept. Of Dermatology, Santa Maria Hospital, Lisbon, Portugal	*Contact Dermatitis* **15**, 252	No	Yes	No	–
A6.12.6 Non-key study Published	Geier, J. *et al.*	1996	Contact Allergy due to Industrial Biocides.	Information Network of Dermatological Clinics (IVDK)	*Dermatosen* **44** (4), 154-159	No	Yes	No	--
A6.12.6 Non-key study Published	Goncalo, M. *et al.*	1987	Immediate and delayed sensitivity to chlorocresol.	Clinica de Dermatologica e Venereologica, Coimbra, Portugal	*Contact Dermatitis* **17**, 46-47	No	Yes	No	--

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A6.12.6 A6.12.2(02)	Hancock, B.W. and Naysmith, A.	1975	Hypersensitivity to Chlorocresol-preserved Heparin. *British Medical Journal:* 746-747, 1975	Royal Hospital, Sheffield, UK	*British Medical Journal*, 746 – 747,	No	Yes	No	--
A6.12.6 Non-key study published	Rudner, E.J.	1977	North American Group Results	–	*Contact Dermatitis* **3**: 208-209	No	Yes	No	–
A6.12.6 Non-key study Published	Uter, W. *et al.*	1993	Contact Allergy in Metal Workers.	Information Network of Dermatological Clinics (IVDK) in Germany	*Dermatosen* **41**(6), 220-227	No	Yes	No	–
A6.12.6 Non-key study Published	Wilkinson, J.D. *et al.*	1980	Comparison of Patch Test Results in Two Adjacent Areas of England. II. Medicaments.	Slade Hospital, Oxford & Wycombe General Hospital, England	*Acta Dermatovener (Stockholm)* **60**, 245-249	No	Yes	No	
A6.12.7 A6.12.8	Joppich, G.	1962	Klinik und Behandlung der Sagrotanvergiftung. *Deut. Med. J.*:11; 20 -21, 1960	University Children's Hospital Göttingen, Germany	*Deut. Med. J.* **13**; 691-693	No	Yes	No	--
A7.1.1.1.1(01)	Erstling, K. and Feldhues, E.	2001a	Abiotic degradation. Date: 2001-08-31 Amended: 2007-02-22	Bayer AG, Zentrale Analytik, Leverkusen, Germany	A 01/0108/04 LEV	Yes	No	Yes	LANXESS Deutschland GmbH

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A7.1.1.1.2(01)	Wilmes, R.	1988	Tests to determine the photodegradation of 4-chloro-3-methylphenol (Preventol CMK) in water. Determination of the quantum yield of direct photodegradation in water in polychromatic light (ECETOC method). Date: 1988-05-30	Bayer AG, Sector 5. Agrochemicals Business Group, PF-F/CE-ME, Monheim, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.1.2.1(01)	Müller, G.	1992	Investigations of the ecological behaviour of Preventol CMK Date: 1992-02-25	Bayer AG, Institut für Umweltananlyse und Bewertungen, Leverkusen, Gemany	A 330 A/91	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.1.2.1(02)	Weyers, A.	2007	Preventol CMK – Biodegradation. Re-Evaluation based on Study Report 330 A/91, corresponding raw data and additional information provided by the sponsor. Date: 2007-03-09 Amended: 2007-03-16	Bayer Industry Services, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH

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A7.1.1.2.1(01, 02, 04)	Neuhahn, A.	2012	2. Amendment to GLP-Final Report Study Title: Biodegradation. Re-evaluation based on study report 330 A/91. Date: 2012-05-14	Currenta GmbH & Co. OHG, Leverkusen, Germany	-	No	No	Yes	LANXESS Deutschland GmbH
A7.1.1.2.1(03)	Hanstveit, A.O. and Pullens, M.A.H.L.	1993	The biodegradability of the product Preventol CMK in a closed bottle test according to a draft OECD guideline: ready biodegradability; the influence of inoculum activity. Date: 1993-01-15 Amended: 2007-03-30	TNO Institute of Environmental Sciences, Delft, The Netherlands	R 92/198	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.1.2.1(04) A7.1.1.2.2(02) Non-key study	Neuhahn	1981	Biodegradability of Preventol CMK (4-chloro-3-methyl-phenol), OECD 301 D. Date: 1981-05-26	Bayer AG, OC-P/Ökologie, Leverkusen, Germany	NHH-Go/2694	No	No	Yes	LANXESS Deutschland GmbH

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A7.1.1.2.1(05) Non-key study	N.N.	1985	Biodegradability of Preventol CMK (4-chloro-3-methyl-phenol), OECD 301 C. Date: July 1985	Bayer AG, WV-UWS/LE, Microbiology, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.1.2.1(06) A7.1.2.1.1(01) Non-key study	Cernick, S.L.	1999	A study of the biodegradability of 4-chloro-3-methylphenol by aerobic biological treatment. Date: 1999-05-13	Duquesne University	--	No	Yes	No	--
A7.1.1.2.2(01)	Thompson, R.S.	1993	Parachlorometacresol : Further study of inherent biodegradability. Date: 1993-06-29	Brixham Environmental Laboratory, Zeneca limited, Brixham Devon, UK	BL4783/B	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.1.2.2(02) A7.1.1.2.1(04) Non-key study	Neuhahn	1981	Biodegradability of Preventol CMK (4-chloro-3-methyl-phenol), OECD 301 D. Date: 1981-05-26	Bayer AG, OC-P/Ökologie, Leverkusen, Germany	NHH-Go/2694	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(01) A7.1.1.2.1(06) Non-key study	Cernick, S.L.	1999	A study of the biodegradability of 4-chloro-3-methylphenol by aerobic biological treatment. Date: 1999-05-13	Duquesne University	--	No	Yes	No	--

