1 Identification

· Product identifier
  · Trade name: all-trans Retinoic Acid
  · Synonym
    atRA
    NSC 122578
    NSC 122758
    RA
    Vitamin A Acid
    (2E,4E,6E,8E)-3,7-dimethyl-9-(2,6,6-trimethylcyclohex-1-en-1-yl)nona-2,4,6,8-tetraenoic acid
  · Article number: 11017
  · CAS Number: 302-79-4
  · EC number: 206-129-0
  · Application of the substance / the mixture For research use only, not for human or veterinary use.

· Details of the supplier of the safety data sheet
  · Manufacturer/Supplier: Cayman Chemical Co.
    1180 E. Ellsworth Rd.
    Ann Arbor, MI 48108
    USA
  · Information department: Product safety department
  · Emergency telephone number:
    During normal opening times: +1 (734) 971-3335
    US/CANADA: 800-424-9300
    Outside US/CANADA: 703-741-5970

2 Hazard(s) identification

· Classification of the substance or mixture
  · GHS08 Health hazard
    Repr. 1B H360 May damage fertility or the unborn child.
  · GHS09 Environment
    Aquatic Acute 1 H400 Very toxic to aquatic life.
    Aquatic Chronic 1 H410 Very toxic to aquatic life with long lasting effects.
  · GHS07
    Skin Irrit. 2 H315 Causes skin irritation.

(Contd. on page 2)
Trade name: all-trans Retinoic Acid

- Label elements
- GHS label elements
  The substance is classified and labeled according to the Globally Harmonized System (GHS).
- Hazard pictograms
  ![GHS07](image1) ![GHS08](image2) ![GHS09](image3)

- Signal word Danger
- Hazard statements
  H315 Causes skin irritation.
  H360 May damage fertility or the unborn child.
  H400 Very toxic to aquatic life.
  H410 Very toxic to aquatic life with long lasting effects.
- Precautionary statements
  Obtain special instructions before use.
  Do not handle until all safety precautions have been read and understood.
  Wash thoroughly after handling.
  Avoid release to the environment.
  Wear protective gloves/protective clothing/eye protection/face protection.
  If on skin: Wash with plenty of water.
  IF exposed or concerned: Get medical advice/attention.
  Specific treatment (see on this label).
  Take off contaminated clothing and wash it before reuse.
  If skin irritation occurs: Get medical advice/attention.
  Collect spillage.
  Store locked up.
  Dispose of contents/container in accordance with local/regional/national/international regulations.
- Classification system:
- NFPA ratings (scale 0 - 4)
  ![NFPA ratings](image4)
  Health = 1
  Fire = 0
  Reactivity = 0

- HMIS-ratings (scale 0 - 4)
  ![HMIS-ratings](image5)
  Health = *1
  Fire = 0
  Reactivity = 0

- Other hazards
- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.

### 3 Composition/information on ingredients
- Chemical characterization: Substances
  - CAS No. Description
    302-79-4 all-trans Retinoic Acid
4 First-aid measures

- **Description of first aid measures**
- **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water.
- **After swallowing:** If symptoms persist consult doctor.
- **Information for doctor:**
  - **Most important symptoms and effects, both acute and delayed**
    May cause anemia, cough, CNS depression, drowsiness, headache, heart damage, lassitude (weakness, exhaustion), liver damage, narcosis, reproductive effects, teratogenic effects.
    No further relevant information available.
  - **Indication of any immediate medical attention and special treatment needed**
    No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
  Use fire fighting measures that suit the environment.
  A solid water stream may be inefficient.
- **Special hazards arising from the substance or mixture**
  No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:**
  No special measures required.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  Not required.
- **Environmental precautions:**
  Inform respective authorities in case of seepage into water course or sewage system.
  Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
  Dispose contaminated material as waste according to item 13.
- **Reference to other sections**
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.
- **Protective Action Criteria for Chemicals**
  - **PAC-1:** Substance is not listed.
  - **PAC-2:** Substance is not listed.
  - **PAC-3:** Substance is not listed.
7 Handling and storage

· Handling:
  · Precautions for safe handling
    No special precautions are necessary if used correctly.
    Avoid breathing dust/fume/gas/mist/vapours/spray.
    Avoid prolonged or repeated exposure.
    Keep away from sources of ignition.
    Take precautionary measures against static discharge.
  · Information about protection against explosions and fires: No special measures required.

