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

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substances

<table>
<thead>
<tr>
<th>Chemical characterization</th>
<th>Natural product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula</td>
<td>C_{12}H_{10}</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>154.21 g/mol</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>92-52-4</td>
</tr>
<tr>
<td>EC-No.</td>
<td>202-163-5</td>
</tr>
<tr>
<td>Index-No.</td>
<td>601-042-00-8</td>
</tr>
</tbody>
</table>

**Hazardous components**

<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/PERSOAL 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></td>
<td></td>
<td>TWA</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>TWA</td>
<td>0.2 ppm 1 mg/m3</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-----</td>
<td>----------------</td>
<td>----------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.200000 ppm 1.000000 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
<td></td>
</tr>
</tbody>
</table>

The value in mg/m3 is approximate.

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<th></th>
<th>TWA</th>
<th>0.200000 ppm 1.000000 mg/m3</th>
<th>USA. NIOSH Recommended Exposure Limits</th>
</tr>
</thead>
</table>

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

PBToPvB 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>
<th>Revision Date</th>
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</thead>
<tbody>
<tr>
<td>Biphenyl</td>
<td>92-52-4</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

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

Massachusetts Right To Know Components

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Biphenyl</td>
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Pennsylvania Right To Know Components

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New Jersey Right To Know Components

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<tbody>
<tr>
<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.

Aquatic 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: 4.8  Revision Date: 03/02/2015  Print Date: 06/12/2015