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A7.1.2.1.1(02) Non-key study	Dohm	1981	Biodegradability of Preventol CMK. Date: 1981-08-20	Bayer Uerdingen Site, Organic Chemicals Division, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(03) Non-key study	Dohm	1984	CMK content in ppb in wastewater, Uerdingen wastewater treatment plant. Date: 1984-07-03	Bayer Uerdingen Site, Organics BG, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(04) Non-key study	Dohm	1985	CMK in the wastewater treatment plant outlet. Date: 1985-03-01	Bayer Uerdingen Site, Organics BG, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(05) Non-key study	N.N.	1981	Degradability of p-chloro-m-cresol in the central biological wastewater treatment plant Uerdingen. Date: 1981-08-25	Bayer Uerdingen Site, UE Environmental Protection/AWALU, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(06) Non-key study	N.N.	1983	Elimination of p-chloro-m-cresol (CMK) in the biological wastewater treatment plant Uerdingen. Date: 1983-01-07	Bayer Uerdingen Site, UE Environmental Protection/AWALU, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH

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A7.1.2.1.1(07) Non-key study	N.N.	1986	Elimination of chlorometacresol (CMK) in the 2-stage biological wastewater treatment plant UE. Date: 1986-05-16	Bayer Uerdingen Works, WV-UE Environmental Protection/AWALU, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(08) Non-key study	N.N.	1988	CMK concentration in the discharge of the Uerdingen biological wastewater treatment plant. Date: 1988-12-02	Bayer Uerdingen Site, WV-UE Environmental Protection/AWALU, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(09) Non-key study	Rother	1996	Preventol CMK, CMK-Na: Analysis of Wastewater from the Leather Industry Date: 1996-01-25	Bayer, Material Protection Unit, Organic Chemicals Business Group, Uerdingen	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(10) Non-key study	Morris, R.	2002	Bench Scale Biological Treatment of Preventol CMK for General Motor's Lansing Plant #5 Date: 2002-08-30	Bayer's Corporate Environmental Testing Services Laboratory, New Martinsville, West Virginia	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1 (11) Non-key Published	Bolz, U. et al.	1999	Determination of phenolic xenoestrogens in sediments and sewage sludges by HRGC/LRMS. *Organohalogen Compounds, Vol. 40, 65-68.*	-	-	No	Yes	No	-

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A7.1.2.1.1 (11) Non-key Published	Bolz, U. et al.	2001	Phenolic xenoestrogens in surface water, sediments, and sewage sludge from Baden-Württemberg, south-west Germany. *Environmental Pollution, 115, 291-301*	-	-	No	Yes	No	-
A7.1.2.1.1 Non-key Published	Körner, W. et al.	1998	Input/output balance of estrogenic active compounds in a major municipal sewage plant in Germany. *Organohalogen Compounds, Vol. 37, 269-272.*	-	-	No	Yes	No	-
A7.1.2.1.1(11) Non-key Published	Körner, W. et al.	2000	Input/output balance of estrogenic active compounds in a major municipal sewage plant in Germany. *Chemosphere, Vol. 40, 1131-1142*	-	-	No	Yes	No	-

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A7.1.2.1.1(11) Non-key published	Schnaak, W. et al.	1997	Organic contaminants in sewage sludge and their ecotoxicological significance in the agricultural utilization of sewage sludge. *Chemosphere, Vol. 35, 5-11.*	-	-	No	Yes	No	-
A7.1.2.1.1(11) Non-key published	Ternes, Th. A.	1998	Simultaneous determination of antiseptics and acidic drugs in sewage and river water. *Vom Wasser, 90, 295-309.*	-	-	No	Yes	No	-
A7.1.2.1.2(01)	Reis, K.-H.	2007	Anaerobic biodegradability of 4-chloro-3-methylphenol (Preventol CMK) in digested sludge: Measurement of gas production	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	32321168	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.2(02)	Voets, J.P., Pipyn, P., van Lancker, P. and Verstrate, W.	1976	Degradation of Microbiocides under Different Environmental Conditions. *J. appl. Bact., 40, 67 - 72, 1976*	Laboratory of General and Industrial Microbiology, State University of Gent, Gent, Belgium.	--	No	Yes	No	--

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A7.1.2.1.2(03)	O'Conner, O.A. & Young, L.Y.	1989	Toxicity and anaerobic biodegradability of substituted phenols under methanogenic conditions. *Environ. Toxicol. Chem.* 8, 853 – 862, 1989	Institute of Environmental Medicine and Department of Microbiology, New York University Medical Center, New York, USA	--	No	Yes	No	--
A7.1.2.1.2(04)	Kirk, P.W.W. & Lester, J.N.	1989	Degradation of phenol, selected chlorophenols and chlorophenoxy herbicides during anaerobic sludge digestion. *Environm. Technol. Lett. 10, 405 – 414, 1989*	Public Health Engineering Laboratory, Department of Civil Engineering, Imperial College of Science, Technology and Medicine, London, UK	--	No	Yes	No	--
A7.1.2.1.2(05)	Feil, N.	2009	Anaerobic biodegradability of 4-Chloro-3-methylphenol (Preventol CMK) in digested sludge: Measurement of gas production.	Institut für biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	45822168	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.2(06)	Möndel, M.	2010a	Anaerobic biodegradability of Preventol CMK in digested sludge Date: 2010-05-26	RLP AgroScience GmbH, Neustadt a.d. Weinstraße, Gemany	AS 142	Yes	No	Yes	LANXESS Deutschland GmbH

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A7.1.2.1.2(07) A7.2.1/A7.2.2	Gerharz, T.	2011a	Degradation of 4-chloro-3-cresol in pork liquid manure under anaerobic conditions. Date: 20111-05-26	LANXESS Deutschland GmbH, Leverkusen, Germany	D 2011-10	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.2.1(01)	Rast, H.-G. and Kölbl, H.	1987	Microbial degradation of Preventol CMK in Rhine water. Date: 1987-10-20 Amended:	Bayer AG, FBT Leverkusen, Germany	LEV 14/76 and LEV 11/76	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.2.1(02) A7.2.1/A7.2.2	Gerharz, T.	2011b	Degradation of 4-chloro-3-cresol in a liquid environment (washing water after stable cleaning – stable with laying hens). Date: 2011-05-26	LANXESS Deutschland GmbH, Leverkusen, Germany	None	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.2.2(01)	Möndel, M.	2009	^{14}C-Preventol CMK: Aerobic degradation of ^{14}C-Preventol CMK in two different aquatic sediment systems. Date: 2009-03-26	RLP AgroScience GmbH, Neustadt a.d. Weinstraße, Gemany	AS 85	Yes	No	Yes	LANXESS Deutschland GmbH

