

Safety Data Sheet

according to Regulation (EC) 1907/2006 (REACH)



Revision date: 1/20/2022
Supercedes date: 2/9/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier:

Product trade name: Kalama* Laevo-Citronellol
Company product number: LCITRONELL
REACH registration number: Mixture
Other means of identification: 32167; Citronellol

1.2. Relevant identified uses of the substance or mixture and uses advised against:

Uses: Fragrance ingredient. Industrial applications. See Annex for covered uses.
Uses advised against: None identified

1.3. Details of the supplier of the safety data sheet:

Manufacturer/Supplier: Emerald Kalama Chemical Limited
Dans Road
Widnes, Cheshire WA8 0RF
United Kingdom
Telephone: +44 (0) 151 423 8000

EU Only Representative: Penman Consulting bvba
Avenue des Arts 10
B-1210 Brussels
Belgium
Telephone: +32 (0) 2 403 7239
email: pcbvba10@penmanconsulting.com

For further information about this SDS: Email: product.compliance@emeraldmaterials.com

1.4. Emergency telephone number:

ChemTel (24 hours): 1-800-255-3924 (USA); +1-813-248-0585 (outside USA).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

Product classification according to Regulation (EC) 1272/2008 (CLP) as amended:

Skin Irritation, category 2, H315
Skin Sensitizer, category 1, H317
Eye Irritation, category 2, H319

See Section 2.2 for full text of H (Hazard) statements (EC 1272/2008).

2.2. Label elements:

Product labeling according to Regulation (EC) 1272/2008 (CLP) as amended:

CLP label - Contains: L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol), DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)

Hazard pictogram(s):



Signal word:

Warning

Hazard statements:

H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.

Precautionary statements:

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash skin thoroughly after handling.

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P280 Wear protective gloves/eye protection/face protection.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P362+P364 Take off contaminated clothing and wash it before reuse.

Supplemental information: No Additional Information

Precautionary statements are listed according to the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Annex III and ECHA Guidance on Labelling and Packaging. Regulations in individual countries/regions may determine which statements are required on the product label. See product label for specifics.

2.3. Other hazards:

PBT/vPvB criteria: Not Available
Endocrine disrupting properties: No specific information available.
Other hazards: No Additional Information

See Section 11 for toxicological information.

SECTION 3: Composition/information on ingredients

3.2. Mixture:

<u>CAS-No.</u>	<u>Chemical Name</u>	<u>Weight%</u>	<u>Classification</u>	<u>H Statements</u>
0007540-51-4	L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	55-<65	Eye Irrit. 2- Skin Irrit. 2- Skin Sens. 1B	H315-317-319
0000106-22-9	DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	35-<45	Eye Irrit. 2- Skin Irrit. 2- Skin Sens. 1B	H315-317-319
0000106-24-1	Geraniol	0.1-<1.0	Eye Dam. 1- Skin Irrit. 2- Skin Sens. 1	H315-317-318
0005392-40-5	Citral	0.1-<0.3	Eye Irrit. 2- Skin Irrit. 2- Skin Sens. 1B	H315-317-319
<u>CAS-No.</u>	<u>Chemical Name</u>	<u>REACH Registration No.</u>	<u>EC/List Number</u>	
0007540-51-4	L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	01-2120771576-43-XXXX	231-415-7	
0000106-22-9	DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	01-2119453995-23-XXXX	203-375-0	
0000106-24-1	Geraniol	Impurity	203-377-1	
0005392-40-5	Citral	Impurity	226-394-6	
<u>CAS-No.</u>	<u>Chemical Name</u>	<u>M-factor</u>	<u>SCLs</u>	<u>ATE</u>
0007540-51-4	L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	N/A	N/E	Not Available
0000106-22-9	DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	N/A	N/E	Not Available
0000106-24-1	Geraniol	N/A	N/E	Not Available
0005392-40-5	Citral	N/A	N/E	Not Available

See Section 16 for full text of H (Hazard) statements (EC 1272/2008).

Amounts specified are typical and do not represent a specification. Remaining components are proprietary, non-hazardous, and/or present at amounts below reportable limits.

SECTION 4: First aid measures

4.1. Description of first aid measures:

General: If irritation or other symptoms occur or persist from any route of exposure, remove the affected individual from the area: see a physician/get medical attention.

