KEMI
Swedish Chemicals Agency

SUBSTANCE EVALUATION CONCLUSION

as required by REACH Article 48

and

EVALUATION REPORT

for

Citral

EC No 226-394-6

CAS No 5392-40-5

Evaluating Member State: Sweden

Dated: 29 April 2016

Template Version 2.1
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Evaluating Member State Competent Authority

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Year of evaluation in CoRAP: 2015

Member State concluded the evaluation without any further need to ask more information from the registrants under Article 46(1) decision.

Further information on registered substances here:

http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances

DISCLAIMER

This document has been prepared by the evaluating Member State as a part of the substance evaluation process under the REACH Regulation (EC) No 1907/2006. The information and views set out in this document are those of the author and do not necessarily reflect the position or opinion of the European Chemicals Agency or other Member States. The Agency does not guarantee the accuracy of the information included in the document. Neither the Agency nor the evaluating Member State nor any person acting on either of their behalves may be held liable for the use which may be made of the information contained therein. Statements made or information contained in the document are without prejudice to any further regulatory work that the Agency or Member States may initiate at a later stage.

Foreword

Substance evaluation is an evaluation process under REACH Regulation (EC) No. 1907/2006. Under this process the Member States perform the evaluation and ECHA secretariat coordinates the work. The Community rolling action plan (CoRAP) of substances subject to evaluation, is updated and published annually on the ECHA web site[1].

Substance evaluation is a concern driven process, which aims to clarify whether a substance constitutes a risk to human health or the environment. Member States evaluate assigned substances in the CoRAP with the objective to clarify the potential concern and, if necessary, to request further information from the registrant(s) concerning the substance. If the evaluating Member State concludes that no further information needs to be requested, the substance evaluation is completed. If additional information is required, this is sought by the evaluating Member State. The evaluating Member State then draws conclusions on how to use the existing and obtained information for the safe use of the substance.

This Conclusion document, as required by Article 48 of the REACH Regulation, provides the final outcome of the Substance Evaluation carried out by the evaluating Member State. The document consists of two parts i.e. A) the conclusion and B) the evaluation report. In the conclusion part A, the evaluating Member State considers how the information on the substance can be used for the purposes of regulatory risk management such as identification of substances of very high concern (SVHC), restriction and/or classification and labelling. In the evaluation report part B the document provides explanation how the evaluating Member State assessed and drew the conclusions from the information available.

With this Conclusion document the substance evaluation process is finished and the Commission, the Registrant(s) of the substance and the Competent Authorities of the other Member States are informed of the considerations of the evaluating Member State. In case the evaluating Member State proposes further regulatory risk management measures, this document shall not be considered initiating those other measures or processes. Further analyses may need to be performed which may change the proposed regulatory measures in this document. Since this document only reflects the views of the evaluating Member State, it does not preclude other Member States or the European Commission from initiating regulatory risk management measures which they deem appropriate.

[1] http://echa.europa.eu/regulations/reach/evaluation/substance-evaluation/community-rolling-action-plan

Contents

Part A. Conclusion

1. CONCERN(S) SUBJECT TO EVALUATION

Citral was originally selected for substance evaluation in order to clarify concerns about:

- human health/sensitiser

- exposure/wide dispersive use, consumer use, exposure of workers, high (aggregated) tonnage

The evaluation was limited to clarifying initial grounds for concern.

2. OVERVIEW OF OTHER PROCESSES / EU LEGISLATION

Citral is covered by the Index number 605-019-00-3 in Part 3 of Annex VI to Regulation (EC) No 1272/2008[2], Table 3.1 (the list of harmonised classification and labelling of hazardous substances) as Skin Irrit. 2 (H315: Causes skin irritation) and Skin Sens. 1 (H317: May cause an allergic skin reaction).

On 5 February 2015 the Registrant of citral with tonnage band of 1000 tonnes or more per year was addressed a compliance check (CCH) decision by ECHA[3] (decision number: CCH-D-2114290517-42-01/F).

