

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

1.1. Product identifier:

Product trade name: Kalama* C-11 Aldehyde (Undecanal)
Company product number: C11AW
REACH registration number: 01-2119529242-47-0005
Substance name: Undecanal
Substance identification number: EC 203-972-6
Other means of identification: 32208; 1-Undecanal; Aldehyde C-11 undecylic

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

Uses: Fragrance ingredient. Industrial applications.
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. FAX: +44 (0) 151 423 8127.
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);
1-300-954-583 (Australia); 000-800-100-4086 (India).

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

2.2. Label elements:

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

Hazard pictogram(s):



Signal word:

Warning

Hazard statements:

H315 Causes skin irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.

P280 Wear protective gloves.

Supplemental information:

No Additional Information

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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:

This product does not meet the PBT and vPvB classification criteria.

Other hazards:

No Additional Information

See Section 11 for toxicological information.

SECTION 3: Composition/information on ingredients

3.1. Substance:

<u>CAS-No.</u>	<u>Chemical Name</u>	<u>Weight%</u>	<u>Classification</u>	<u>H Statements</u>
0000112-44-7	Undecanal	98-100	Skin Irrit. 2	H315
0000112-42-5	Undecan-1-ol	0.1-<1.0	Aquatic Acute 1- Aquatic Chronic 2- Eye Irrit. 2	H319-400-411

<u>CAS-No.</u>	<u>Chemical Name</u>	<u>Weight%</u>	<u>REACH Registration No.</u>	<u>EC/List Number</u>
0000112-44-7	Undecanal	98-100	01-2119529242-47-0005	203-972-6
0000112-42-5	Undecan-1-ol	0.1-<1.0	Impurity	203-970-5

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.

Eye contact: Any material that contacts the eye should be washed out immediately with water. Get medical attention if symptoms occur.

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.

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.

Ingestion: Do not induce vomiting. Never give anything by mouth to an unconscious person. Rinse out the mouth 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. Preexisting sensitization, skin and/or respiratory disorders or diseases may be aggravated. 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

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(due to build up in pressure) when exposed to extreme heat. Combustion hazard: waste soaked with this product may heat to temperatures causing self-ignition if improperly discarded. Many aldehydes readily oxidize exothermically when exposed to air. Any clean up materials, like rags, towels, etc. should be washed with water with mild soap or laundered with mild detergent before proper disposal to avoid the potential temperature rise from oxidation.

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 launder before reuse. Combustion hazard: waste soaked with this product may heat to temperatures causing self-ignition if improperly discarded. Immediately after use, rags, steel wool or other waste should be wetted or cleaned with water with mild soap or laundered with mild detergent or placed into a water-filled metal container before proper disposal.

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. Product can easily oxidize. It is recommended that opened containers be padded with nitrogen. Protect from light. Product can easily oxidize. It is recommended that opened containers be padded with nitrogen.

7.3. Specific end use(s):

No Additional Information

SECTION 8: Exposure controls / personal protection

8.1. Control parameters:

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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>
Undecanal	N/E	N/E	N/E	N/E
Undecan-1-ol	N/E	N/E	N/E	N/E
<u>Chemical Name</u>	<u>UK WEL</u>	<u>Ireland OEL</u>		
Undecanal	N/E	N/E		
Undecan-1-ol	N/E	N/E		

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

Derived No Effect Levels (DNELs) - Workers:

<u>Chemical Name</u>	<u>Inhalation-Acute (local)</u>	<u>Inhalation-Acute (systemic)</u>	<u>Inhalation-Long Term (local)</u>	<u>Inhalation-Long Term (systemic)</u>
Undecanal	N/E	N/E	N/E	59 mg/m3
Undecan-1-ol	N/E	220 mg/m3	N/E	220 mg/m3
<u>Chemical Name</u>	<u>Dermal-Acute (local)</u>	<u>Dermal-Acute (systemic)</u>	<u>Dermal-Long Term (local)</u>	<u>Dermal-Long Term (systemic)</u>
Undecanal	N/E	N/E	N/E	8,3 mg/kg bw/day
Undecan-1-ol	N/E	125 mg/kg	N/E	125 mg/kg