Following eye contact: Immediately flush eyes with plenty of clean water for an extended time, not less than fifteen (15) minutes. Flush longer if there is any indication of residual chemical in the eye. Ensure adequate flushing of the eyes by separating the eyelids with fingers and roll eyes in a circular motion. If eye irritation persists: Get medical advice/attention.

Following skin contact: Immediately remove contaminated clothing and shoes. Wash the affected area with plenty of soap and water until no evidence of the chemical remains (at least 15-20 minutes). Launder clothing before reuse. If skin irritation occurs: Get medical advice/attention.

Following inhalation: If affected, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a POISON CENTER or doctor/physician if you feel unwell.

Following ingestion: Do not induce vomiting. Never give anything by mouth to an unconscious person. Rinse out the mouth

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with water. Get medical attention immediately.

Protection of first aid responders: Wear proper personal protective clothing and equipment.

4.2. Most important symptoms and effects, both acute and delayed:

Irritation. Pre-existing skin problems may be aggravated by prolonged or repeated contact. See section 11 for additional information.

4.3. Indication of any immediate medical attention and special treatment needed:

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media:

Suitable: Use water spray, ABC dry chemical, foam or carbon dioxide. Water or foam may cause frothing. Use water to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures.

Unsuitable: Do not use direct water stream. May spread fire.

5.2. Special hazards arising from the substance or mixture:

Unusual fire/explosion hazards: Product is not considered a fire hazard, but will burn if ignited. Closed container may rupture (due to build up in pressure) when exposed to extreme heat.

Hazardous combustion products: Irritating or toxic substances may be emitted upon burning, combustion or decomposition. See section 10 (10.6 Hazardous decomposition products) for additional information.

5.3. Advice for firefighters:

Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and approved protective clothing. Personnel without suitable respiratory protection must leave the area to prevent significant exposure to hazardous gases from combustion, burning or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

See section 9 for additional information.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

See Section 8 for recommendations on the use of personal protective equipment. If spilled in an enclosed area, ventilate. Eliminate ignition sources. Personal Protective Equipment must be worn.

6.2. Environmental precautions:

Do not flush liquid into public sewer, water systems or surface waters.

6.3. Methods and material for containment and cleaning up:

Contain by diking with sand, earth or other non-combustible material. Wear proper personal protective clothing and equipment. Absorb spill with an inert material. Place into labeled, closed container; store in safe location to await disposal. Change contaminated clothing and laundry before reuse.

6.4. References to other sections:

See Section 8 for recommendations on the use of personal protection and Section 13 for waste disposal.

SECTION 7: Handling and storage

7.1. Precautions for safe handling:

As with any chemical product, use good laboratory/workplace procedures. Do not cut, puncture, or weld on or near the container. Wash thoroughly after handling this product. Always wash up before eating, smoking or using the facilities. Use under well-ventilated conditions. Avoid eye and skin contact. Avoid inhalation of aerosol, mist, spray, fume or vapor. Avoid drinking, tasting, swallowing or ingesting this product. Wash contaminated clothing before reuse. Provide eyewash fountains and safety showers in the work area.

7.2. Conditions for safe storage, including any incompatibilities:

Store cool and dry, under well-ventilated conditions. Store this material away from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use. Do not reuse empty container without commercial cleaning or reconditioning. Empty container contains residual product which may exhibit hazards of product.

7.3. Specific end use(s):

Further information concerning special risk management measures: see annex of this safety data sheet (exposure scenarios).

SECTION 8: Exposure controls / personal protection**8.1. Control parameters:****Occupational exposure limits (OEL):**

<u>Chemical Name</u>	<u>EU OELV</u>	<u>EU IOELV</u>	<u>ACGIH - TWA/Ceiling</u>	<u>ACGIH - STEL</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	N/E	N/E	N/E	N/E
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	N/E	N/E	N/E	N/E
Geraniol	N/E	N/E	N/E	N/E
Citral	N/E	N/E	5 ppm TWA (inhalable fraction and vapor) (skin) (dermal sensitizer)	N/E

<u>Chemical Name</u>	<u>UK WEL</u>	<u>Ireland OEL</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	N/E	N/E
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	N/E	N/E
Geraniol	N/E	N/E
Citral	N/E	5 ppm TWA, 15 ppm STEL

N/E=Not established (no exposure limits established for the listed substances for listed country/region/organization).