· Conditions for safe storage, including any incompatibilities
  Keep container tightly closed.
  Store in accordance with information listed on the product insert.

· Storage:
  · Requirements to be met by storerooms and receptacles: No special requirements.
  · Information about storage in one common storage facility: Not required.
  · Further information about storage conditions: None.
  · Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

· Additional information about design of technical systems: No further data; see item 7.

· Control parameters
  · Components with limit values that require monitoring at the workplace: Not required.
  · Additional information: The lists that were valid during the creation were used as basis.

· Exposure controls
  · Personal protective equipment:
    · General protective and hygienic measures:
      Keep away from foodstuffs, beverages and feed.
      Immediately remove all soiled and contaminated clothing.
      Wash hands before breaks and at the end of work.
      Avoid contact with the skin.
      Avoid contact with the eyes and skin.
    · Breathing equipment: Not required.
    · Protection of hands:

      Protective gloves

      The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
      Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
      Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
    · Material of gloves
      The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
    · Penetration time of glove material
      The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
### 9 Physical and chemical properties

- **Information on basic physical and chemical properties**
  - **General Information**
  - **Appearance:**
    - **Form:** Crystalline
    - **Color:** Not determined.
  - **Odor:** Characteristic
  - **Structural Formula:** C20H28O2
  - **Molecular Weight:** 300.4 g/mol
  - **Odor threshold:** Not determined.

- **pH-value:** Not applicable.

- **Change in condition**
  - **Melting point/Melting range:** 178 °C (352.4 °F)
  - **Boiling point/Boiling range:** Undetermined.

- **Flash point:** Not applicable.

- **Flammability (solid, gaseous):** Product is not flammable.

- **Decomposition temperature:** Not determined.

- **Auto igniting:** Not determined.

- **Danger of explosion:** Product does not present an explosion hazard.

- **Explosion limits:**
  - **Lower:** Not determined.
  - **Upper:** Not determined.

- **Vapor pressure:** Not applicable.

- **Density:** Not determined.
  - **Relative density:** Not determined.
  - **Vapor density:** Not applicable.
  - **Evaporation rate:** Not applicable.

- **Solubility in / Miscibility with**
  - **Water:** Not determined.

- **Partition coefficient (n-octanol/water):** Not determined.

- **Viscosity**
  - **Dynamic:** Not applicable.
  - **Kinematic:** Not applicable.

- **Other information** No further relevant information available.

### 10 Stability and reactivity

- **Reactivity** No further relevant information available.

- **Chemical stability**
  - **Thermal decomposition / conditions to be avoided:**
    No decomposition if used according to specifications.
Trade name: all-trans Retinoic Acid

- Possibility of hazardous reactions: No hazardous reactions known.
- Conditions to avoid: No further relevant information available.
- Incompatible materials: Strong oxidizing agents
- Hazardous decomposition products: Carbon oxides

11 Toxicological information

- RTECS Number: VH6475000
- Information on toxicological effects
  - Acute toxicity:

<table>
<thead>
<tr>
<th>Route</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50</td>
<td>1,100 mg/kg (mouse)</td>
</tr>
<tr>
<td>LD50</td>
<td>2 g/kg (rat)</td>
</tr>
<tr>
<td>Intraperitoneal LD50</td>
<td>208 mg/kg (mouse)</td>
</tr>
<tr>
<td></td>
<td>96 mg/kg (rat)</td>
</tr>
<tr>
<td>Subcutaneous LD50</td>
<td>253 mg/kg (mouse)</td>
</tr>
<tr>
<td></td>
<td>53 mg/kg (rat)</td>
</tr>
</tbody>
</table>

- Primary irritant effect:
  - on the skin: Irritant to skin and mucous membranes.
  - on the eye: No irritating effect.
  - Sensitization: No sensitizing effects known.
- Additional toxicological information:
  - Carcinogenic categories
    - IARC (International Agency for Research on Cancer): Substance is not listed.
    - NTP (National Toxicology Program): Substance is not listed.
    - OSHA-Ca (Occupational Safety & Health Administration): Substance is not listed.

