

SECTION 1: Identification

Product identifiers:

Product trade name: Kalama* C-6 Aldehyde FCC
Company product number: C6A
Other means of identification: Hexaldehyde

Recommended use of the chemical and restrictions on use:

Uses: Flavor and fragrance ingredient
Restrictions on use: None identified

Details of the supplier:

Manufacturer/Supplier: Emerald Performance Materials, LLC
Emerald Kalama Chemical, LLC
1296 NW Third Street
Kalama, WA 98625 United States
Telephone: +1-360-673-2550

1499 SE Tech Center Place, Suite 300
Vancouver, WA 98683 United States
Telephone: +1-360-954-7100

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

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: Hazard(s) identification

Classification of the substance or mixture:

Flammable Liquid, category 3, H226
Skin Irritation, category 2, H315
Eye Irritation, category 2, H319
Hazardous to the aquatic environment, Acute, category 2, H401

Label elements:

Hazard pictogram(s):



Signal word:

Warning

Hazard statements:

H226 Flammable liquid and vapour.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H401 Toxic to aquatic life.

Precautionary statements:

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof electrical/ventilating/lighting equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to

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do. Continue rinsing.
P332+P313 If skin irritation 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.
P370+P378 In case of fire: Use carbon dioxide, dry chemical, foam to extinguish.
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local, regional and international regulations.

Supplemental information: No Additional Information

Classification and hazards statements are listed according to the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS). Regulations in individual countries/regions may determine which classifications and hazard statements are applicable based on adopted hazard classes and categories. Precautionary statements are listed according to the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Annex III. Regulations in individual countries/regions may determine which statements are required on the product label. See product label for specifics.

Other hazards: No Additional Information

See Section 11 for toxicological information.

SECTION 3: Composition/information on ingredients

Substance:

| <u>CAS-No.</u> | <u>Chemical Name</u> | <u>Weight%</u> |
|----------------|----------------------|----------------|
| 0000066-25-1 | Hexanal | 99-100 |

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

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: 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.

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.

Most important symptoms and effects, both acute and delayed: Dizziness, Headache, Irritation, Nausea. Preexisting sensitization, skin and/or respiratory disorders or diseases may be aggravated. See section 11 for additional information.

Indication of any immediate medical attention and special treatment needed, if necessary: Treat symptomatically.

SECTION 5: Fire-fighting measures

Extinguishing media:

Suitable: Use ABC dry chemical, foam, CO₂, or water fog. Water may be ineffective due to the low flash point.

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

Special hazards arising From the chemical:

Unusual fire/explosion hazards: Issue warning: flammable liquid. Eliminate all ignition sources. Ventilate the area. If spill is large, be prepared to isolate the hazard area. Deny access to the spill area to persons who are not involved in the cleanup and/or who have not been properly trained in spill management of hazardous/flammable liquids. Vapors may explode if ignited in an enclosed area. Run off to sewer may cause a fire or explosion hazard. Protect product from flames of any kind; maintain proper clearance when using heat devices, etc. Product can form a flammable vapor/air mixture at temperatures at or above the flash point. Closed container may rupture (due to build up in pressure) when exposed to extreme heat. Product may burn if an ignition source is present. Gives off volatile vapors that are heavier than air and may travel along the ground or may be moved by ventilation and ignited by flame, sparks, heaters, or other ignition sources at distant locations (flashback potential).

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

Special protective equipment and precautions for fire-fighters: Use water/water spray to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures. Do not flush flammable liquids into sewer as a fire or vapor explosion hazard may result. Never direct a hose stream directly onto a burning flammable/combustible liquid. Solid or straight hose stream will cause fire to spread if directed onto a burning spill or into an open container of burning liquid. 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

Personal precautions, protective equipment and emergency procedures: See Section 8 for recommendations on the use of personal protective equipment. Eliminate ignition sources. Ventilate areas of spill. Personal Protective Equipment must be worn.

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

Methods and materials 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.

SECTION 7: Handling and storage

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. Bond and ground all containers when transferring chemical. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). Use spark-proof tools and equipment. Vapors may travel to distant ignition sources.

Conditions for safe storage, including any incompatibilities: Avoid excessive heat. Do not store near flammable agents. Keep away from heat, sparks and open flames. Store under well-ventilated conditions. Keep container upright, when not in use, to prevent leakage. Avoid storing containers in direct sunlight as vapors may accumulate in the head space creating pressure. 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. Emptied container may contain residual vapors or liquid which may ignite or explode. Do not reuse empty container without commercial cleaning or reconditioning. Bond and ground all containers when transferring chemical. Comply with all national, state and local codes pertaining to the storage, handling, dispensing and disposal of flammable liquids. Product can easily oxidize. It is recommended that opened containers be padded with nitrogen. Protect from light.