Predicted No Effect Concentration (PNECs):

<u>Chemical Name</u>	<u>Freshwater</u>	<u>Marine water</u>	<u>Intermittent releases</u>	<u>Soil</u>
Undecanal	0,003 mg/L	0,0003 mg/L	0,5 mg/L	0,006 mg/kg soil dw
Undecan-1-ol	0.0088 mg/L	0.00088 mg/L	N/E	1.606 mg/kg dw
<u>Chemical Name</u>	<u>Sediment (freshwater)</u>	<u>Sediment (marine)</u>	<u>STP</u>	<u>Oral</u>
Undecanal	0,039 mg/kg sediment dw	0,004 mg/kg sediment dw	5,5 mg/L	no potential for bioaccumulation
Undecan-1-ol	1.612 mg/kg dw	0.1612 mg/kg dw	0.086 mg/L	N/E

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: Wear eye protection.

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). The protective gloves to be used must comply with the specifications of the EC directive 89/686/EEC 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. Wear an approved respirator (e.g., an organic vapor respirator, a full face air purifying respirator for organic vapors, or a self-contained breathing apparatus) whenever exposure to aerosol, mist, spray, fume or vapor exceed the applicable exposure limit(s) of any chemical substance listed in this SDS.

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:

Form:	Liquid	pH:	Not Available
Appearance:	Colorless to light yellow	Relative density:	0.823-0.833 (20°C)
Odour:	Aldehyde-like	Partition coefficient (n-octanol/water):	3.84
Odour threshold:	Not Available	% Volatile by weight:	Not Available
Solubility in water:	Insoluble	VOC:	Not Available
Evaporation rate:	Not Available	Boiling point °C:	225 °C

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Vapour pressure:	Not Available	Boiling point °F:	437 °F
Vapour density:	Not Available	Flash point:	96-105 °C (205-221 °F) Closed Cup
Viscosity:	Not Available	Autoignition temperature:	200 °C (392 °F)
Melting point/Freezing point:	-10 °C (14 °F)	Flammability (solid, gas):	Not Applicable (liquid)
Oxidising properties:	Not oxidizing	Flammability or explosive limits:	LFL/LEL: Not Available
Explosive properties:	Not explosive		UFL/UEL: Not Available
Decomposition temperature:	Not Available	Surface tension:	44.8 mN/m @ 20°C (11.5 mg/L)

9.2. Other information:

Amounts specified are typical and do not represent a specification.

SECTION 10: Stability and reactivity

10.1. Reactivity:

Presents no significant reactivity hazard. Neither pyrophoric nor reactive with water. Does not form explosive mixtures with other organic materials.

10.2. Chemical stability:

This product is stable. Normally stable even at elevated temperatures and pressures. Does not undergo explosive decomposition; is shock stable; and is not an oxygen donor. Readily undergoes oxidation by air.

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. Avoid contact with reducing agents. Avoid contact with amines. May attack galvanized steel.

10.6. Hazardous decomposition products:

Carbon dioxide, carbon monoxide and hydrocarbons.

SECTION 11: Toxicological information

11.1. Information on toxicological effects:

Information on likely routes of exposure:

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

Eyes: May cause eye irritation.

Skin: Causes skin irritation. Repeated or prolonged contact may cause skin irritation and dermatitis.

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

Ingestion: Ingestion may cause irritation.

Acute toxicity information: Not classified (based on available data, the classification criteria are not met).

<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>
Undecanal	N/E	N/E	>5000 mg/kg (similar materials)	Rat/ adult	>5000 mg/kg	Rabbit/ adult
Undecan-1-ol	>0.7 mg/L (6 hours, vapor, no mortalities)	Rat/ adult	>5000 mg/kg	Rat/ adult	>5000 mg/kg	Rabbit/ adult

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

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<u>Chemical Name</u>	<u>Skin irritation</u>	<u>Species</u>
Undecanal	Irritant (OECD 404)	Similar materials
Undecan-1-ol	Non-irritant	Human

Serious eye damage/irritation: Not classified (based on available data, the classification criteria are not met).