12 Ecological information

- Toxicity
  - Aquatic toxicity: No further relevant information available.
  - Persistence and degradability: No further relevant information available.
- Behavior in environmental systems:
  - Bioaccumulative potential: No further relevant information available.
  - Mobility in soil: No further relevant information available.
- Ecotoxicological effects:
  - Remark: Very toxic for fish
- Additional ecological information:
  - General notes:
    - Water hazard class 2 (Self-assessment): Hazardous for water
    - Do not allow product to reach ground water, water course or sewage system.
    - Danger to drinking water if even small quantities leak into the ground.
    - Also poisonous for fish and plankton in water bodies.
    - Very toxic for aquatic organisms
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.
13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
  Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
  **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

- **UN-Number**
  DOT, IMDG, IATA UN3077
- **UN proper shipping name**
  DOT, IATA Environmentally hazardous substance, solid, n.o.s. (all-trans Retinoic Acid)
  IMDG ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (all-trans Retinoic Acid)
- **Transport hazard class(es)**
  DOT, IMDG
  - **Class**
    - **Label** 9 Miscellaneous dangerous substances and articles
  - **IATA**
    - **Class**
      - **Label** 9 Miscellaneous dangerous substances and articles
- **Packing group**
  DOT, IMDG, IATA III
- **Environmental hazards:**
  - **Special marking (IATA):** Symbol (fish and tree)
- **Special precautions for user**
  Warning: Miscellaneous dangerous substances and articles
- **Hazard identification number (Kemler code):** 90
- **EMS Number:** F-A,S-F
- **Stowage Category** A
### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - No further relevant information available.
- **Sara**
- **Section 355 (extremely hazardous substances):** Substance is not listed.
- **Section 313 (Specific toxic chemical listings):** Substance is not listed.
- **TSCA (Toxic Substances Control Act):** ACTIVE
- **Hazardous Air Pollutants** Substance is not listed.
- **Proposition 65**
- **Chemicals known to cause cancer:** Substance is not listed.
- **Chemicals known to cause reproductive toxicity for females:** Substance is not listed.
- **Chemicals known to cause reproductive toxicity for males:** Substance is not listed.
- **Chemicals known to cause developmental toxicity:** Substance is listed.
- **Carcinogenic categories**
- **EPA (Environmental Protection Agency)** Substance is not listed.
- **TLV (Threshold Limit Value established by ACGIH)** Substance is not listed.
- **NIOSH-Ca (National Institute for Occupational Safety and Health)** Substance is not listed.
- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

### 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.
Trade name: all-trans Retinoic Acid

· **Department issuing SDS:** Environment protection department.
· **Contact:** -
· **Date of preparation / last revision** 01/19/2021 / -
· **Abbreviations and acronyms:**
  IMDG: International Maritime Code for Dangerous Goods
  DOT: US Department of Transportation
  IATA: International Air Transport Association
  ACGIH: American Conference of Governmental Industrial Hygienists
  EINECS: European Inventory of Existing Commercial Chemical Substances
  CAS: Chemical Abstracts Service (division of the American Chemical Society)
  NFPA: National Fire Protection Association (USA)
  HMIS: Hazardous Materials Identification System (USA)
  LC50: Lethal concentration, 50 percent
  LD50: Lethal dose, 50 percent
  PBT: Persistent, Bioaccumulative and Toxic
  vPvB: very Persistent and very Bioaccumulative
  NIOSH: National Institute for Occupational Safety
  OSHA: Occupational Safety & Health
  TLV: Threshold Limit Value
  PEL: Permissible Exposure Limit
  REL: Recommended Exposure Limit
  Skin Irrit. 2: Skin corrosion/irritation – Category 2
  Repr. 1B: Reproductive toxicity – Category 1B
  Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
  Aquatic Chronic 1: Hazardous to the aquatic environment - long-term aquatic hazard – Category 1