SECTION 8: Exposure controls / personal protection

Control parameters:

Occupational exposure limits (OEL):

| <u>Chemical Name</u> | <u>ACGIH - TWA/Ceiling</u> | | <u>ACGIH - STEL</u> | |
|----------------------|----------------------------|--------------------|---------------------|------------------|
| Hexanal | N/E | | N/E | |
| <u>Chemical Name</u> | <u>Australia</u> | <u>New Zealand</u> | <u>Korea</u> | <u>Indonesia</u> |
| Hexanal | N/E | N/E | N/E | N/E |
| <u>Chemical Name</u> | <u>Japan ISHL</u> | <u>Japan JSOH</u> | <u>Taiwan</u> | <u>Malaysia</u> |
| Hexanal | N/E | N/E | N/E | N/E |
| <u>Chemical Name</u> | <u>Philippines</u> | <u>Singapore</u> | | |
| Hexanal | N/E | N/E | | |

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

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. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.).

Individual protection measures, such as personal protective equipment:

Eye/face protection: Safety glasses or goggles required.

Skin and body protection: Wear chemical resistant (impervious) gloves. Use good laboratory/workplace procedures including personal protective clothing: labcoat, safety glasses and protective gloves.

Respiratory protection: 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.

SECTION 9: Physical and chemical properties

| | | | |
|--------------------------------------|---------------------------|---|--------------------------------|
| Form: | Liquid | pH: | Not Available |
| Appearance: | Colorless | Relative density: | 0.808-0.817 (25°C) |
| Odor: | Characteristic | Partition coefficient (n-octanol/water): | 2.3 @ 25°C (OECD 117) |
| Odor threshold: | Not Available | % Volatile by weight: | Not Available |
| Solubility in water: | 5.77 g/L @ 20°C | VOC: | Not Available |
| Evaporation rate: | Not Available | Boiling point °C: | 128 °C @ 101.3 kPa |
| Vapor pressure: | 2050 Pa @ 20°C | Boiling point °F: | 263 °F @ 101.3 kPa |
| Vapor density: | 3.5 (Air=1) | Flash point: | 26-29 °C (79-85 °F) Closed Cup |
| Viscosity: | 0.69 mPas @ 20°C | Auto-ignition temperature: | 205°C (401°F) @ 1013 hPa |
| Melting point/Freezing point: | -57°C (-71°F) @ 101.3 kPa | Flammability (solid, gas): | Not Applicable (liquid) |
| Oxidizing properties: | Not oxidizing | Flammability or explosive limits: | LFL/LEL: 1.0% |
| Explosive properties: | Not explosive | | UFL/UEL: 7.5% |
| Decomposition temperature: | Not Available | Surface tension: | 50.11 mN/m @ 20°C (1000 mg/L) |

Other information: Amounts specified are typical and do not represent a specification.

SECTION 10: Stability and reactivity

Reactivity: Presents no significant reactivity hazard. Neither pyrophoric nor reactive with water. Does not form explosive mixtures with other organic materials. Oxidizes when exposed to air.

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.

Possibility of hazardous reactions: Hazardous polymerization will not occur. Auto-oxidizes and polymerizes especially in the presence of traces of acid.

Conditions to avoid: Do not expose to excessive heat or ignition sources. Exposure to air.

Incompatible materials: Avoid strong acids, bases, and oxidizing agents. Avoid contact with reducing agents. Avoid contact with amines. May attack some plastics, rubber and coatings.

Hazardous decomposition products: Carbon dioxide, carbon monoxide and hydrocarbons.

SECTION 11: Toxicological information

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: Causes serious eye irritation.

Skin: May be absorbed through the skin. Causes skin irritation.

Inhalation: Inhalation may cause irritation of the respiratory tract and mucous membranes. Chronic exposure may cause headache, dizziness, tiredness, nausea and vomiting.