3. CONCLUSION OF SUBSTANCE EVALUATION

The evaluation of the available information on the substance has led the evaluating Member State Competent Authority (eMSCA) to the following conclusions, as summarised in the table below.

Table 1

CONCLUSION OF SUBSTANCE EVALUATION Conclusions	Tick box
Need for follow-up regulatory action at EU level	
Harmonised Classification and Labelling	
Identification as SVHC (authorisation)	
Restrictions	
Other EU-wide measures	✓
No need for regulatory follow-up action at EU level	

[2] REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

[3] Available on the ECHA website, http://echa.europa.eu/information-on-chemicals/dossier-evaluation-decisions.

4. FOLLOW-UP AT EU LEVEL

4.1. Need for follow-up regulatory action at EU level

4.1.1. Harmonised Classification and Labelling

Not applicable.

4.1.2. Identification as a substance of very high concern, SVHC (first step towards authorisation)

Not applicable.

4.1.3. Restriction

Not applicable.

4.1.4. Other EU-wide regulatory risk management measures

The eMSCA revised the Derived No Effect Level (DNEL) for skin sensitisation for citral by applying an additional assessment factor of 3-fold for possible matrix/vehicle effect.

The Risk Characterisation Ratios (RCRs) (with the revised eMSCA DNEL for skin sensitisation) for dermal long-term local effects to workers and consumers for the uses of citral given in the table below are above 1.

Table 2

Population	Exposure Scenario	RCRs (with $DNEL_{eMSCA}$) for dermal long-term local route
Industrial workers	Compounding use – 'contributing scenario (9) controlling industrial worker exposure for PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.'	>2
Professional workers	Use in cleaning agents – 'contributing scenarios (9) and (10) controlling professional worker exposure for PROC 11: Non industrial spraying.'	>1
Industrial wokers	Formulation use – 'contributing scenario (4) controlling industrial worker exposure for PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).'	>1
Consumers	Use in cleaning agents – 'contributing scenarios (19), (21), and (47), controlling consumer exposure for PC 35: Washing and cleaning products (including solvent based products).'	>1

The highest concentration of citral reported by the Registrant(s) in the exposure scenarios for the use in cleaning agents is <1.5% for workers and <0.5% for consumers. The eMSCA finds from the Swedish Product Register that there are such products on the Swedish market used by workers and consumers with much higher concentration of citral leading to RCRs (with the revised eMSCA DNEL for skin sensitisation) well above 1 for dermal long-term local route.

Table 3

Population	Use of products with highest concentration on the Swedish market	RCRs (with $DNEL_{eMSCA}$) for dermal long-term local route
Industrial workers	Use in cleaning agents –Industrial	>4
Professional workers	Use in cleaning agents – Professional	>10
Consumers	Use in cleaning agents – Product Category 35: Washing and cleaning products (including solvent based products)	>2

The eMSCA recommends the Registrant(s) of citral to use the DNEL for skin sensitisation as revised by the eMSCA and consequently, revise the Chemical Safety Assessment.

The eMSCA will inform the National Enforcement Authorities (NEAs) via PD NEA (Portal Dashboard NEA) or Forum (the Forum for Exchange of Information on Enforcement) about possible much higher concentrations of citral in products in the EU market, than that indicated in the exposure scenarios by the Registrant(s). The NEAs may further consider to inspect if the Downstream Users are using citral safely.

5. CURRENTLY NO FOLLOW-UP FORESEEN AT EU LEVEL

5.1. No need for regulatory follow-up at EU level

Not applicable.

5.2. Other actions

Not applicable.

