1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name: Biphenyl
Product Number: W312908
Brand: Aldrich
Index-No.: 601-042-00-8
CAS-No.: 92-52-4

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
3050 Spruce Street
SAINT LOUIS MO  63103
USA

Telephone: +1 800-325-5832
Fax: +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #: (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Germ cell mutagenicity (Category 1B), H340
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

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

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H340 May cause genetic defects.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and
understood.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P391 Collect spillage.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

| Formula | C_{12}H_{10} |
| Molecular weight | 154.21 g/mol |
| CAS-No. | 92-52-4 |
| EC-No. | 202-163-5 |
| Index-No. | 601-042-00-8 |

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biphenyl</td>
<td>Skin Irrit. 2; Eye Irrit. 2A; Muta. 1B; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H335, H340, H410</td>
<td>&lt;= 100%</td>
</tr>
</tbody>
</table>

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

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. 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

5. FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

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

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biphenyl</td>
<td>92-52-4</td>
<td>TWA</td>
<td>0.2 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks Pulmonary function</td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td></td>
<td>0.200000 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pulmonary function</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TWA</td>
<td>0.2 ppm 1 mg/m^3</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TWA</td>
<td>0.200000 ppm 1.000000 mg/m^3</td>
</tr>
</tbody>
</table>

The value in mg/m^3 is approximate.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>TWA</th>
<th>0.2 ppm 1 mg/m^3</th>
<th>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</th>
</tr>
</thead>
</table>

The value in mg/m^3 is approximate.

|    |    |    | TWA | 0.200000 ppm 1.000000 mg/m^3 | USA. NIOSH Recommended Exposure Limits |

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

**Eye/face protection**
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber  
Minimum layer thickness: 0.3 mm  
Break through time: 480 min  
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact  
Material: Nitrile rubber  
Minimum layer thickness: 0.11 mm  
Break through time: 30 min  
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.
9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties
a) Appearance
   Form: crystalline
   Colour: light yellow
b) Odour
   characteristic
c) Odour Threshold
   No data available
d) pH
   5.5
e) Melting point/freezing point
   Melting point/range: 68 - 70 °C (154 - 158 °F) - lit.
f) Initial boiling point and boiling range
   255 °C (491 °F) - lit.
g) Flash point
   110 °C (230 °F) - closed cup
h) Evaporation rate
   No data available
i) Flammability (solid, gas)
   No data available
j) Upper/lower flammability or explosive limits
   Upper explosion limit: 5.8 %(V)
   Lower explosion limit: 0.6 %(V)
k) Vapour pressure
   0.04 hPa (0.03 mmHg) at 20 °C (68 °F)
   5.5 hPa (4.1 mmHg) at 100 °C (212 °F)
   12.6 hPa (9.5 mmHg) at 115 °C (239 °F)
   95.7 hPa (71.8 mmHg) at 166 °C (331 °F)
l) Vapour density
   No data available
m) Relative density
   0.992 g/cm3
n) Water solubility
   0.0075 g/l at 15 °C (59 °F)
o) Partition coefficient: n-octanol/water
   No data available
p) Auto-ignition temperature
   No data available
q) Decomposition temperature
   No data available
r) Viscosity
   No data available
s) Explosive properties
   No data available
t) Oxidizing properties
   No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents
10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2,140 mg/kg
Inhalation: No data available
LD50 Dermal - Rabbit - > 5,010 mg/kg
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin. - 24 h
(Draize Test)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation
(Draize Test)

Respiratory or skin sensitisation
- Guinea pig
Remarks: Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity
In vivo tests showed mutagenic effects

Mouse
lymphocyte
DNA damage

Mouse
lymphocyte
Mutation in mammalian somatic cells.

Hamster
Lungs
Mutation in microorganisms

Hamster
fibroblast
Sister chromatid exchange

Rat
Unscheduled DNA synthesis

Mouse
DNA damage

Carcinogenicity
Carcinogenicity - Mouse - Oral

Carcinogenicity - Mouse - Subcutaneous
Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Liver:Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: DU8050000
Liver injury may occur., Gastrointestinal disturbance
Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish
LC50 - Pimephales promelas (fathead minnow) - 1.45 mg/l - 96.0 h
LC0 - Danio rerio (zebra fish) - 38 mg/l - 96.0 h
LC50 - Salmo gairdneri - 1.5 mg/l - 96.0 h
LC50 - Lepomis macrochirus (Bluegill) - 4.7 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates
LC50 - Daphnia magna (Water flea) - 0.36 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability
(Closed Bottle test)
Remarks: According to the results of tests of biodegradability this product is considered as being readily biodegradable.

12.3 Bioaccumulative potential

Bioaccumulation
Leuciscus idus (Golden orfe) - 3 d
- 50 µg/l

Bioconcentration factor (BCF): 281

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Very toxic to aquatic life.
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

No data available
13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

**Product**
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. Offer surplus and non-recyclable solutions to a licensed disposal company.

**Contaminated packaging**
Dispose of as unused product.

14. TRANSPORT INFORMATION

**DOT (US)**
- UN number: 3077
- Class: 9
- Packing group: III
- Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Biphenyl)
- Reportable Quantity (RQ): 100 lbs
- Marine pollutant: yes
- Poison Inhalation Hazard: No

**IMDG**
- UN number: 3077
- Class: 9
- Packing group: III
- EMS-No: F-A, S-F
- Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Biphenyl)
- Marine pollutant: yes

**IATA**
- UN number: 3077
- Class: 9
- Packing group: III
- Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Biphenyl)

15. REGULATORY INFORMATION

**SARA 302 Components**
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
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<tbody>
<tr>
<td>Biphenyl</td>
<td>92-52-4</td>
<td>2007-07-01</td>
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</tbody>
</table>

**SARA 311/312 Hazards**
Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

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**Pennsylvania Right To Know Components**

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<tbody>
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</table>

**New Jersey Right To Know Components**

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<td>Biphenyl</td>
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<td>2007-07-01</td>
</tr>
</tbody>
</table>

**California Prop. 65 Components**
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

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

| Acute Acute | Acute aquatic toxicity |
Aquatic Chronic  Chronic aquatic toxicity
Eye Irrit.  Eye irritation
H315  Causes skin irritation.
H319  Causes serious eye irritation.
H335  May cause respiratory irritation.
H340  May cause genetic defects.
H400  Very toxic to aquatic life.
H410  Very toxic to aquatic life with long lasting effects.
Muta.  Germ cell mutagenicity

**HMIS Rating**
Health hazard:  2
Chronic Health Hazard:  *
Flammability:  1
Physical Hazard  0

**NFPA Rating**
Health hazard:  2
Fire Hazard:  1
Reactivity Hazard:  0

**Further information**
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**Preparation Information**
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 4.9  Revision Date: 06/18/2015  Print Date: 06/24/2015