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> |
|----------------------|-------------------------|----------------|------------------|-----------------|--------------------|----------------|
| Hexanal | LCL0=2000 ppm (4 hours) | Rat/ adult | 7703 mg/kg bw | Rat/ adult male | >8100 mg/kg bw | Rabbit/ adult |

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

| <u>Chemical Name</u> | <u>Skin Irritation</u> | <u>Species</u> |
|----------------------|---------------------------|----------------|
| Hexanal | Irritant (OECD 431 & 439) | In-Vitro |

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

| <u>Chemical Name</u> | <u>Eye Irritation</u> | <u>Species</u> |
|----------------------|---------------------------|----------------|
| Hexanal | Irritant (OECD 438 & 492) | In-Vitro |

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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> |
|----------------------|---------------------------|--------------------|
| Hexanal | Non-sensitizer | Weight of evidence |

Carcinogenicity: Not classified (no relevant information found).

Germ cell mutagenicity: Not classified (based on available data, the classification criteria are not met). HEXANAL: Mixed results were seen in in-vitro genotoxicity assays. Based on the weight-of-evidence approach, there is some limited indication for genotoxicity of hexanal. However, the chromosome aberration test on hexanal did not induce chromosome aberrations. The results of an in vivo mammalian alkaline comet assay reveal that hexanal did not induce statistically significant increases in DNA strand breaks, up to limit concentration of 2000 mg/kg bw/day. Thus, the in vivo study confirms that hexanal does not possess genotoxic activity.

Reproductive toxicity: Not classified (based on available data, the classification criteria are not met). HEXANAL: 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 (no relevant information found).

Specific target organ toxicity (STOT) - repeated exposure: Not classified (based on available data, the classification criteria are not met). HEXANAL: Repeated dose study, oral, rat: NOAEL (no-observed-adverse-effect-level) = 1000 mg/kg bw/day.

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

Other toxicity information: No additional information available.

SECTION 12: Ecological information

Ecotoxicity:

| <u>Chemical Name</u> | <u>Species</u> | <u>Acute</u> | <u>Acute</u> | <u>Chronic</u> |
|----------------------|-----------------|--|--------------|----------------------------|
| Hexanal | Fish | LC50 14 mg/L (96 hours) | N/E | LC50 9.8 mg/L (14 days) |
| Hexanal | Invertebrates | EC50 7.16 mg/L (48 hours) (geometric mean measured) | N/E | N/E |
| Hexanal | Algae | EC50 22.6 mg/L (72 hours) | N/E | EC10 19.25 mg/L (72 hours) |
| Hexanal | Micro-organisms | EC50 / EC10 250 mg/L / 67 mg/L (3 hours) | | |

Persistence and degradability:

| <u>Chemical Name</u> | <u>Biodegradation</u> |
|----------------------|-----------------------------------|
| Hexanal | Readily biodegradable (OECD 301F) |

Bioaccumulative potential:

| <u>Chemical Name</u> | <u>Bioconcentration Factor (BCF)</u> | <u>Log Kow</u> |
|----------------------|--------------------------------------|-----------------------|
| Hexanal | 13 (calculated) | 2.3 @ 25°C (OECD 117) |

Mobility in soil:

| <u>Chemical Name</u> | <u>Mobility in soil (Koc/Kow)</u> |
|----------------------|-----------------------------------|
| Hexanal | 32.359 (20°C) |

Other adverse effects: No additional information available.

SECTION 13: Disposal considerations

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.

UN number: UN1207

UN proper shipping name:

Hexaldehyde

Transport hazard class(es):

U.S. DOT hazard class: 3

Canada TDG hazard class: 3

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Europe ADR/RID hazard class: 3
IMDG Code (ocean) hazard class: 3
ICAO/IATA (air) hazard class: 3

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

Packing group: III

Environmental hazards:

Marine pollutant: Not Applicable
Hazardous substance (USA): Not Applicable

Special precautions for user: Not Applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:
Not Applicable

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question:

Japan regulations:

Japan Industrial Safety and Health Law:

Chemical name
Hexanal

Category
Dangerous Substance

Japan Fire Service Law:

Chemical name
Hexanal

Category
Group 4 - Flammable liquids

Japan Poisonous and Deleterious Substances:

Chemical name
No subject chemicals

Category Threshold

Japan Prevention of Marine Pollution and Disaster:

Chemical name
No subject chemicals

Category

Japan Chemical Substances Control Law:

Chemical name
No subject chemicals

Category Notes

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

Chemical inventory notes: New Zealand: One or more components may be covered by a group standard.

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.

SECTION 16: Other information

Legend:

* : Trademark owned by Emerald Performance Materials, LLC.
ACGIH: American Conference of Governmental Industrial Hygienists
N/A: Not Applicable
N/E: None Established
STEL: Short Term Exposure Limit

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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