6. TENTATIVE PLAN FOR FOLLOW-UP ACTIONS (IF NECESSARY)

Table 4

FOLLOW-UP		
Follow-up action	**Date for intention**	**Actor**
Information to the National Enforcement Authorities	August 2016	Sweden

Part B. Substance evaluation

7. EVALUATION REPORT

7.1. Overview of the substance evaluation performed

Citral was originally selected for substance evaluation in order to clarify concerns about:

- human health/sensitiser

- exposure/wide dispersive use, consumer use, exposure of workers, high (aggregated) tonnage

The evaluation was limited to clarifying initial grounds for concern.

Table 5

EVALUATED ENDPOINTS	
Endpoint evaluated	**Outcome/conclusion**
DNEL for skin sensitisation	The eMSCA recommends to revise the DNEL for skin sensitisation by applying an assessment factor of at least 3-fold for possible matrix/vehicle effect.
Risks for skin sensitisation to workers and consumers	With eMSCA's revised DNEL for skin sensitisation, there are risks of dermal long-term local effects to workers and consumers.

7.2. Procedure

The updated Community rolling action plan (CoRAP) was published on the ECHA website on 17 March 2015.

On 5 February 2015 the Registrant of citral with tonnage band of 1000 tonnes or more per year was addressed a compliance check (CCH) decision by ECHA[4] (decision number: CCH-D-2114290517-42-01/F) requesting, among others,

- A reassessment of the skin sensitisation hazard information on a basis of the study giving rise to highest concern (or) A full justification for why the study giving rise to the highest concern was not chosen to draw conclusions for skin sensitisation and a robust study summary for the study chosen (Annex I, 3.1.5 of the REACH Regulation);
- Revised DNELs [Dervied No Effect Levels] for workers and for the general population using the assessment factors recommended by ECHA (or) A full justification for not using the recommended assessment factors in the DNEL derivation (Annex I, 1.4.1 of the REACH Regulation);

[4] Available on ECHA website, http://echa.europa.eu.

The deadline to submit the information requested in the above CCH decision was 12 August 2016 Since the above requests are relevant for initial grounds for concern for this evaluation, the concerned Registrant submitted an updated dossier including relevant information on these requests on 30 April 2015.

Without prejudice to the compliance check, the eMSCA is of the opinion that the information available in the registration dossier(s) and other relevant and available information is enough to clarify the concern addressed in this substance evauation and thus no draft decision was prepared.

7.3. Identity of the substance

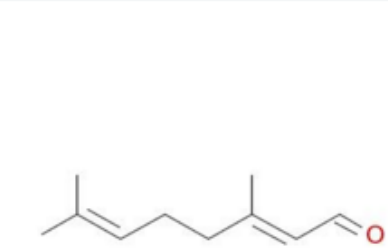
Table 6

SUBSTANCE IDENTITY	
Public name:	citral
EC number:	226-394-6
CAS number:	5392-40-5
Index number in Annex VI of the CLP Regulation:	605-019-00-3
Molecular formula:	$C_{10}H_{16}O$
Molecular weight range:	152.233
Synonyms:	Reaction mass of (E)-3,7-dimethylocta-2,6-dienal and (Z)-3,7-dimethylocta-2,6-dienal 2,6-Octadienal, 3,7-dimethyl-

Type of substance: Multi-constituent

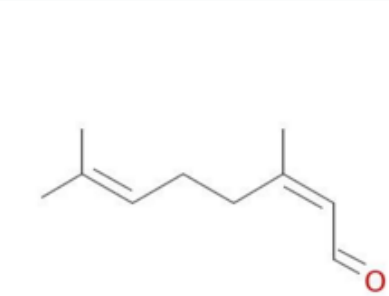
Structural formula:

Constituent 1



Reference substance name:	(E)-3,7-dimethylocta-2,6-dienal
EC Number:	205-476-5
EC Name:	(E)-3,7-dimethylocta-2,6-dienal
CAS Number:	141-27-5
Molecular formula:	C10H16O
IUPAC Name:	(E)-3,7-dimethylocta-2,6-dienal