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A7.1.2.2.2(02)	Möndel, M.	2010b	^{14}C-Preventol CMK: Characterisation of non-identified radioactivity of ^{14}C-Preventol CMK in aquatic sediment systems. Date: 2010-05-21	RLP AgroScience GmbH, Neustadt a.d. Weinstraße, Gemany	AS 139	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.2.2.2(03) / B7.5(05)	Dixon, E.M.	1997	Proposed environmental quality standards for 4-chloro-3-methyl-phenol in water. Draft final report to the Department of the Environment, UK. 72p	-	No	Yes	No	-	-
A7.1.2.2.2(03)	Bolz, U. *et al.*	1999	Determination of phenolic xenoestrogens in sediments and sewage sludges by HRGC/LRMS. *Organohalogen Compounds, Vol. 40, 65-68.*	-	-	No	Yes	No	-

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A7.1.2.2.2(03) / B7.5(04)	Bolz, U. *et al.*	2001	Phenolic xenoestrogens in surface water, sediments, and sewage sludge from Baden-Württemberg, south-west Germany. *Environmental Pollution, 115, 291-301*	-	-	No	Yes	No	-
A7.1.2.2.2(03)	Körner, W. *et al.*	2001	Steroid analysis and xenosteroid potentials in two small streams in southwest Germany. *Journal of Aquatic Ecosystem Stress and Recovery, 8, 215-229.*	-	-	No	Yes	No	-
A7.1.2.2.2(03) / B7.5(06)	Lacorte, S. *et al.*	2001	Main findings and conclusions of the implementation of Directive 76/464/CEE concerning the monitoring of organic pollutants in surface waters (Portugal, April 1999 – May 2000). Journal of Environmental Monitoring, 3, 475-482	-	-	No	Yes	No	-

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A7.1.2.2.2(03) / B7.5(03)	Schmidt-Bäumler, K., *et al.*	1999	Occurrence and distribution of organic contaminants in the aquatic system in Berlin. Part II: substituted phenols in Berlin surface water.	-	-	No	Yes	No	-
B7.5(01) Non-key study	Grote	1987	No title. Date: 1987-07-14	LE Environmental Protection/ AWALU, Analytics, Air Laboratory, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B7.5(02) Non-key study	Oblak	1989	Determination of 4-chloro-3-methylphenol (CMK) in Rhine water (Ultra Trace range). Date: 1989-12-06	Bayer AG, Uerdingen, Central Analytics, Uerdingen, Germany	LM Ue 50/89	No	No	Yes	LANXESS Deutschland GmbH
A7.1.3(01)	Erstling, K. and Feldhues, E.	2001b	Adsorption/Desorption. Date: 2001-09-13 Amended: 2001-11-13 and 2007-02-22	Bayer AG, ZF – Zentrale Analytik, Leverkusen, Germany	A 01/0108/05/ LEV	Yes	No	Yes	LANXESS Deutschland GmbH

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A7.1.3(01) Non-key study/ published	Ohlenbusch, G., Kumke, M.U. and Frimmel, F.H.	2000	Sorption of phenols to dissolved organic matter investigated by solid phase microextraction. *The Science of the Total Environment 253, 63 – 74, 2000*	Bereich Wasserchemie, Universität Karlsruhe, Germany	--	No	Yes	No	--
A7.1.3(02) and A7.2.3.1(01)	Meinerling, M.	2007	Determination of the Adsorption / Desorption behaviour of 4-Chloro-3-methylphenol (Preventol CMK) Date: 2007-06-20	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany,	32323195	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.3(02) and A7.2.3.1(01)	Meinerling, M.	2008	Determination of the Stability of 4-Chloro-3-methylphenol (Preventol CMK) in Soils of an Adsorption/Desorption Study	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	45821195	Yes	No	Yes	LANXESS Deutschland GmbH
A7.2.1/ A7.2.2 Non-key study/ published	Federle, T.W.	1988	Mineralization of monosubstituted aromatic compounds in unsaturated and saturated subsurface soils. Can. J. Microbiol. 34: 1037-1042	-	-	No	Yes	No	--

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A7.2.1/A7.2.2/ A7.1.2.1.2(07)	Gerharz, T.	2011a	Degradation of 4-chloro-3-cresol in pork liquid manure under anaerobic conditions. Date: 20111-05-26	LANXESS Deutschland GmbH, Leverkusen, Germany	D 2011-10	No	No	Yes	LANXESS Deutschland GmbH
A7.2.1/A7.2.2 A7.1.2.2.1(02)	Gerharz, T.	2011b	Degradation of 4-chloro-3-cresol in a liquid environment (washing water after stable cleaning – stable with laying hens). Date: 2011-05-26	LANXESS Deutschland GmbH, Leverkusen, Germany	None	No	No	Yes	LANXESS Deutschland GmbH
A7.2.1/ A7.2.2 Non-key study/ published	Gerharz, T.	2011c	Vaporisation behaviour of 4-chloro-3-methylphenol from an inert surface (glass petri dish)	LANXESS Deutschland GmbH, Leverkusen, Germany	Lab Report ID: D 2011-22.1.5	No	No	Yes	LANXESS Deutschland GmbH
A7.2.1/ A7.2.2 Non-key study/ published	Loehr, R.C. and Matthews, J.E.	1992	Loss of organic chemicals in soil. Pure compound treatability studies. *Journal of Soil Contamination **1(4)**, 339-360, 1992*	Environmental and Water Resources Engineering Laboratories, Texas, Austin, USA	--	No	Yes	No	--