Derived No Effect Levels (DNELs):**L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)**

<u>Population</u>	<u>Route</u>	<u>Acute (local)</u>	<u>Acute (systemic)</u>	<u>Long Term (local)</u>	<u>Long Term (systemic)</u>
Workers	Inhalation	N/E	N/E	N/E	0,59 mg/m3
Workers	Dermal	N/E	N/E	N/E	0,5 mg/kg bw/day
General population	Inhalation	N/E	N/E	N/E	0,145 mg/m3
General population	Dermal	N/E	N/E	N/E	0,25 mg/kg bw/day
General population	Oral	N/E	N/E	N/E	0,083 mg/kg bw/day

DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)

<u>Population</u>	<u>Route</u>	<u>Acute (local)</u>	<u>Acute (systemic)</u>	<u>Long Term (local)</u>	<u>Long Term (systemic)</u>
Workers	Inhalation	10 mg/m3	N/E	10 mg/m3	161,6 mg/m3
Workers	Dermal	2,95 mg/cm2	N/E	N/E	327,4 mg/kg
General population	Inhalation	10 mg/m3	N/E	10 mg/m3	47,8 mg/m3
General population	Dermal	2,95 mg/cm2	N/E	N/E	196,4 mg/kg bw/day
General population	Oral	N/E	N/E	N/E	13,8 mg/kg bw/day

Predicted No Effect Concentration (PNECs):**L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)**

<u>Compartment</u>	<u>PNEC</u>
Freshwater	0,0024 mg/L
Freshwater sediment	0,0312 mg/kg dw
Marine water	0,00024 mg/L
Marine water sediment	0,00312 mg/kg dw
Soil	0,00479 mg/kg dw
STP	580 mg/L
Oral	6,67 mg/kg food

DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)

<u>Compartment</u>	<u>PNEC</u>
Freshwater	0,0024 mg/L
Freshwater sediment	0,0256 mg/kg
Marine water	0,00024 mg/L
Marine water sediment	0,00256 mg/kg
Intermittent releases	0,024 mg/L
Soil	0,00371 mg/kg
STP	580 mg/L

N/E=Not established; N/A=Not applicable (not required); bw=body weight; dw=dry weight; ww=wet weight.

8.2. Exposure controls:

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation to draw spray, aerosol, fume, mist and vapor away from workers to prevent routine inhalation. Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in the SDS.

Individual protection measures, such as personal protective equipment:

Eye/face protection: Safety glasses or goggles required.

Hand protection: Avoid skin contact when mixing or handling the material by wearing impervious and chemical resistant gloves. In case of prolonged immersion or frequently repeated contact, gloves with breakthrough times greater than 480 minutes (protection class 6) are recommended. For brief contact or splash applications, gloves with breakthrough times of 30 minutes or greater are recommended (protection class 2 or greater). Suggested materials for protective gloves: Butyl rubber, Nitrile rubber, PVC. The protective gloves to be used must comply with the specifications of the Regulation (EU) 2016/425 and the resultant standard EN 374. Suitability and durability of a glove is dependent on usage (e.g. frequency

and duration of contact, other chemicals which may be handled, chemical resistance of glove material and dexterity). Always seek advice of the glove supplier as to the most suitable glove material.

Skin and body protection: Use good laboratory/workplace procedures including personal protective clothing: labcoat, safety glasses and protective gloves.

Respiratory protection: Respiratory protection is not needed with proper ventilation. In case of insufficient ventilation, wear suitable respiratory equipment.

Further information: Eyewash fountains and safety showers are recommended in the work area.

Environmental exposure controls: See Sections 6 and 12.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties:

Physical state:	Liquid
Colour:	Clear, Colorless to light yellow
Odour:	Floral. Fruity.
Odour threshold:	Not Available
Melting point/Freezing point:	Not Available
Boiling point °C:	224 °C
Boiling point °F:	435 °F
Flammability:	Not flammable
Lower and upper explosion limit:	LEL: Not Available UEL: Not Available
Flash point:	>93.3 °C (>200 °F) Closed Cup
Auto-ignition temperature:	240 °C (464 °F)
Decomposition temperature:	Not Available
pH:	Not Available
Kinematic viscosity:	Not Available
Solubility in water:	Negligible
Partition coefficient n-octanol/water (log value):	3.4-3.7
Vapour pressure:	<0.1 kPa (<1 mm Hg) @ 20°C
Density and/or relative density:	0.853-0.856
Relative vapour density:	Not Available
Particle characteristics:	Not Applicable
% Volatile by weight:	Not Available
VOC:	Not Available

Amounts specified are typical and do not represent a specification.