<u>Chemical Name</u>	<u>Eye irritation</u>	<u>Species</u>
Undecanal	Slight irritant	Rabbit/ adult
Undecan-1-ol	Irritant	Rabbit/ adult

Respiratory or skin sensitization: Not classified (based on available data, the classification criteria are not met).

<u>Chemical Name</u>	<u>Skin sensitisation</u>	<u>Species</u>
Undecanal	Non-sensitizer	Human
Undecan-1-ol	Non-sensitizer	Guinea Pig/ adult

Carcinogenicity: Not classified (no relevant information found).

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). UNDECANAL: In vitro testing showed no mutagenic activity.

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). UNDECANAL: Reproductive toxicity, oral study in rats: NOAEL (no-observed adverse-effect-level) >1000 mg/kg bw/day (OECD 422).

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). UNDECANAL: Repeated dose study, oral, rat: NOAEL (no-observed-adverse-effect-level) =1000 mg/kg bw/day (systemic effects); <100 mg/kg bw/day (local effects).

Aspiration hazard: Not classified (based on available data, the classification criteria are not met).

Other toxicity information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

<u>Chemical Name</u>	<u>Fish 96 hour LC50</u>	<u>Fish 96 hour LC50</u>	<u>Fish Chronic NOEC</u>
Undecanal	6 mg/L (similar materials)	N/E	N/E
Undecan-1-ol	1.04 mg/L	N/E	N/E
<u>Chemical Name</u>	<u>Invertebrates 48 hour EC50</u>	<u>Invertebrates 24 hour EC50</u>	<u>Invertebrates Chronic NOEC</u>
Undecanal	2.5 mg/L (similar materials)	N/E	N/E
Undecan-1-ol	>0.8-1.1 mg/L (96 hours)	N/E	0.044-0.17 mg/L (21 days, calculated)
<u>Chemical Name</u>	<u>Algae 96 hour EC50</u>	<u>Algae 72 hour EC50</u>	<u>Algae Chronic NOEC</u>
Undecanal	N/E	4.37 mg/L (similar materials)	EC10=1.46 mg/L (72 hours, similar materials)
Undecan-1-ol	N/E	>0.1-1 mg/L	N/E

12.2. Persistence and degradability:

<u>Chemical Name</u>	<u>Biodegradation</u>
Undecanal	Readily biodegradable (failed 10-day window)
Undecan-1-ol	Readily biodegradable (OECD 301D)

12.3. Bioaccumulative potential:

<u>Chemical Name</u>	<u>Bioconcentration Factor (BCF)</u>	<u>Log Kow</u>
Undecanal	158.7 (calculated)	3.84
Undecan-1-ol	N/E	4.9

12.4. Mobility in soil:

<u>Chemical Name</u>	<u>Mobility in soil (Koc/Kow)</u>
Undecanal	119.7 @ 25°C
Undecan-1-ol	8400 (calculated)

12.5. Results of PBT and vPvB assessment:

This product does not meet the PBT and vPvB classification criteria.

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12.6. 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: 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 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. Transport in bulk according to Annex II of Marpol and the IBC Code:

Chemical Name

Undecan-1-ol

Category

Category X

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. REACH is only relevant to substances either manufactured or imported into the EU. Emerald Performance Materials has met its obligations under the REACH regulation. REACH information regarding this product is provided for informational purposes only. Each Legal Entity may have differing REACH obligations, depending on their place in the supply chain. 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:

Regulation

Australian Inventory of Chemical Substances (AICS):

Status

Y

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<u>Regulation</u>	<u>Status</u>
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):	N
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Y
Taiwan Inventory of Existing Chemicals:	Y
U.S. Toxic Substances Control Act (TSCA):	Y

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; 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.

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.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Reason for revision: Changes in Section(s): 1, 3, 15

Evaluation method for classification of mixtures: Not Applicable (substance)

Legend:

* : Trademark owned by Emerald Performance Materials, LLC.

ACGIH: American Conference of Governmental Industrial Hygienists

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

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:

Product Compliance Department

Emerald Performance Materials, LLC

1499 SE Tech Center Place, Suite 300

Vancouver, WA 98683

United States

Annex

Document in process