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A7.2.1/ A7.2.2 Non-key study/ published	Sattar, M.A.	1989	Fate of chlorinated cresols from environmental samples. *Chemosphere **19** (8/9), 1421 – 1426, 1989*	Department of Soil Science, Agricultural University, Mymensingh, Bangladesh	--	No	Yes	No	--
A7.2.2.1	Nitsche, M.	2011	Biodegradation of Preventol® CMK (4-Chloro-3-methylphenol) in soil under aerobic conditions.	LANXESS Deutschland GmbH	2011-07-25	No	No	Yes	LANXESS Deutschland GmbH
A7.2.3.1(01) and A7.1.3(02)	Meinerling, M.	2007	Determination of the Adsorption / Desorption behaviour of 4-Chloro-3-methylphenol (Preventol CMK) Date: 2007-06-20	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany,	32323195	Yes	No	Yes	LANXESS Deutschland GmbH
A7.2.3.1(02) and A7.1.3(02)	Meinerling, M.	2008	Determination of the Stability of 4-Chloro-3-methylphenol (Preventol CMK) in Soils of an Adsorption/Desorption Study	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	45821195	Yes	No	Yes	LANXESS Deutschland GmbH
A7.2.3.2 Non-key study	Brown, K.W., Barbee, G.C. and Thomas, J.C.	1990	Detecting organic contaminants in the unsaturated zone using soil and soil-pore water samples.	--	*Hazardous Waste and Hazardous Materials **7 (2)**, 151 – 168*	No	Yes	No	--

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A7.3.1(01)	Anthe, M.	2006	p-Chloro-m-cresol. Calculation of indirect photodegradation. Date: 2006-07-05	Dr. Knoell Consult GmbH, Leverkusen, Germany	KC-PD-04/06	No	No	Yes	LANXESS Deutschland GmbH
A7.4.1.1(01)	[redacted]	1993a	Acute Toxicity of Preventol CMK Technical to the Rainbow Trout (*Oncorhynchus mykiss*) Under Static Renewal Conditions. Date: 1993-02-19	[redacted]	105020	Yes	No	Yes	LANXESS Deutschland GmbH
A7.4.1.2(01)	Gagliano, G.G. and Bowers, L.M.	1993b	Acute Toxicity of Preventol CMK technical to the Waterflea (*Daphnia magna*) under static conditions. Date: 1993-02-19	Miles Incorporated, Agriculture Division, South Metcalf, Stilwell, Kansas, US	105021	Yes	No	Yes	LANXESS Deutschland GmbH
A7.4.1.3(01)	Caspers, N.	1983/1991	Preventol CMK (4-chloro-3-methyl-phenol) – Growth Inhibition Test Algae. Date: 1991-01-28	Bayer AG, WV-Umweltschutz, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.4.1.3(02)	Weyers, A.	2006a	Preventol CMK – Algae, Growth Inhibition Test. Re-Evaluation based on Study Report Growth Inhibition Test Algae (1983) and the corresponding raw data. Date: 2006-07-07	Bayer Industry Services, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.4.1.3(03)	Vinken, R. and Wydra, V.	2007	Toxicity of 4-Chloro-3-methylphenol (Preventol CMK) to *Desmodesmus subspicatus* in an Algal Growth Inhibition Test. Date: 2007-01-04	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	Project No. 32324210	Yes	No	Yes	LANXESS Deutschland GmbH
A7.4.1.4(01)	Kanne, R.	1988	Preventol CMK – Toxicity towards Bacteria. Date: 1988-02-10	Bayer AG, WV-LE Umweltschutz, Leverkusen, Germany	88105507	No	No	Yes	LANXESS Deutschland GmbH
A7.4.1.4(02)	Weyers, A.	2006b	Preventol CMK – Toxicity towards Bacteria. Re-Evaluation based on Study Report No. 88105507, corresponding raw data and additional information provided by the sponsor. Date: 2006-06-29	Bayer Industry Services, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.4.1.4(03)	Neuhahn, A.	2008	Activated Sludge, Respiration Inhibition Test with Preventol CMK Pastillen. Date: 2008-08-19	Currenta GmbH & Co. OHG, Services Analytik, Leverkusen, Germany	2006/0025/16	Yes	No	Yes	Lanxess Deutschland GmbH
A7.4.2(01)	Paul, A.	2007	p-Chloro-m-cresol (CMK) – Calculation of the bioconcentration factor (BCF) Date: 2007-05-31	DR. KNOELL CONSULT GmbH, Mannheim, Germany	KC-BCF-07/07	No	No	Yes	LANXESS Deutschland GmbH
A7.4.2(02) Non-key study/ published	MITI (Ministry of International Trade & Industry)	1992	Biodegradation and bioaccumulation: Data of existing chemicals based on the CSCL Japan. Published by Japan Chemical Industry Ecology-Toxicology & Information Center, 1992	--	--	No	Yes	No	--
A7.4.2(03) Non-key study/ published	Jennings, J.G., de Nys, R., Charlton, T.S., Duncan, M.W. and Steinberg, P.D.	1996	Phenolic compounds in the nearshore waters of Sidney, Australia. *Mar. Freshwater Res.* ***47****, 951 – 959, 1996*	--	--	No	Yes	No	--