Constituent 2



Reference substance name:	(Z)-3,7-dimethylocta-2,6-dienal
EC Number:	203-379-2
EC Name:	(Z)-3,7-dimethylocta-2,6-dienal
CAS Number:	106-26-3
Molecular formula:	C10H16O
IUPAC Name:	(Z)-3,7-dimethylocta-2,6-dienal

7.4. Physico-chemical properties

Table 7

OVERVIEW OF PHYSICOCHEMICAL PROPERTIES	
Property	**Value**
Physical state at 20°C and 101.3 kPa	liquid
Boiling point	ca. 230 °C at 1013 hPa
Vapour pressure	0.071 hPa at 25 °C
Water solubility	0.42 g/L at pH 7 and 25 °C
Partition coefficient n-octanol/water (Log Kow)	2.76

7.5. Manufacture and uses

7.5.1. Quantities

Table 8

AGGREGATED TONNAGE (PER YEAR)

☐ 1 – 10 t	☐ 10 – 100 t	☐ 100 – 1000 t	☒ 1000- 10,000 t	☐ 10,000-50,000 t
☐ 50,000 – 100,000 t	☐ 100,000 – 500,000 t	☐ 500,000 – 1000,000 t	☐ > 1000,000 t	☐ Confidential

7.5.2. Overview of uses

Table 9

USES	Use(s)
Uses as intermediate	On site-isolated use as intermediate under strictly controlled conditions at industrial sites
Formulation	Formulation of preparations
Uses at industrial sites	In cleaning agents
Uses by professional workers	In cleaning agents
Consumer Uses	In cleaning agents, air care products, cosmetics, fragrances and biocidal products
Article service life	Scented articles including clothes, eraser, paper, CD (compact disc)

7.6. Classification and Labelling

7.6.1. Harmonised Classification (Annex VI of CLP)

Table 10

HARMONISED CLASSIFICATION ACCORDING TO ANNEX VI OF CLP REGULATION (REGULATION (EC) 1272/2008)							
Index No	**International Chemical Identification**	**EC No**	**CAS No**	**Classification**		**Spec. Conc. Limits, M-factors**	**Notes**
				Hazard Class and Category Code(s)	**Hazard statement code(s)**		
605-019-00-3	citral	226-394-6	5392-40-5	Skin Irrit. 2 Skin Sens. 1	H315 H317		

7.6.2. Self-classification

- In the registration(s)*:*

Skin Sens. 1B H317: May cause an allergic skin reaction
Eye Irrit. 2 H319: Causes serious eye irritation

- The following hazard classes are in addition notified among the aggregated self-classifications in the C&L Inventory*:*

Aquatic Chronic 3 H412: Harmful to aquatic life with long lasting effects

7.7. Environmental fate properties

Not relevant for this evaluation.

7.8. Environmental hazard assessment

Not relevant for this evaluation.

7.9. Human Health hazard assessment

7.9.1. Toxicokinetics

Based on the results of three *in vivo* and one *in vitro* studies reported in the registration dossier(s) providing information on dermal absorption/penetration of citral, the Registrant(s) assumed a dermal penetration rate of 50% for derivation of dermal DNELs. The eMSCA can support the use of this value.

Citral has a rapid and almost complete (ca. 90-95%) absorption via gastro-intestinal tract in the rats. It undergoes rapid first-pass liver metabolism and total 7 hydrophilic metabolites were identified in urine (major route of excretion) and glucuronic acid conjugates in bile of the rats. The available data shows no indications of bioaccumulation of citral.

7.9.2. Acute toxicity and Corrosion/Irritation

Not evaluated. Citral has a harmonised classification as Skin Irrit. 2, H315: Causes skin irritation.

7.9.3. Sensitisation

Citral has a harmonised classification as Skin Sens. 1, H317: May cause an allergic skin reaction.