9.2. Other information:

Information with regard to physical hazard classes:

Explosive properties: Not explosive
Oxidising properties: Not oxidizing

Other safety characteristics:

Evaporation rate: Not Available

SECTION 10: Stability and reactivity

10.1. Reactivity:

None known.

10.2. Chemical stability:

This product is stable.

10.3. Possibility of hazardous reactions:

Hazardous polymerization will not occur.

10.4. Conditions to avoid:

Excessive heat and ignition sources.

10.5. Incompatible materials:

Avoid strong acids, bases, and oxidizing agents.

10.6. Hazardous decomposition products:

Carbon dioxide, carbon monoxide and hydrocarbons.

SECTION 11: Toxicological information**11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008**

Acute toxicity: Not classified (based on available data, the classification criteria are not met). ATEmix (oral): >3000 - <5000 mg/kg. ATEmix (dermal): >2000 - 5000 mg/kg.

<u>Chemical Name</u>	<u>Inhalation LC50</u>	<u>Species</u>	<u>Oral LD50</u>	<u>Species</u>	<u>Dermal LD50</u>	<u>Species</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	N/E	N/E	3450 mg/kg (similar materials)	Rat/ adult	2650 mg/kg (similar materials)	Rabbit/ adult
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	N/E	N/E	3450 mg/kg	Rat/ adult	2650 mg/kg	Rabbit/ adult
Geraniol	N/E	N/E	3600 mg/kg	Rat/ adult	>5000 mg/kg	Rabbit/ adult
Citral	N/E	N/E	6800 mg/kg	Rat/ adult	2250 mg/kg	Rabbit/ adult

Skin corrosion/irritation: Causes skin irritation - Category 2.

<u>Chemical Name</u>	<u>Skin irritation</u>	<u>Species</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	Irritant (OECD 431)	In-Vitro, Read-across
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	Irritant	Rabbit/ adult
Geraniol	Irritant (OECD 404)	Rabbit/ adult
Citral	Irritant	Rabbit/ adult

Serious eye damage/irritation: Causes serious eye irritation - Category 2.

<u>Chemical Name</u>	<u>Eye irritation</u>	<u>Species</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	Irritant (OECD 405)	Rabbit, Read-across
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	Moderate irritant	Rabbit/ adult
Geraniol	Severe irritant	Rabbit/ adult
Citral	Irritant	Rabbit/ adult

Respiratory or skin sensitization: Skin sensitization - Category 1.

<u>Chemical Name</u>	<u>Skin sensitisation</u>	<u>Species</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	Sensitizer	Mouse/Local lymph node assay (similar materials)
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	Sensitizer	Mouse/Local lymph node assay
Geraniol	Sensitizer	Local Lymph Node Assay (OECD 429)
Citral	Sensitizer	Weight of evidence

Carcinogenicity: Not classified (no relevant information found). CITRONELLOL - READ-ACROSS (Geranyl acetate & Citronellyl acetate): NOAEL (carcinogenicity), rat: >2000 mg/kg bw/day.

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). L-CITRONELLOL - READ-ACROSS (DL-CITRONELLOL): Ames tests, with and without activation: negative. Mutagenicity was negative in in-vivo genotoxicity assays. DL-CITRONELLOL: Ames tests, with and without activation: negative. Mutagenicity was negative in in-vivo genotoxicity assays.

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). L-CITRONELLOL - READ-ACROSS: Reproductive toxicity: oral, rat (reaction mass of geraniol and nerol) - NOAEL (no-observed adverse-effect-level) of 1000 mg/kg bw/day; dermal, rat (Geraniol) - NOAEL of 300 mg/kg bw/day. Developmental toxicity: oral, rat (reaction mass of geraniol and nerol) - NOAEL of 100 mg/kg bw/day (maternal toxicity), 300 mg/kg bw/day (prenatal development toxicity); dermal, rat (Geraniol)- NOAEL of 300 mg/kg bw/day. DL-CITRONELLOL: Reproductive toxicity - READ-ACROSS: oral, rat (reaction mass of geraniol and nerol) - NOAEL (no-observed adverse-effect-level) of 1000 mg/kg bw/day; dermal, rat (Geraniol) - NOAEL of 300 mg/kg bw/day. Developmental toxicity: oral, rat - NOAEL of >= 750 mg/kg bw/day.