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.4.3.1(01)	Caspers, N. and Müller, G.	1991	Preventol CMK: Prolonged Toxicity Test with Zebrafish (Brachydanio rerio). Date: 1991-11-13	Bayer AG, Institut für Umweltanalyse und Bewertungen, Leverkusen, Germany	212 A/90FL	Yes	No	Yes	LANXESS Deutschland GmbH
A7.4.3.1(02)	Weyers, A.	2006c	Preventol CMK – Fish, prolonged toxicity test. Re-Evaluation based on Study Report 212 A/90FL, corresponding raw data and additional information provided by the sponsor. Date: 2006-07-05	Bayer Industry Services, Leverkusen, Germany	--	Yes	No	Yes	LANXESS Deutschland GmbH
A7.4.3.2(01)	[redacted]	2007	Toxicity of 4-Chloro-3-methylphenol (Preventol CMK) to Rainbow Trout (*Oncorhynchus mykiss*) in a Prolonged Semi Static Test over 28 Days. Date: 2007-03-28	[redacted]	32325231	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.4.3.4(01) Non-key study/ published	Kühn, R., Pattard, M., Pernak, K.-D. Winter, A.	1988	Research Report 10603052: Harmful effects of chemicals in the *Daphnia* reproduction test as a basis for assessing their environmental hazard in aquatic systems. Date: 1988-03-31	Instiute for Water, Land and Air Hygiene of the Federal German Health Office	--	No	Yes	No	--
A7.4.3.4(01) Non-key study/ published	Jungheim R	2006	Addendum to Research Report 10603052: Harmful effects of chemicals in the *Daphnia* reproduction test as a basis for assessing their environmental hazard in aquatic systems.	Bayer Industry Services, Leverkusen, Germany	--	Yes	No	Yes	LANXESS Deutschland GmbH
A7.4.3.4(02)	Weyers, A.	2007	Preventol CMK Pastillen - Daphnia magna Reproduction Test. Date: 2007-03-08	Bayer Industry Services GmbH & Co. OHG, Leverkusen, Germany	2006/0025/10	Yes	No	Yes	Lanxess Deutschland GmbH
A7.5.1.1(01)	Reis, K.-H.	2007	Effects of 4-Chloro-3-methylphenol (Preventol CMK) on the activity of the soil microflora in the laboratory.	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	32322080	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.5.1.1(02)	Schulz, L.	2012	Preventol CMK – Effects on the activity of soil microflora (Nitrogen transformation test). Date: 2012-04-13.	BioChem agrar, Labor für biologische und chemische Analytik GmbH 04827 Gerichshain, Germany	Project-No. 12 10 48 011 N,	Yes	No	Yes	LANXESS Deutschland GmbH
A7.5.1.2	Lührs, U.	2007	Acute Toxicity (14 Days) of 4-Chloro-3-methylphenol (Preventol CMK) to the Earthworm *Eisenia fetida* in Artificial Soil with 5% Peat. Date: 2007-01-17	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	Project No. 32326021	Yes	No	Yes	LANXESS Deutschland GmbH
A7.5.1.3(01)	Buetzler, R. and Meinerling, M.	2007	Effects of Preventol CMK on terrestrial (non-target) plants: Seedling emergence and seedling growth test	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	32327086	Yes	No	Yes	LANXESS Deutschland GmbH
A7.5.3.1.1(01)	[redacted]	1993a	Preventol CMK: An acute oral LD_{50} with Bobwhite Quail. Date: 1993-02-19	[redacted]	105005	Yes	No	Yes	LANXESS Deutschland GmbH
A7.5.3.1.2(01)	[redacted]	1993b	Preventol CMK: A subacute dietary LD_{50} with Bobwhite Quail. Date: 1993-02-19	[redacted]	105006	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-A	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.5.5(01)	Fàbregas, E.	2007	p-Chloro-m-cresol (CMK) – Calculation of the bioconcentration factor in earthworms (BCFearthworm). Date: 2007-05-30	DR. KNOELL CONSULT GmbH, Mannheim, Germany	KC-BCF-06/07	No	No	Yes	LANXESS Deutschland GmbH
Published	European Commission	2000	IUCLID Dataset – CAS No. 108-95-2 - Phenol	-	-	No	Yes	No	-
Published	United States Environmental Protection Agency (EPA) (Ed.)	2009	Reregistration Eligibility Decision for Phenol & Salts	-	EPA 739-R-08-010	No	Yes	No	-

List of Submitted Studies - Part B

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
B2.2(01)	Anonymous	2002	Product specification Preventol CMK pellets. Date: 2002-08-16	LANXESS Deutschland GmbH, Leverkusen, Germany	Art.-No.: 04189671	No	No	Yes	LANXESS Deutschland GmbH
B2.3(01) B3.1(01)	Kraus, H.	2006a	4-Chloro-3-methylphenol / Appearance. Date: 2006-05-23	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A3.10(01)	Erstling, K.	2001	Physicochemical properties: Preventol CMK (pellets). Date: 2001-11-15 Amended: 2006-03-29	Bayer AG, ZF-Zentrale Analytik, Leverkusen, Germany	A 01/0108/01 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
A3.10(02) B3.7(01)	Ambroz, J.	2000	Determination of the stability of Preventol CMK to normal and elevated temperature. Date: 2000-09-12	ABC Laboratories, Inc., Columbia, Missouri, USA	Study No.: 46189	Yes	No	Yes	LANXESS Deutschland GmbH
A3.11(01) B3.4(01)	Heitkamp, D.	2006	Determination of safety-relevant data of Preventol CMK Pastillen. Date: 2006-03-29	Bayer Industry Services GmbH & Co. OHG, Leverkusen, Germany	2006/00416	Yes	No	Yes	LANXESS Deutschland GmbH
A3.15(01) B3.2(01)	Kraus, H.	2006a	4-Chloro-3-methylphenol / Explosive properties. Date: 2006-03-01	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A3.16(01) B3.3(01)	Kraus, H.	2006b	4-Chloro-3-methylphenol / Oxidising properties. Date: 2006-03-03	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A3.17(01) A8.1(02) B8.1(02)	Kraus, H.	2006c	4-Chloro-3-methylphenol (CMK) / Reactivity towards container material. Date: 2006-06-01	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B3.2(01) A3.15(01)	Kraus, H.	2006a	4-Chloro-3-methylphenol / Explosive properties. Date: 2006-03-01	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B3.3(01) A3.16(01)	Kraus, H.	2006b	4-Chloro-3-methylphenol / Oxidising properties. Date: 2006-03-03	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B3.4(01) A3.11(01)	Heitkamp, D.	2006	Determination of safety-relevant data of Preventol CMK Pastillen. Date: 2006-03-29	Bayer Industry Services GmbH & Co. OHG, Leverkusen, Germany	2006/00416	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
B3.7(01) A3.10(02)	Ambroz, J.	2000	Determination of the stability of Preventol CMK to normal and elevated temperature. Date: 2000-09-12	ABC Laboratories, Inc., Columbia, Missouri, USA	Study No.: 46189	Yes	No	Yes	LANXESS Deutschland GmbH
B3.7(02)	European Commission (Ed.)	2006	Content of the product dossier accompanying the active substance for Annex I inclusion. Date: 2006-09-14	European Commission, Directorate-General-JRC, Institute for Health and Consumer Protection, Unit: Toxicology and Chemical Substances, European Chemicals Bureau	--	No	Yes	No	European Commission, European Chemicals Bureau
B3.2(01)	Kraus, H.	2006b	4-Chloro-3-methylphenol / Explosive properties. Date: 2006-03-01	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B3.3(01)	Kraus, H.	2006c	4-Chloro-3-methylphenol / Oxidising properties Date: 2006-03-03	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B3.4(01)	Heitkamp, D.	2006	Determination of safety-relevant data of Preventol CMK Pastillen. Date: 2006-03-29	Bayer Industry Services GmbH & Co. OHG, Leverkusen, Germany	2006/00416	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
B3.5(01)	Reusche, W.	1991	Partition coefficient, dissociation constant and pH value, Preventol CMK. Date: 1991-01-07 Amended: 2007-03-06	Bayer AG, ZF-D/ Zentrale Analytik, Leverkusen, Germany	A90/0107/03 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
B3.6(01)	Erstling, K.	2001	Physicochemical properties: Preventol CMK (pellets). Date: 2001-11-15 Amended: 2006-03-29	Bayer AG, ZF-Zentrale Analytik, Leverkusen, Germany	A 01/0108/01 LEV	Yes	No	Yes	LANXESS Deutschland GmbH
B3.6(02)	Haßmann, V.	1992	Preventol CMK – Bulk density. Date: 1992-03-06	Bayer AG, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B3.7(01)	Ambroz J.	2000	Determination of the stability of Preventol CMK to normal and elevated temperature. Date: 2000-09-12	ABC Laboratories, Inc., Columbia, Missouri, USA	Study No.: 46189	Yes	No	Yes	LANXESS Deutschland GmbH
B3.7(02)	European Commission (Ed.)	2006	Content of the product dossier accompanying the active substance for Annex I inclusion. Date: 2006-09-14	European Commission, Directorate-General-JRC, Institute for Health and Consumer Protection, Unit: Toxicology and Chemical Substances, European Chemicals Bureau	--	No	Yes	No	European Commission, European Chemicals Bureau