In the registration dossier(s) one Local Lymph Node Assay (LLNA) and two Guinea Pig Maximisation Test (GPMT) are reported as key studies. Another LLNA, GPMT, and a review article (Lalko and Api, 2008) are reported as supporting studies. Furthermore, two Human Repeated Insult Patch Test (HRIPT), one with reliability score 2 (reliable with restrictions) and the other with reliability score 4 (not assignable), and two human diagnostic patch tests with reliability scores 2 are reported as supporting studies.

Among the studies reported in the registration dossier(s), the key LLNA showed an EC3 value of 6.3% (1575 µg/cm^2) and a No Observed Effect Level (NOEL) of 1400 µg/cm^2 was observed in the supporting HRIPT with reliability score 2.

Lalko and Api (2008) reviewed several studies with citral including eleven LLNAs, sixteen studies in guinea pigs, five HRIPTs, fourteen Human Maximisation Tests (HMTs), and eleven human diagnostic patch tests in order to identify a threshold for induction of skin sensitisation to citral. The weighted mean of EC3 values from eleven LLNAs is 5.7% (1414 µg/cm^2) depending on the vehicle used (ethanol:diethyl phthalate or acetone:olive oil (4:1)). In this comprehensive review it was concluded "by a weight of evidence that the human NOEL for induction of sensitization to citral is 1400 µg/cm^2."

7.9.4. Repeated dose toxicity

Not evaluated.

7.9.5. Mutagenicity

Not relevant for this evaluation.

7.9.6. Carcinogenicity

Not relevant for this evaluation.

7.9.7. Toxicity to reproduction (effects on fertility and developmental toxicity)

Not relevant for this evaluation.

7.9.8. Hazard assessment of physico-chemical properties

Not relevant for this evaluation.

7.9.9. Selection of the critical DNEL(s)/DMEL(s) and/or qualitative/semi-quantitative descriptors for critical health effects

The Registrant(s) identified skin sensitisation as the most sensitive endpoint to set DNEL for dermal long-term local effects and the NOEL of 1400 µg/cm^2 (Lalko and Api, 2008) is used as a starting dose descriptor value to derive DNEL for skin sensitisation. The eMSCA used the same starting dose descriptor value to revise the DNEL for skin sensitisation.

The Registrant(s) applied only an assessment factor (AF) of 10 for intraspecies differences when deriving skin sensitisation DNEL for workers and general population. Since the NOEL is derived from human data, no interspecies AF is applied. Therefore, the Registrant(s) DNEL for induction of skin sensitisation to citral is

$DNEL_{Registrant(s)}$ = NOEL/overall AF = 1400 µg/cm^2/10 = 140 µg/cm^2

Appendix R. 8-10 to the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.8: Characterisation of dose [concentration]-response for human health (version 2.1, November 2012), provides additional guidance on setting a DNEL for skin sensitisation for cases where reliable dose descriptors are available.

Citral is used in different products which might contain different matrices than the one used in the experimental test systems. If a product contains substances with irritant or/and penetration enhancing properties it might increase the potential of citral for induction of sensitisation. According to Appendix R. 8-10, the application of an additional AF of 1-10-fold should be considered depending on the information available on the vehicle or matrix relevant for human exposure. An AF of 3 has to be applied if human exposure is expected in a matrix even with no penetration enhancers or irritants. Furthermore, an additional AF of 1-10-fold should be considered to account for specific exposure conditions concerning situations when the experimental set up (animal or human) differs from actual human exposure conditions, by e.g. different parts of the body being exposed, differences in skin integrity caused by specific human activities, occlusion of the exposed skin and differences in exposure frequency between the animal/human study and actual human exposure situation.