Specific target organ toxicity (STOT) - single exposure: Not classified (based on available data, the classification criteria are not met).

Specific target organ toxicity (STOT) - repeated exposure: Not classified (based on available data, the classification criteria are not met). L-CITRONELLOL - READ-ACROSS (weight of evidence): Repeated dose oral toxicity studies showed NOAEL (No-Observed-Adverse-Effect-Level), oral: 1000 mg/kg bw/day (mouse); 2000 mg/kg bw/day (rat). DL-CITRONELLOL - READ-ACROSS (geraniol): Repeated dose oral toxicity studies showed a NOAEL (No-Observed-Adverse-Effect-Level), oral, rat - >550 mg/kg bw/day.

Aspiration hazard: Not classified (no relevant information found).

Other toxicity information: No additional information available.

Information on likely routes of exposure:

General: Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure.

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Eyes: Causes serious eye irritation.

Skin: May be harmful in contact with skin. May cause allergic skin reaction. Causes skin irritation.

Inhalation: High airborne concentrations of vapors resulting from heating, misting or spraying may cause irritation of the respiratory tract and mucous membranes.

Ingestion: May be harmful if swallowed. Ingestion may cause irritation.

11.2. Information on other hazards

Endocrine disrupting properties: No specific information available.

Other information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

<u>Chemical Name</u>	<u>Species</u>	<u>Acute</u>	<u>Acute</u>	<u>Chronic</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	Fish	LC50 14.66 mg/L (96 hours) (similar materials)	N/E	N/E
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	Invertebrates	EC50 17.48 mg/L (48 hours) (similar materials)	N/E	N/E
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	Algae	EC50 2.4 mg/L (72 hours) (similar materials)	N/E	EC20 1.1 mg/L(72 hours) (similar materials)
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	Micro-organisms	EC10 580 mg/L (30 minutes) (similar materials)		
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	Fish	LC50 14.66 mg/L (96 hours)	N/E	N/E
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	Invertebrates	EC50 17.48 mg/L (48 hours)	N/E	N/E
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	Algae	EC50 2.4 mg/L (72 hours)	N/E	EC20 1.1 mg/L(72 hours)
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	Micro-organisms	EC10 580 mg/L (30 minutes)		
Geraniol	Fish	LC50 22 mg/L (96 hours) (similar materials)	N/E	N/E
Geraniol	Invertebrates	EC50 10.8 mg/L (48 hours) (similar materials)	N/E	N/E
Geraniol	Algae	EC50 13.1 mg/L (72 hours) (similar materials)	N/E	EC10 3.77 mg/L(72 hours) (similar materials)
Geraniol	Micro-organisms	EC50 70 mg/L (30 minutes)		
Citral	Fish	LC50 6.78 mg/L (96 hours)	N/E	N/E
Citral	Invertebrates	EC50 6.8 mg/L (48 hours)	N/E	N/E
Citral	Algae	EC50 104 mg/L (72 hours)	N/E	N/E

12.2. Persistence and degradability:

<u>Chemical Name</u>	<u>Biodegradation</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	Readily biodegradable (OECD 301F, read-across)
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	Readily biodegradable (OECD 301F)
Geraniol	Readily biodegradable (OECD 301A)
Citral	Readily biodegradable

12.3. Bioaccumulative potential:

<u>Chemical Name</u>	<u>Bioconcentration Factor (BCF)</u>	<u>Log Kow</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	N/E	3.66 @ 40°C (OECD 117)
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	82.59 L/kg (calculated)	3.41 @ 25°C
Geraniol	N/E	2.6 (OECD 117)
Citral	N/E	2.76-2.9

12.4. Mobility in soil:

<u>Chemical Name</u>	<u>Mobility in soil (Koc/Kow)</u>
L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol)	N/E
DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol)	N/E
Geraniol	N/E
Citral	N/E

12.5. Results of PBT and vPvB assessment:

Not Available.

