Section 1 - Product and Company Information

Product Name                  L-ASCORBIC ACID, 99+%, A.C.S. REAGENT
Product Number                255564
Brand                          SIAL
Company                       Sigma-Aldrich
Address                       3050 Spruce Street
                              SAINT LOUIS MO 63103 US
Technical Phone:              800-325-5832
Fax:                          800-325-5052
Emergency Phone:             314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name                ASCORBIC ACID (VITAMIN C)
CAS #                         50-81-7
SARA 313                      No

Formula                      C6H8O6
Synonyms                     Adenex * Allercorb * Antiscorbic vitamin *
                             Antiscorbutic vitamin * Arco-nee * Ascoltin *
                             Ascorbajen * Ascorbate * Ascorbic acid *
                             L(+)-Ascorbic acid * Ascor-B.I.D. * Ascorbutina *
                             Ascorin * Ascorteal * Ascorvit * Cantan *
                             Cantaxin * Catavin C * Cebicure * Cebid * Cebion *
                             Cebione * Cecon * Cee-caps TD * Cee-vite *
                             Cegiolan * Ceglion * Celaskon * ce lent * Celin *
                             Cemagyl * Ce-Mi-Lin * Cemill * Cenitone * Cereon *
                             * Cergona * Cescorbat * Cetamid * Cetane-caps TD *
                             * Cetemican * Cevalin * Cevatine * Cevex *
                             Cevi-bid * Cevimin * CE-VI-Sol * Cevital *
                             Cevitamic acid * Cevitamin * Cevitan * Cevitex *
                             Cewin * Ciamin * Cipca * Citricorb * C-Level *
                             C-Long * Colascor * Concemin * C-Quin * C-Span *
                             C-Vimin * Dora-C-500 * Davitamon C * Duoscorb *
                             L-threo-Hex-2-enonic acid, gamma-lactone * Hicee *
                             Hybrin * IDO-C * 3-Keto-L-gulofuranolactone *
                             L-3-Ketothreohexuronic acid lactone * Kyselina *
                             askorbova (Czech) * Laroscorbine * Lemascorb *
                             Liqui-Cee * L-Lyxoascorbic acid * NCI-C54808 *
                             NSC 33832 * 3-Oxo-L-gulofuranolactone *
                             3-Oxo-L-gulofuranolactone (enol form) * Planavit *
                             C * Proscorbin * Redoxon * Ribena * Roscorbic *

Section 3 - Hazards Identification

HMIS RATING
  HEALTH: 0
  FLAMMABILITY: 0
  REACTIVITY: 1

NFPA RATING
HEALTH: 0  
FLAMMABILITY: 0  
REACTIVITY: 1  

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE  
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE  
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE  
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE  
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT  
N/A

AUTOIGNITION TEMP  
N/A

FLAMMABILITY  
N/A

EXTINGUISHING MEDIA  
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING  
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)  
Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of dust.

METHODS FOR CLEANING UP  
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING  
User Exposure: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.
STORAGE
Suitable: Keep tightly closed.

SPECIAL REQUIREMENTS
Light sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks.
Hand: Protective gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
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<tbody>
<tr>
<td>Molecular Weight</td>
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<td>pH</td>
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<tr>
<td>MP/MP Range</td>
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<td>Vapor Pressure</td>
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<tr>
<td>Bulk Density</td>
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<td>Odor Threshold</td>
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<tr>
<td>Volatile%</td>
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<tr>
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<tr>
<td>Water Content</td>
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<tr>
<td>Miscellaneous Data</td>
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<tr>
<td>Solubility</td>
<td>Solubility in Water: 1 M in H2O, 20°C complete, colorless</td>
<td></td>
</tr>
</tbody>
</table>

N/A = not available

Section 10 - Stability and Reactivity
STABILITY
Stable: Stable.
Conditions to Avoid: Light.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
Chronic ingestion of large doses may cause gastrointestinal disturbances including nausea and diarrhea, urinary effects involving urine acidification, oxalate and uric crystallization in the bladder and kidney, and decreased reaction times and psychomotor coordination.

TOXICITY DATA

Intravenous
Woman
900 MG/KG
LDLO
Remarks: Kidney, Ureter, Bladder: Changes in tubules (including acute renal failure, acute tubular necrosis).

Oral
Rat
11900 mg/kg
LD50

Subcutaneous
Rat
>10 GM/KG
LD50

Intravenous
Rat
>4 GM/KG
LD50

Oral
Mouse
3367 mg/kg
LD50

Intraperitoneal
Mouse
643 MG/KG
LD50

Intravenous
Mouse
518 MG/KG
LD50

NTP CARCINOGEN LIST
Rating: No evidence.
Species: Mouse/rat
Route: Feed

CHRONIC EXPOSURE - TERATOGEN

Species: Mouse
Dose: 6680 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (11D PREG)
Result: Effects on Embryo or Fetus: Fetal death.

Species: Mouse
Dose: 800 MG/KG
Route of Application: Intravenous
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Central nervous system.

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 200 UMOL/L
Cell Type: fibroblast
Mutation test: DNA damage

Species: Human
Dose: 200 UMOL/L
Cell Type: Other cell types
Mutation test: DNA damage

Species: Human
Dose: 2500 UMOL/L
Cell Type: HeLa cell
Mutation test: DNA inhibition

Species: Human
Dose: 200 UMOL/L
Cell Type: Other cell types
Mutation test: DNA inhibition

Species: Human
Dose: 200 UMOL/L
Cell Type: fibroblast
Mutation test: Other mutation test systems

Species: Human
Dose: 200 UMOL/L
Cell Type: Other cell types
Mutation test: Other mutation test systems
Species: Human
Dose: 200 MG/L
Cell Type: Other cell types
Mutation test: DNA inhibition

Species: Mouse
Route: Intraperitoneal
Dose: 4500 MG/KG
Exposure Time: 3D
Mutation test: Micronucleus test

Species: Mouse
Dose: 500 UMOL/L
Cell Type: liver
Mutation test: Other mutation test systems

Species: Mouse
Route: Intraperitoneal
Dose: 1600 MG/KG
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Intraperitoneal
Dose: 1600 MG/KG
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 400 MG/L
Cell Type: ovary
Mutation test: Micronucleus test

Species: Hamster
Dose: 300 MG/L
Cell Type: ovary
Mutation test: Cytogenetic analysis

Species: Hamster
Dose: 500 MG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

Species: Mammal
Dose: 500 UMOL/L
Cell Type: lymphocyte
Mutation test: DNA damage

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 2500 MG/KG
Route of Application: Oral
Exposure Time: (1-22D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Guinea pig
Dose: 19500 MG/KG
Route of Application: Oral
Exposure Time: (30-58D PREG/10D POST)
Result: Effects on Newborn: Biochemical and metabolic.
Species: Guinea pig  
Dose: 5800 MG/KG  
Route of Application: Oral  
Exposure Time: (1-58D PREG)  
Result: Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive). Effects on Newborn: Stillbirth.

Species: Guinea pig  
Dose: 2471 MG/KG  
Route of Application: Oral  
Exposure Time: (MULTIGENERATIONS)  
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION  
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT  
Proper Shipping Name: None  
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA  
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

UNITED STATES REGULATORY INFORMATION  
SARA LISTED: No  
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION  
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.  
DSL: Yes  
NDSL: No

Section 16 - Other Information

DISCLAIMER  
For R&D use only. Not for drug, household or other uses.

WARRANTY  
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any
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