Effective date: 11/23/2010

1 - Identification

Product identifier: Kalama* Amyl Cinnamic Aldehyde
Product number: ACA

Recommended uses of the chemical and restrictions on use:
Organic liquid

Manufacturer/Supplier: Emerald Performance Materials, LLC
2020 Front Street, Suite 100
Cuyahoga Falls, Ohio 44221
United States
Telephone: 1-330-916-6700
FAX: 1-330-916-6734

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

Emergency telephone number:
Chemtrec (24 hours)
USA 1-800-424-9300
International: +01-703-527-3887

2 - Hazard(s) identification

Potential physical and environmental effects: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Potential health effects:

Acute health effects: May cause allergic skin reaction. May cause eye and skin irritation. Repeated or prolonged contact may cause skin irritation and dermatitis. High airborne concentrations of vapors resulting from heating, misting or spraying may cause irritation of the respiratory tract and mucous membranes.

Chronic health effects: May cause skin sensitization.

Carcinogenic status: Not listed or regulated by IARC, NTP, OSHA, or ACGIH.

Reproductive effects: None Expected

See Section 11 for toxicological information.

3 - Composition / information on ingredients

Substance:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>000122-40-7</td>
<td>60-100</td>
</tr>
</tbody>
</table>
Notes: No Additional Information

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

4 - First-aid measures

If irritation or other symptoms (as noted above) 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. Get medical attention if symptoms occur.

Inhalation: If affected, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration.

Ingestion: Do not induce vomiting. Never give anything by mouth to an unconscious person. Rinse out the mouth with water. Get medical attention immediately.

Most important symptoms and effects, both acute and delayed: Irritation. Pre-existing skin problems may be aggravated by prolonged or repeated contact.

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

5 - Fire-fighting measures

NFPA flammability class: IIIB

Extinguishing media: NFPA Class IIIB (Combustible liquid): 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.

Special protective equipment and precautions for fire fighters: 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.

Specific hazards arising from the chemical: Product is not considered a fire hazard, but will burn if ignited. Irritating or toxic substances may be emitted upon burning, combustion or decomposition. Closed container may rupture (due to build up in pressure) when exposed to extreme heat.

See section 9 for additional information.

6 - Accidental release measures

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.

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

Methods and material for containment and cleaning up: Contain by digging 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.

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.

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. Empty container contains residual product which may exhibit hazards of product. Do not reuse empty container without commercial cleaning or reconditioning. Product can easily oxidize. It is recommended that opened containers be padded with nitrogen. Protect from light.

8 - Exposure controls / personal protection

Control parameters:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TWA</th>
<th>ACGIH STEL</th>
<th>OSHA TWA</th>
<th>OSHA STEL</th>
<th>MEXICO</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>N/E</td>
<td>N/E</td>
<td>N/E</td>
<td>N/E</td>
<td>N/E</td>
</tr>
</tbody>
</table>

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

Notes: No Additional Information

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation to draw fumes, vapors and/or dust 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. (Ventilation guidelines/techniques may be found in publications such as Industrial Ventilation: American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, OH, 45240-1634, USA.) (http://www.acgih.org/home.htm).

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: 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. Use respirator in accordance with manufacturer's use limitations and OSHA standard 1910.134 (29CFR).

General protection: Eyewash fountains and safety showers are recommended in the work area.

9 - Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>pH</td>
<td>Not Available</td>
</tr>
<tr>
<td>Appearance</td>
<td>Pale yellow</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>0.96 - 0.97 (25 °C)</td>
</tr>
<tr>
<td>Odor</td>
<td>Floral</td>
</tr>
<tr>
<td>%Volatile by weight</td>
<td>100%</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Negligible</td>
</tr>
<tr>
<td>VOC</td>
<td>100%</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Flash point</td>
<td>&gt;212 °F (&gt;100 °C) Tag Closed Cup</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>&lt;0.1 mm Hg @ 20 °C</td>
</tr>
<tr>
<td>Boiling Point °F</td>
<td>543 °F</td>
</tr>
<tr>
<td>Boiling Point °C</td>
<td>284 °C</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>4.7</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Not oxidizing</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not Available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Melting point / Freezing</td>
<td>Not Available</td>
</tr>
<tr>
<td>Explosive range</td>
<td>LEL Not Available</td>
</tr>
</tbody>
</table>
Other information: Amounts specified are typical and do not represent a specification.