12.6. Endocrine disrupting properties:

No specific information available.

12.7. Other adverse effects:

No additional information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods:

Dispose of unused contents (incineration) in accordance with national and local regulations. Dispose of container in accordance with national and local regulations. Ensure the use of properly authorized waste management companies, where appropriate.

See Section 8 for recommendations on the use of personal protective equipment.

SECTION 14: Transport information

The information below is provided to assist in documentation. It may supplement the information on the package. The package in your possession may carry a different version of the label depending on the date of manufacture. Depending on inner packaging quantities and packaging instructions, it may be subject to specific regulatory exceptions.

14.1. UN number or ID number: N/A

14.2. UN proper shipping name:

Not regulated - See Bill of Lading for Details

14.3. Transport hazard class(es):

U.S. DOT hazard class: N/A

Canada TDG hazard class: N/A

Europe ADR/RID/ADN hazard class: N/A

IMDG Code (ocean) hazard class: N/A

ICAO/IATA (air) hazard class: N/A

A "N/A" listing for the hazard class indicates the product is not regulated for transport by that regulation.

14.4. Packing group: N/A

14.5. Environmental hazards:

Marine pollutant: Not Applicable

Hazardous substance (USA): Not Applicable

14.6. Special precautions for user:

Not Applicable

14.7. Maritime transport in bulk according to IMO instruments

Not Applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Europe REACH (EC) 1907/2006: Applicable components are registered, exempt or otherwise compliant. EU REACH is only relevant to substances either manufactured or imported into the EU. Emerald Kalama Chemical has met its obligations under the EU REACH regulation. EU REACH information regarding this product is provided for informational purposes only. Each Legal Entity may have differing EU REACH obligations, depending on their place in the supply chain. Emerald's compliance with EU REACH does not imply automatic coverage for Downstream Users located in the EU. For material manufactured outside of the EU, the importer of record must understand and meet their specific obligations under the regulation.

EU Authorizations and/or restrictions on use: Not Applicable

Other EU information: No Additional Information

National regulations: No Additional Information

Chemical inventories:

<u>Regulation</u>	<u>Status</u>
Australian Inventory of Industrial Chemicals (AIIC):	Y
Canadian Domestic Substances List (DSL):	Y
Canadian Non-Domestic Substances List (NDSL):	N
China Inventory of Existing Chemical Substances (IECSC):	Y
European EC Inventory (EINECS, ELINCS, NLP):	Y
Japan Existing and New Chemical Substances (ENCS):	Y
Japan Industrial Safety and Health Law (ISHL):	Y
Korean Existing and Evaluated Chemical Substances (KECL):	Y
New Zealand Inventory of Chemicals (NZIoC):	Y
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Y
Taiwan Inventory of Existing Chemicals:	Y

Regulation

U.S. Toxic Substances Control Act (TSCA) (Active):

A "Y" listing indicates all intentionally added components are either listed or are otherwise compliant with the regulation. A "N" listing indicates that for one or more components: 1) there is no listing on the public inventory (or is not on the ACTIVE inventory for U.S. TSCA); 2) no information is available; or 3) the component has not been reviewed. A "Y" for New Zealand may mean that a qualified group standard may exist for the components in this product.

Status

Y

UK REACH: As the UK has formally left the European Union, EU REACH [(EC) 1907/2006] is no longer directly applicable within the UK. Please see UK REACH formatted SDS for information related to UK REACH compliance.

15.2. Chemical safety assessment:

A chemical safety assessment has been carried out for the substance or mixture.

SECTION 16: Other information**Hazard (H) Statements in the Composition section (Section 3):**

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.

Reason for revision: Changes in Section(s): 1

Evaluation method for classification of mixtures: Calculation method

Legend:

* : Trademark owned by Emerald Kalama Chemical, LLC.
 ACGIH: American Conference of Governmental Industrial Hygienists
 ATE: Acute toxicity estimate
 EU OELV: European Union Occupational Exposure Limit Value
 EU IOELV: European Union Indicative Occupational Exposure Limit Value
 N/A: Not Applicable
 N/E: None Established
 SCL: Specific concentration limit
 STEL: Short Term Exposure Limit
 TWA: Time Weighted Average (exposure for 8-hour workday)

Users Responsibility/Disclaimer of Liability:

The information set forth herein is based on our current knowledge, and is intended to describe the product solely with respect to health, safety and the environment. As such, it must not be interpreted as a guarantee of any specific property of the product. As a result, the customer shall be solely responsible for deciding whether said information is suitable and beneficial.

