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

1.1 Product identifiers
Product name : N-Acetyl-L-cysteine

Product Number : PHR1098
Brand : Sigma-Aldrich
REACH No. : 01-2120766167-47-XXXX
CAS-No. : 616-91-1

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO  63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone
Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Eye irritation (Category 2), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word : Warning

Hazard statement(s) :
H319 Causes serious eye irritation.
Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P280 Wear eye protection/ face protection.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.

Supplemental Hazard Statements
none

Reduced Labeling (<= 125 ml)
Pictogram

Signal word Warning
Hazard statement(s) none
Precautionary statement(s) none
Supplemental Hazard Statements none

2.3 Other hazards
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances
Formula : C₅H₉NO₃S
Molecular weight : 163.19 g/mol
CAS-No. : 616-91-1
EC-No. : 210-498-3

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<th>Classification</th>
<th>Concentration</th>
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<td></td>
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<tr>
<td>CAS-No.</td>
<td>616-91-1</td>
<td>Eye Irrit. 2; H319</td>
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<tr>
<td>EC-No.</td>
<td>210-498-3</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.
In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Nitrogen oxides (NOx)
Sulfur oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.
6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Storage stability
Recommended storage temperature
2 - 8 °C

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L
The life science business of Merck operates as MilliporeSigma in the US and Canada

Body Protection
protective clothing

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type P2
The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance  Form: crystalline
    Color: white
b) Odor  weakly of acetic acid
c) Odor Threshold  No data available
d) pH  No data available
e) Melting point/freezing point
    Melting point: 110,4 °C at 1.013,25 hPa - OECD Test Guideline 102
f) Initial boiling point and boiling range
    143,9 - 145,3 °C at 1.013,25 hPa - OECD Test Guideline 103
g) Flash point  Not applicable
h) Evaporation rate  No data available
i) Flammability (solid, gas)
    The product is not flammable. - Test N.1: Test method for readily combustible solids
j) Upper/lower flammability or explosive limits  No data available
k) Vapor pressure
    < 0,1 hPa at 20 °C - OECD Test Guideline 104
l) Vapor density  No data available
m) Density
    1,48 g/cm3 at 20 °C - OECD Test Guideline 109
    Relative density
    1,48 at 20 °C - OECD Test Guideline 109
n) Water solubility  179,5 g/l at 20 °C - OECD Test Guideline 105
o) Partition coefficient: n-octanol/water
    log Pow: -0,6 at 23 °C - OECD Test Guideline 107 - Bioaccumulation is not expected.
p) Autoignition temperature  No data available
q) Decomposition temperature  No data available
r) Viscosity
Viscosity, kinematic: No data available
Viscosity, dynamic: No data available

s) Explosive properties
No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in
 correspondingly fine distribution, when whirled up a dust explosion potential may generally
 be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents

10.4 Conditions to avoid
No information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 5.050 mg/kg
Remarks: (RTECS)
Symptoms: Nausea, Vomiting, Gastrointestinal discomfort
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Skin - reconstructed human epidermis (RhE)
Result: No skin irritation
(OECD Test Guideline 439)

Serious eye damage/eye irritation
Causes serious eye irritation. (ECHA)

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

### Additional Information
bronchospasm, Nausea, Vomiting, stomatitis, nasal discharge

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

Therapeutically used substance.

Handle in accordance with good industrial hygiene and safety practice.

### SECTION 12: Ecological information

#### 12.1 Toxicity

- **Toxicity to daphnia and other aquatic invertebrates**
  
  static test EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h
  
  (OECD Test Guideline 202)

- **Toxicity to algae**
  
  static test ErC50 - Pseudokirchneriella subcapitata - > 100 mg/l - 72 h
  
  (OECD Test Guideline 201)

#### 12.2 Persistence and degradability

- **Biodegradability**
  
  aerobic - Exposure time 28 d
  Result: 76 % - Readily biodegradable.
  
  (OECD Test Guideline 301F)

#### 12.3 Bioaccumulative potential
No data available

#### 12.4 Mobility in soil
No data available

#### 12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
12.6 **Other adverse effects**
Discharge into the environment must be avoided.

### SECTION 13: Disposal considerations

#### 13.1 Waste treatment methods

**Product**
See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

### SECTION 14: Transport information

#### 14.1 UN number

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<tr>
<th>ADR/RID</th>
<th>IMDG</th>
<th>IATA</th>
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#### 14.2 UN proper shipping name

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#### 14.3 Transport hazard class(es)

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#### 14.4 Packaging group

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#### 14.5 Environmental hazards

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<td>IMDG Marine pollutant: no</td>
<td>IATA: no</td>
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</table>

#### 14.6 Special precautions for user

**Further information**
Not classified as dangerous in the meaning of transport regulations.

### SECTION 15: Regulatory information

#### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

**Other regulations**
Take note of Dir 94/33/EC on the protection of young people at work.

#### 15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

### SECTION 16: Other information

**Full text of H-Statements referred to under sections 2 and 3.**

H319 Causes serious eye irritation.
Relevant changes since previous version
2. Hazards identification

Further information
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 guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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