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
B3.8(01)	Jungheim, R.	2007	Physicochemical properties (foam stability and wettability) of Preventol CMK (pellets). Date: 2007-06-25	Bayer Industry Services GmbH & Co. OHG, BIS-SUA-Analytics, Leverkusen, Germany	2006/0025/11	Yes	No	Yes	LANXESS Deutschland GmbH
B3.8(02)	Güldner, W.	2009	Determination of dustiness (optical dust factor) of Preventol CMK pastilles. Date: 2009-09-30	Bayer CropScience AG, Development, Formulation Technology, Monheim, Germany	FM0045(RP00)G01	Yes	No	Yes	Bayer CropScience AG
B3.8(03)	Eğilmez, D.	2011	Flowability of Preventol® CMK after accelerated storage under pressure. Date: 2011-05-24	LANXESS Deutschland GmbH, Leverkusen, Germany	None	No	No	Yes	LANXESS Deutschland GmbH
B3.10(01)	Olf, G.	2006	Surface tension, Physical-chemical properties. Date: 2006-03-17 Amended: 2006-05-10	Bayer AG, BTS-PT-RPT-KPM, Leverkusen, Germany	06/002/03	Yes	No	Yes	LANXESS Deutschland GmbH
B3.11(01)	Erstling, K.	2008	Physicochemical properties of Preventol CMK. Date: 2008-11-03	CURRENTA GmbH & Co. OHG, Services Analytik, Leverkusen, Germany	2006/0025/14	Yes	No	Yes	LANXESS Deutschland GmbH
B4.1(01)	Jungheim, R.	2006	Validation of a GC-Method for Preventol CMK (Pellets). Date: 2006-04-21 **CONFIDENTIAL**	Bayer Industry Services GmbH & Co. OHG, BIS-SUA-Analytics, Leverkusen, Germany	Study No.: 2006/0014/01	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A8, B8	Anonymous	2005	Safety Data Sheet Preventol CMK pellets. Date: 2005-10-06	LANXESS Deutschland GmbH, Leverkusen, Germany	690981/13	No	No	--	LANXESS Deutschland GmbH
A8.1(02) A3.17(01) B8.1(02)	Kraus, H.	2006c	4-Chloro-3-methylphenol (CMK) / Reactivity towards container material. Date: 2006-06-01	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B8, A8	Anonymous	2005	Safety Data Sheet Preventol CMK pellets. Date: 2005-10-06	LANXESS Deutschland GmbH, Leverkusen, Germany	690981/13	No	No	--	LANXESS Deutschland GmbH
B8.1(02) A3.17(01) A8.1(02)	Kraus, H.	2006c	4-Chloro-3-methylphenol (CMK) / Reactivity towards container material. Date: 2006-06-01	LANXESS Deutschland GmbH, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B5.10(01)	Kugler, M.	2003	Determination of the antimicrobial effects of Preventol CMK against bacteria and fungi. Date: 2003-05-22	Bayer Chemicals AG, Leverkusen, Germany	Report No. 2003-05-21	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
B5.10(02)	Wachtler, P.	2011a	Efficacy of Preventol® CMK in a detergent. Date: 2011-08-04	LANXESS Deutschland GmbH, Business Unit Material Protection Products, Business Line Biocides Technical Marketing-Industrial Preservation, Leverkusen, Germany	None	No	No	Yes	LANXESS Deutschland GmbH
B5.10(03)	Wachtler, P.	2011b	Efficacy of Preventol® CMK in a paper coating. Date: 2011-08-05 Amended: 2011-11-04	LANXESS Deutschland GmbH, Business Unit Material Protection Products, Business Line Biocides Technical Marketing-Industrial Preservation, Leverkusen, Germany	None	No	No	Yes	LANXESS Deutschland GmbH
B5.10(04)	Wachtler, P.	2011c	Efficacy of Preventol® CMK in a polymer emulsion. Date: 2011-10-31	LANXESS Deutschland GmbH, Business Unit Material Protection Products, Business Line Biocides Technical Marketing-Industrial Preservation, Leverkusen, Germany	None	No	No	Yes	LANXESS Deutschland GmbH
A7.1.1.1.1(01)	Erstling, K. and Feldhues, E.	2001a	Abiotic degradation. Date: 2001-08-31 Amended: 2007-02-22	Bayer AG, Zentrale Analytik, Leverkusen, Germany	A 01/0108/04 LEV	Yes	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.1.1.1.2(01)	Wilmes, R.	1988	Tests to determine the photodegradation of 4-chloro-3-methylphenol (Preventol CMK) in water. Determination of the quantum yield of direct photodegradation in water in polychromatic light (ECETOC method). Date: 1988-05-30	Bayer AG, Sector 5. Agrochemicals Business Group, PF-F/CE-ME, Monheim, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.1.2.1(01)	Müller	1992	Investigations of the ecological behaviour of Preventol CMK Date: 1992-02-25	Bayer AG, Institut für Umweltananlyse und Bewertungen, Leverkusen, Gemany	A 330 A/91	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.1.2.1(02)	Weyers, A.	2007	Preventol CMK – Biodegradation. Re-Evaluation based on Study Report 330 A/91, corresponding raw data and additional information provided by the sponsor. Date: 2007-03-09 Amended: 2007-03-16	Bayer Industry Services, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(02) Non-key study	Dohm	1981	Biodegradability of Preventol CMK. Date: 1981-08-20	Bayer Uerdingen Site, Organic Chemicals Division, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH

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A7.1.2.1.1(03) Non-key study	Dohm	1984	CMK content in ppb in wastewater, Uerdingen wastewater treatment plant. Date: 1984-07-03	Bayer Uerdingen Site, Organics BG, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(04) Non-key study	Dohm	1985	CMK in the wastewater treatment plant outlet. Date: 1985-03-01	Bayer Uerdingen Site, Organics BG, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(05) Non-key study	N.N.	1981	Degradability of p-chloro-m-cresol in the central biological wastewater treatment plant Uerdingen. Date: 1981-08-25	Bayer Uerdingen Site, UE Environmental Protection/AWALU, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(06) Non-key study	N.N.	1983	Elimination of p-chloro-m-cresol (CMK) in the biological wastewater treatment plant Uerdingen. Date: 1983-01-07	Bayer Uerdingen Site, UE Environmental Protection/AWALU, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(07) Non-key study	N.N.	1986	Elimination of chlorometacresol (CMK) in the 2-stage biological wastewater treatment plant UE. Date: 1986-05-16	Bayer Uerdingen Works, WV-UE Environmental Protection/AWALU, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(08) Non-key study	N.N.	1988	CMK concentration in the discharge of the Uerdingen biological wastewater treatment plant. Date: 1988-12-02	Bayer Uerdingen Site, WV-UE Environmental Protection/AWALU, Krefeld-Uerdingen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.1.2.1.1(09) Non-key study	Rother	1996	Preventol CMK, CMK-Na: Analysis of Wastewater from the Leather Industry Date: 1996-01-25	Bayer, Material Protection Unit, Organic Chemicals Business Group, Uerdingen	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1(10) Non-key study	Morris, R.	2002	Bench Scale Biological Treatment of Preventol CMK for General Motor's Lansing Plant #5 Date: 2002-08-30	Bayer's Corporate Environmental Testing Services Laboratory, New Martinsville, West Virginia	--	No	No	Yes	LANXESS Deutschland GmbH
A7.1.2.1.1 (11) Non-key Published	Bolz, U. et al.	1999	Determination of phenolic xenoestrogens in sediments and sewage sludges by HRGC/LRMS. *Organohalogen Compounds, Vol. 40, 65-68.*	-	-	No	Yes	No	-
B7.5(04) Non-key/ published A7.1.2.1.1(11)	Bolz, U., Hagenmaier, H. and Körner, W.	2001	Phenolic xenoestrogens in surface water, sediments, and sewage sludge from Baden-Württemberg, south-west Germany *Environmental Pollution* **115**, 291 – 301, 2001	Institute of Organic Chemistry, University of Tübingen, Tübingen, Germany	--	No	Yes	No	--

Section No. in Doc III-B or IIIA	Authors (s)	Year	Title	Testing Company	Report No.	GLP Study (Yes/No)	Published (Yes/No)	Data Protection Claimed (Yes/No)	Data Owner
A7.1.2.1.1(11) Non-key Published	Körner, W. et al.	2000	Input/output balance of estrogenic active compounds in a major municipal sewage plant in Germany. *Chemosphere, Vol. 40, 1131-1142*	-	-	No	Yes	No	-
A7.1.2.1.1(11) Non-key published	Schnaak, W. et al.	1997	Organic contaminants in sewage sludge and their ecotoxicological significance in the agricultural utilization of sewage sludge. *Chemosphere, Vol. 35, 5-11.*	-	-	No	Yes	No	-
A7.1.2.1.1(11) Non-key published	Ternes, Th. A.	1998	Simultaneous determination of antiseptics and acidic drugs in sewage and river water. *Vom Wasser, 90, 295-309.*	-	-	No	Yes	No	-
A7.1.2.1.2(06)	Möndel, M.	2010a	Anaerobic biodegradability of Preventol CMK in digested sludge Date: 2010-05-26	RLP AgroScience GmbH, Neustadt a.d. Weinstraße, Gemany	AS 142	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.2.2.2(01)	Möndel, M.	2009	14C-Preventol CMK: Aerobic degradation of 14C-Preventol CMK in two different aquatic sediment systems. Date: 2009-03-26	RLP AgroScience GmbH, Neustadt a.d. Weinstraße, Gemany	AS 85	Yes	No	Yes	LANXESS Deutschland GmbH