Safety Data Sheet Preparer:
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Annex**Exposure Scenarios****Substance information:**

Registered substances:

- 1) L-Citronellol ((-)-3,7-Dimethyloct-6-en-1-ol), EC# 231-415-7 / CAS# 7540-51-4, REACH Registration number:01-2120771576-43-XXXX.
 - 2) DL-Citronellol ((±)-3,7-Dimethyloct-6-en-1-ol), EC# 203-375-0 / CAS# 106-22-9, REACH Registration number: 01-2119453995-23-XXXX.
- The following exposure scenario is for lead component: L-Citronellol (EC# 231-415-7).

List of exposure scenarios:

ES1: Formulation or re-packing.

General remarks:

Exposure scenarios are based on the following: Generic Exposure Scenarios (GES) and specific Exposure Scenarios (SpERCs) from the Industry Guidance Document REACH Exposure Scenarios for Fragrance Substances (version 2.1, 11 December 2012) developed by the International Fragrance Association (IFRA).

The first tier environmental exposure assessments have at first instance been performed using EUSES v2.1.2 which is part of Chemical Safety Assessment and Reporting tool.

The worker dermal and inhalation exposure assessments for industrial and professional uses have been performed using ECETOC TRA Worker v3 model integrated in the Chemical Safety Assessment and Reporting tool or the Advanced REACH tool (ART v1.5) (inhalation exposures). The RiskofDerm Tier 2 model was used to refine dermal exposure estimates, if necessary.

Exposure scenario (1): Formulation or re-packing**1. Exposure scenario (1)**

Short title of the exposure scenario:

Formulation or re-packing

List of use descriptors:

Process category (PROC): PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15

Environmental release category (ERC): ERC2 (SpERC IFRA 2.1a.v1)

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.

PROC5 Mixing or blending in batch processes. Covers mixing or blending of solid or liquid materials in the context of manufacturing or formulating sectors, as well as upon end use.

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.

PROC15 Use as laboratory reagent. Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace).

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.

SpERC IFRA 2.1(a): Formulation of fragrance compounds at large/medium sites.

For further information on standardized use descriptors see the European Chemical Agency (ECHA) Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_r12_en.pdf). For further information on CEFIC (The European Chemical Industry Council) Specific Environmental Release Categories (SpERCs), see <http://www.cefic.org/Industry-support/Implementing-reach/Libraries/>.

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:

Generally accepted standards of occupational hygiene are maintained. Smoking, eating and drinking are prohibited at the workplace. Spills are cleaned immediately.

Product characteristics:

Concentration of substance:

- PROC1, PROC3, PROC5, PROC8b, PROC15: <=100%

- PROC8a, PROC9: <=25%

Physical state: liquid.

Vapour pressure: 0,086 hPa at 20°C.

Amounts used:

This information is not relevant for assessment of worker's exposure.

Frequency and duration of use/exposure:

Duration of activity:

- PROC1, PROC8b, PROC9: <=1 hour/day.

- PROC3, PROC5, PROC8a: <=4 hours/day.

- PROC15: <=15 minutes/day.

Human factors not influenced by risk management:

Exposed skin surface:

- PROC1, PROC3, PROC15: 240 cm² (one hand, face side only).

- PROC5, PROC9: 480 cm² (two hands, face side only).

- PROC8a, PROC8b: 960 cm² (two hands).

Other given operational conditions affecting workers exposure:

Location: Indoor use.

Domain: Industrial use.

Process temperature: <= 40 °C.

Assessment tool used:

- PROC1: ECETOC TRA v3 for inhalation and dermal exposure.

- PROC3, PROC9, PROC15: ECETOC TRA v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure.

- PROC5, PROC8a, PROC8b: RiskofDerm Tier 2 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure.

Technical conditions and measures to control dispersion from source towards the worker:

General ventilation: Basic general ventilation (1-3 air changes per hour): 0%.

Containment:

- PROC1: Closed system (minimal contact during routine operations).