10 - Stability and reactivity

Reactivity: None known.
Chemical stability: This product is stable. Readily undergoes oxidation by air.
Possibility of hazardous reactions: Hazardous polymerization will not occur.
Conditions to avoid: Avoid exposure to air, moisture, ignition sources and elevated temperatures.
Incompatible materials: Avoid contact with strong oxidizing agents.
Hazardous decomposition products: Carbon dioxide and carbon monoxide.
Notes: No Additional Information.

11 - Toxicological information

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

Information on toxicological effects:

General: No Additional Information
Inhalation: High airborne concentrations of vapors resulting from heating, misting or spraying may cause irritation of the respiratory tract and mucous membranes.

Eyes: May cause eye irritation.
Skin: May cause allergic skin reaction. May cause skin irritation.

Ingestion: Ingestion may cause irritation.

Acute toxicity information:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>LC50 Inhalation</th>
<th>Species</th>
<th>LD50 Oral</th>
<th>Species</th>
<th>LD50 Skin</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>&gt;2.12 mg/L (similar materials, 4 hours)</td>
<td></td>
<td>3730 mg/kg</td>
<td>Rat/ adult</td>
<td>&gt;2000 mg/kg</td>
<td>Rabbit/ adult</td>
</tr>
<tr>
<td>2-Benzylideneheptanal</td>
<td>N/E</td>
<td>Species</td>
<td>N/E</td>
<td>Species</td>
<td>N/E</td>
<td>Species</td>
</tr>
<tr>
<td>2-Benzylideneheptanal</td>
<td>N/E</td>
<td>Species/Dose</td>
<td>Mild-moderate irritant</td>
<td>Species/Dose</td>
<td>N/E</td>
<td>Species/Dose</td>
</tr>
</tbody>
</table>

Other toxicity information:
Ames mutagenicity test: negative.

### 12 - Ecological information

#### Ecotoxicity:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Fish 96 hour LC50</th>
<th>Species</th>
<th>Fish 96 hour LC50</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>3.14 mg/L</td>
<td>Calculated</td>
<td>N/E</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Invertebrates 48 hour EC50</th>
<th>Species</th>
<th>Invertebrates 24 hour EC50</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>1.1 mg/L</td>
<td>Daphnia magna</td>
<td>N/E</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Algal 96 hour EC50</th>
<th>Species</th>
<th>Algal 72 hour EC50</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>N/E</td>
<td></td>
<td>1.88 mg/L</td>
<td>Pseudokirchneriella subcapitata</td>
</tr>
</tbody>
</table>

#### Persistence and degradability:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Biodegradation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>Readily biodegradable</td>
</tr>
</tbody>
</table>

#### Bioaccumulative potential:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Bioconcentration Factor (BCF)</th>
<th>Log Kow</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>N/E</td>
<td>4.7</td>
</tr>
</tbody>
</table>

#### Mobility in soil:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Mobility in soil (Koc/Kow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Benzylideneheptanal</td>
<td>N/E</td>
</tr>
</tbody>
</table>

Other adverse effects: No Additional Information

### 13 - Disposal considerations

For waste disposal purposes, this product is not known to be defined or designated as hazardous by current provisions of the Federal (EPA) Resource Conservation and Recovery Act (RCRA, 40CFR261). Incinerate waste product when in liquid form (i.e., as supplied) in a properly permitted (approved) incineration facility in accordance with federal, state and local regulations. Liquids cannot be disposed of in a landfill. Federal, state and local regulations where the waste material is generated, treated, and/or disposed of must be examined to verify the appropriate waste classification.

### 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.

<table>
<thead>
<tr>
<th>UN/NA Number:</th>
<th>U.S. DOT Class:</th>
<th>IMDG Class:</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN3082</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Packing Group:</th>
<th>ICAO/IATA Class:</th>
<th>TDG Class:</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

ADR/RID Class: 9

Proper shipping name: Environmentally Hazardous Substance Liquid N.O.S. (2-Benzylideneheptanal)

Environmental hazards:

Marine pollutant: Marine Pollutant (IMDG code 2.9.3). For air transport, see Special Provision A97 (ICAO/IATA).
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

Notes: For surface shipments within the United States, in containers of 119 gallons (450 L) or less: Not regulated.