The eMSCA recommends to revise the DNEL for skin sensitisation by applying at least an additional AF of 3-fold for possible matrix/vehicle effect as explained above while acknowledging this being a less conservative approach. The overall AF would then be 30 (10 (intraspecies AF) * 3 (matrix/vehicle effect AF)). Therefore, the eMSCA's proposed DNEL for induction of skin sensitisation to citral is

$DNEL_{eMSCA}$ = NOEL/overall AF = 1400 µg/cm^2/30 = 47 µg/cm^2

It is to be noted that in the proposed DNEL by eMSCA no AFs were applied to account for specific exposure conditions as discussed above. The eMSCA recommends the Registrant(s) and/or the Downstream Users of citral to take this uncertainty into account while performing the chemical safety assessment.

Table 11

CRITICAL DNEL FOR WORKERS AND GENERAL POPULATION						
Endpoint of concern	**Type of effect**	**Critical study**	**Corrected dose descriptor**	**DNEL**		**Justification/ Remarks**
				Registrant(s)	**eMSCA**	
Skin sensitisation	Long-term dermal – local effects	Lalko and Api, 2008	NOEL: 1400 µg/cm²	140 µg/cm²	47 µg/cm²	eMSCA applied an additional AF of 3-fold for possible matrix/vehicle effect to derive the DNEL for this endpoint.

Important note: "In case of skin sensitisation, the first step should always be a qualitative approach to assessing and controlling the risks and setting a DNEL (if possible) could be used to judge the remaining/residual likelihood of risks" (ECHA Guidance on information requirements and chemical safety assessment, Chapter R.8: Characterisation of dose [concentration]-response for human health (version 2.1, November 2012)).

7.10. Assessment of endocrine disrupting (ED) properties

Not relevant for this evaluation.

7.11. PBT and VPVB assessment

Not relevant for this evaluation.

7.12. Exposure assessment

7.12.1. Human health

The Registrant(s) generated exposure scenarios and made exposure estimations for manufacture and for all the identified uses of citral (viz., see below) using EasyTRA 4.0 model[5].

1. Manufacturing of the substance
2. Intermediate: on site-isolated under strictly controlled conditions
3. Compounding
4. Formulation
5. Use in cleaning agents – Industrial
6. Use in cleaning agents – Professional
7. Use in air care
8. Use in cosmetics
9. Use in cleaning agents – Consumers

[5] www.easytra.com, last accessed 16 March 2016.

10. Other consumer use as fragrance material

In the eMSCA's opinion the Registrant(s) have adequately described the operational conditions and the risk management measures for all the scenarios.

7.12.1.1. Worker

In the registration dossier(s) the highest exposure value estimated for workers for dermal long-term local route is between 75 and 100 µg/cm^2 for the compounding use – 'contributing scenario (9) controlling industrial worker exposure for PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.'

The second highest exposure value estimated for workers (professional) for dermal long-term local route is between 50 and 75 µg/cm^2 for the use in cleaning agents – 'contributing scenarios (9) and (10) controlling professional worker exposure for PROC 11: Non industrial spraying.'

The third highest exposure value estimated for workers for dermal long-term local route is between 47 and 50 µg/cm^2 for the formulation use – 'contributing scenario (4) controlling industrial worker exposure for PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).'

The highest concentration of citral reported by the Registrant(s) in the exposure scenarios for the use in cleaning agents by workers – Industrial and Professional – is <1.5%. The eMSCA finds from the Swedish Product Register that there are such products on the Swedish market used by workers with concentration of citral much higher than 1.5%.

7.12.1.2. Consumer

In the registration dossier(s) exposure values between 47 and 50 µg/cm^2 are estimated for consumers for dermal long-term local route for use in cleaning agents – 'contributing scenarios (19), (21), and (47), controlling consumer exposure for PC 35: Washing and cleaning products (including solvent based products).'

For the use in cleaning agents by consumers (PC 35) the Registrant(s) specify in the Chemical Safety Report that the concentrations given in the exposure scenarios for PC 35 are derived from the highest 97.5th percentile of citral concentrations provided by the Downstream Users for this product category and the upper limit percentages of fragrance compounds in fragranced end-products given in the IFRA guidance document (IFRA, 2012). The highest concentration of citral reported by the Registrant(s) in the exposure scenarios for the use in cleaning agents for PC 35 is <0.5%. The eMSCA finds from the Swedish Product Register that there are such products on the Swedish market used by consumers with concentration of citral higher than 0.5%.