- PROC3: Closed batch process with occasional controlled exposure.

- PROC8b, PROC9: Semi-closed process with occasional controlled exposure.

- PROC5, PROC8a, PROC15: No.

Local exhaust ventilation: Not required.

Occupational Health and Safety Management System: Advanced.

Conditions and measures related to personal protection, hygiene and health evaluation:

Respiratory protection: Not required.

Eye protection: Yes (chemical resistant face shield, goggles or safety glasses with side shields when there is potential for direct contact).

Dermal protection:

- PROC1: No (Effectiveness Dermal: 0%).

- PROC3, PROC5, PROC15: Yes (chemically resistant gloves conforming to EN374) (Effectiveness Dermal: 80%).

- PROC8a, PROC9: Yes (chemically resistant gloves conforming to EN374 with basic employee training) (Effectiveness Dermal: 90%).

- PROC8b: Yes (chemically resistant gloves conforming to EN374 with specific activity training) (Effectiveness Dermal: 95%).

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Wear suitable coveralls to prevent exposure to the skin.
Generally accepted standards of occupational hygiene are maintained.

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:

Generally accepted standards of occupational hygiene are maintained.
Minimisation of manual phases/work tasks.
Minimisation of splashes and spills.
Avoidance of contact with contaminated tools and objects.
Regular cleaning of equipment and work area.
Training staff on good practice.
Management/supervision in place to check that RMMs in place are being used correctly and OCs followed.

2.2 Control of environmental exposure

General:

All risk management measures utilised must also comply with all relevant local regulations.

Amounts used:

Maximum daily use at a site: 0,16 tons/day.
Maximum annual use at a site: 40 tons/year.

Frequency and duration of use:

Emission days: <=250 days/year.

Environmental factors not influenced by risk management:

Flow rate of receiving surface water: >=18,000 m3/day (default).

Other given operational conditions affecting environmental exposure:

Indoor use.
Industrial use.
Release fraction to air from process (initial release): 0.00025; (final release): 0.00025. Local release rate: 4 kg/day (SpERC IFRA 2.1a.v1).
Release fraction to wastewater from process (initial release): 0.00002; (final release): 0.000002. Local release rate: 0,32 kg/day (SpERC IFRA 2.1a.v1)
Release fraction to soil from process (final release): 0.0 (SpERC IFRA 2.1a.v1).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Dry sludge application to agricultural soil: Yes (default).

Conditions and measures related to municipal sewage treatment plant:

Municipal Sewage Treatment Plant (STP): Yes (freshwater).
Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town).

Conditions and measures related to external treatment of waste for disposal:

External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste:

External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:

All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Assessment method-Health: PROC3, PROC9: ECETOC TRA v3 for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure Only highest figures are presented here.

Assessment method-Environment: EUSES 2.1.2.

Health

<u>Effect/Compartment</u>	<u>Exposure estimate/PEC</u>	<u>RCR</u>	<u>Notes</u>
Worker, long-term, systemic, Dermal	0,412 mg/kg bw/day	0,823	PROC9
Worker, long-term, systemic, Inhalation	0,32 mg/m3	0,542	PROC3
Worker, long-term, systemic, Combined routes	N/A	0,869	PROC9

Environment

<u>Effect/Compartment</u>	<u>Exposure estimate/PEC</u>	<u>RCR</u>	<u>Notes</u>
Freshwater	0,00222 mg/L	0,926	
Freshwater sediment	0,029 mg/kg dw	0,927	
Marine water	0,000219 mg/L	0,913	
Marine water sediment	0,00285 mg/kg dw	0,914	
Soil	0,00413 mg/kg dw	0,862	
STP	0,02 mg/L	<0,01	

RCR=Risk characterization ratio (PEC/PNEC or Exposure estimate/DNEL); PEC=Predicted environmental concentration.

4. Guidance to the Downstream User to evaluate whether he works inside the boundaries set by the ES

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, with gloves, no respirator required. Duration of activity: PROC1, PROC8b, PROC9: <=1 hour/day. PROC3, PROC5, PROC8a: <=4 hours/day. PROC15: <=15 minutes/day. Concentration of substance: PROC1, PROC3, PROC5, PROC8b, PROC15: <=100%. PROC8a, PROC9: <=25%.

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific

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chemical safety assessment is required.