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A7.1.2.2.2(02)	Möndel, M.	2010b	^{14}C-Preventol CMK: Characterisation of non-identified radioactivity of ^{14}C-Preventol CMK in aquatic sediment systems. Date: 2010-05-21	RLP AgroScience GmbH, Neustadt a.d. Weinstraße, Gemany	AS 139	Yes	No	Yes	LANXESS Deutschland GmbH
B7.5(01) Non-key study	Grote	1987	No title. Date: 1987-07-14	LE Environmental Protection/ AWALU, Analytics, Air Laboratory, Leverkusen, Germany	--	No	No	Yes	LANXESS Deutschland GmbH
B7.5(02) Non-key study	Oblak	1989	Determination of 4-chloro-3-methylphenol (CMK) in Rhine water (Ultra Trace range). Date: 1989-12-06	Bayer AG, Uerdingen, Central Analytics, Uerdingen, Germany	LM Ue 50/89	No	No	Yes	LANXESS Deutschland GmbH
B7.5(03) Non-key study/ published A7.1.2.2.2(03)	Schmidt-Bäumler, K., Heberer, Th. and Stan, H.-J.	1999	Occurrence and distribution of organic contaminats in the aquatic system in Berlin. Part II: Substituted phenols in Berlin surface water. *Acta hydrochim. Hydrobiol*. **27**, 143 – 149, 1999	--	--	No	Yes	No	--

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B7.5(04) Non-key/ published A7.1.2.2.2(03)	Bolz, U., Hagenmaier, H. and Körner, W.	2001	Phenolic xenoestrogens in surface water, sediments, and sewage sludge from Baden-Württemberg, south-west Germany *Environmental Pollution* **115**, 291 – 301, 2001	Institute of Organic Chemistry, University of Tübingen, Tübingen, Germany	--	No	Yes	No	--
B7.5(05) Non-key/published A7.1.2.2.2(03)	Dixon, E.M., Gowers, A. and Sutton, A.	1997	Proposed environmental quality standards for 4-chloro-3-methylphenol in water. *WRC-Final Report to the Department of the Environment,* Report No. DoE 4259(P)	--	DoE 4259(P)	No	Yes	No	--
B7.5(06) Non-key study/ published A7.1.2.2.2(03)	Lacorte, S., Viana, P., Guillamon, M, Tauler, R., Vinhas, T. and Barceló, D.	2001	Main findings and conclusions of the implementation of Directive 76/464/CEE concerning the monitoring of organic pollutants in surface waters (Portugal, April 1999 – May 2000). J. Environ. Monit. 3, 475 – 482, 2001	--	--	No	Yes	No	--

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A7.1.2.1.1 (11) Non-key Published A7.1.2.2.2(03)	Bolz, U. et al.	1999	Determination of phenolic xenoestrogens in sediments and sewage sludges by HRGC/LRMS. *Organohalogen Compounds, Vol. 40, 65-68.*	-	-	No	Yes	No	-
A7.1.2.2.2(03)	Körner, W. *et al.*	2001	Steroid analysis and xenosteroid potentials in two small streams in southwest Germany. *Journal of Aquatic Ecosystem Stress and Recovery, 8, 215-229.*	-	-	No	Yes	No	-
A7.1.3(01)	Erstling, K. and Feldhues, E.	2001b	Adsorption/Desorption . Date: 2001-09-13 Amended: 2001-11-13 and 2007-02-22	Bayer AG, ZF – Zentrale Analytik, Leverkusen, Germany	A 01/0108/05/ LEV	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.3(02) and A7.2.3.1(01)	Meinerling, M.	2007	Determination of the Adsorption / Desorption behaviour of 4-Chloro-3-methylphenol (Preventol CMK) Date: 2007-06-20	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany,	32323195	Yes	No	Yes	LANXESS Deutschland GmbH

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A7.1.3(02) and A7.2.3.1(01)	Meinerling, M.	2008	Determination of the Stability of 4-Chloro-3-methylphenol (Preventol CMK) in Soils of an Adsorption/Desorption Study	Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany	45821195	Yes	No	Yes	LANXESS Deutschland GmbH
A7.1.3(02) Non-key/ published	Ohlenbusch, G., Kumke, M.U. and Frimmel, F.H.	2000	Sorption of phenols to dissolved organic matter investigated by solid phase microextraction *The Science of the Total Environment 253, 63 – 74, 2000*	Bereich Wasserchemie, Universität Karlsruhe, Germany	--	No	Yes	No	--
A7.2.1(01) Non-key/ published	Sattar, M.A.	1989	Fate of chlorinated cresols from environmental samples. *Chemosphere* **19** (8/9), 1421 – 1426, 1989	Department of Soil Science, Agricultural University, Mymensingh, Bangladesh	--	No	Yes	No	--
A7.2.1(02) Non-key/ published	Loehr, R.C. and Matthews, J.E.	1992	Loss of organic chemicals in soil. Pure compound treatability studies. *Journal of Soil Contamination **1(4)**, 339-360, 1992*	Environmental and Water Resources Engineering Laboratories, Texas, Austin, USA	--	No	Yes	No	--
A7.2.2.1	Nitsche, M.	2011	Biodegradation of Preventol® CMK (4-Chloro-3-methylphenol) in soil under aerobic conditions.	LANXESS Deutschland GmbH	2011-07-25	No	No	Yes	LANXESS Deutschland GmbH

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A7.3.1(01)	Anthe, M.	2006	p-Chloro-m-cresol. Calculation of indirect photodegradation. Date: 2006-07-05	Dr. Knoell Consult GmbH, Leverkusen, Germany	KC-PD-04/06	No	No	Yes	LANXESS Deutschland GmbH
A7.4.2(01)	Paul, A.	2007	p-Chloro-m-cresol (CMK) – Calculation of the bioconcentration factor (BCF) Date: 2007-05-31	DR. KNOELL CONSULT GmbH, Mannheim, Germany	KC-BCF-07/07	No	No	Yes	LANXESS Deutschland GmbH
A7.4.2(02) Non-key/ published	Jennings, J.G. et al.	1996	Phenolic compounds in the nearshore waters of Sidney, Australia. *Mar. Freshwater Res.* ***47****, 951 – 959, 1996*	--	--	No	Yes	No	--