7.12.2. Environment

Not relevant for this evaluation.

7.12.3. Combined exposure assessment

As skin sensitisation is considered to be mainly a threshold concentration effect, it may be less relevant to perform a combined exposure assessment and therefore this has not been done.

7.13. Risk characterisation

With eMSCA's revised DNEL for skin sensitisation, the RCRs are above 1 for the dermal long-term local route for the exposure scenarios given in the table below

Table 12

RCRs FOR DERMAL LONG-TERM LOCAL ROUTE				
Population	**Scenario**	**Exposure conentration**	**$DNEL_{eMSCA}$ for Skin Sensitisation**	**RCR**
Industrial workers	Compounding use – 'contributing scenario (9) controlling industrial worker exposure for PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.'	75 – 100 µg/cm^2	47 µg/cm^2	>2
Professional workers	Use in cleaning agents – 'contributing scenarios (9) and (10) controlling professional worker exposure for PROC 11: Non industrial spraying.'	50 – 75 µg/cm^2	47 µg/cm^2	>1
Industrial wokers	Formulation use – 'contributing scenario (4) controlling industrial worker exposure for PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).'	47 – 50 µg/cm^2	47 µg/cm^2	>1
Consumers	Use in cleaning agents – 'contributing scenarios (19), (21), and (47), controlling consumer exposure for PC 35: Washing and cleaning products (including solvent based products).'	47 – 50 µg/cm^2	47 µg/cm^2	>1

With eMSCA's revised DNEL for skin sensitisation, the RCRs are well above 1 for dermal long-term local route for the use of cleaning products with highest concentration of citral on the Swedish market as shown in the table below. While calculating these RCRs the eMSCA considered a linear relation to the exposure of citral and its concentration in the products.

Table 13

RCRs FOR DERMAL LONG-TERM LOCAL ROUTE				
Population	**Use**	**Highest conc. in products in the Exposure Scenarios**	**Highest conc. in products reported in the Swedish Product Register**	**RCR (with $DNEL_{eMSCA}$) for the use of products with highest conc. on Swedish market**
Industrial workers	Use in cleaning agents – Industrial	<1.5%	>>1.5%	>4

Professional workers	Use in cleaning agents – Professional	<1.5%	>>1.5%	>10
Consumers	Use in cleaning agents – PC 35: Washing and cleaning products (including solvent based products)	<0.5%	>0.5%	>2

Important note: "Since sensitisation is essentially systemic in nature, it is important for the purposes of risk management to acknowledge that skin sensitisation may be acquired by other routes of exposure than dermal. There is therefore a need for cautious use of known contact allergens in products to which consumers or workers may be exposed by inhalation" (ECHA Guidance on information requirements and chemical safety assessment, Part E: Risk Characterisation (version 2.0, November 2012)).

7.14. References

Note: The references citing the studies reported in the registration dossier(s) can be found on the ECHA dissemination webpage http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances.

IFRA (International Fragrance Association) REACH Exposure Scenarios for Fragrance Substances, Version 2.1, 11 December 2012.

Lalko, J & Api, A.M. 2008. Citral: Identifying a threshold for induction of dermal sensitization. Regulatory Toxicology and Pharmacology 52 (2008) 62–73.

7.15. Abbreviations

AF	Assessment Factor
DNEL	Derived No-Effect Level
eMSCA	Evaluating Member State Competent Authority
GPMT	Guinea Pig Maximisation Test
HRIPT	Human Repeated Insult Patch Test
HMT	Human Maximization Test
LLNA	Local Lymph Node Assay
NOAEL	No Observed Adverse Effect Level
NOEL	No Observed Effect Level
PC	Product Category
PROC	Process Category