15 - Regulatory information

Safety, health and environment regulations/legislation specific for the product:

U.S. federal and state regulations/legislation:

This MSDS has been prepared in accordance with the hazard criteria of the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

U.S. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Reportable Quantity (RQ):

Not Applicable

U.S. Superfund Amendments and Reauthorization Act (SARA):

SARA Title III Section 312 Hazard Category (40 CFR 370): Immediate health hazard

SARA Section 313: This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and 40 CFR 372:

None Known

California Proposition 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:
None known to be present or none in reportable amounts for occupational exposure as per OSHA's approval of the California Hazard Communication Standard, Federal Register, page 31159 ff, 6 June 1997.

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:
None known to be present or none in reportable amounts for occupational exposure as per OSHA's approval of the California Hazard Communication Standard, Federal Register, page 31159 ff, 6 June 1997.

Notes: No Additional Information

Canadian regulations/legislation:

Canadian Ingredient Disclosure List: The following components are on the Canadian Ingredient Disclosure List (WHMIS):
None Listed

Canadian Workplace Hazardous Material Information System (WHMIS) classification: D2B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.
Notes: No Additional Information

Chemical inventories:

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Domestic Substances List (DSL):</td>
<td>Y</td>
</tr>
<tr>
<td>Canadian Non-Domestic Substances List (NDSL):</td>
<td>N</td>
</tr>
<tr>
<td>European Inventory of Existing Chemical Substances (EINECS):</td>
<td>Y</td>
</tr>
<tr>
<td>European List of Notified Chemical Substances (ELINCS):</td>
<td>N</td>
</tr>
<tr>
<td>U.S. Toxic Substances Control Act (TSCA):</td>
<td>Y</td>
</tr>
</tbody>
</table>

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.

Chemical inventory notes: No Additional Information

Notes: No Additional Information

16 - Other information

Notes: No Additional Information

MSDS Revision date: 11/23/2010

HMIS Rating
Health: 2  Flammability: 1  Reactivity: 0  Personal Protection: X

NFPA Rating
Health: 2  Flammability: 1  Reactivity: 0

Key: 0=Insignificant; 1=Slight; 2=Moderate; 3=High; 4=Extreme. An asterisk appearing after the HMIS Health numerical rating denotes a chronic hazard.

Hazardous Materials Identification System (HMIS), National Paint and Coating Association (NFPA). rating applies to product "as packaged" (i.e., ambient temperature). Ratings are based upon HMIS® III and NFPA 704 (2007). An asterisk appearing after the HMIS Health® III numerical rating denotes a chronic hazard. National Fire Protection Association (NFPA) rating identifies the severity of hazards of material during a fire emergency (i.e., "on fire").

Legend:
* : Trademark owned by Emerald Performance Materials, LLC.
ACGIH: American Conference of Governmental Industrial Hygienists
A1: Confirmed human carcinogen
A2: Suspected human carcinogen
A3: Animal carcinogen
CAS No: Chemical Abstract Service Registry Number
ADR/RID: European dangerous goods transport road and rail regulations
CERCLA: Comprehensive Environmental Response, Compensation and Liability Act (U.S. EPA)
DOT: Department of Transportation (U.S.)
EPA: Environmental Protection Agency (U.S.)
GHS: Globally Harmonized System of Classification and Labeling of Chemicals
HMIS: Hazardous Materials Identification System
IARC: International Agency for Research on Cancer
Group 1: Carcinogenic to humans
Group 2A: Probably carcinogenic to humans
Group 2B: Possibly carcinogenic to humans
Group 3: Unclassified as a carcinogen to humans
IATA: International Air Transport Association
ICAO: International Civil Aviation Organization
IMDG: International Maritime Dangerous Goods code
MSDS: Material Safety Data Sheet
Users responsibility/disclaimer of liability
As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local laws and local regulations remains the responsibility of the user.

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of your operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained in this bulletin should be provided to your employees or customers. It is your responsibility to develop appropriate work practice guidelines and employee instructional programs for your operation.

Safety Data Sheet Preparer:
Product Compliance Department
Emerald Performance Materials, LLC
2020 Front Street, Suite 100
Cuyahoga Falls, Ohio 44221
United States