1. PRODUCT AND COMPANY IDENTIFICATION

Chemical product name: Timolol Formulation

Supplier’s company name, address and phone number

Company name of supplier: MSD
Address: Kumagaya, Saitama Prefecture, Xicheng 810 MSD Co., Ltd. Menuma factory
Telephone: 048-588-8411
E-mail address: EHSDATASTEWARD@msd.com
Emergency telephone number: +1-908-423-6000

Recommended use of the chemical and restrictions on use
Recommended use: Pharmaceutical

2. HAZARDS IDENTIFICATION

GHS classification of chemical product
Specific target organ toxicity - repeated exposure: Category 1 (Cardio-vascular system, Lungs)

GHS label elements
Hazard pictograms: 

Signal word: Danger

Hazard statements: H372 Causes damage to organs (Cardio-vascular system, Lungs) through prolonged or repeated exposure.

Precautionary statements: Prevention:
P260 Do not breathe mist or vapours.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

Response:
P314 Get medical advice/attention if you feel unwell.

Disposal:
P501 Dispose of contents/container to an approved waste disposal plant.

Other hazards which do not result in classification
None known.
3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

<table>
<thead>
<tr>
<th>Components</th>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
<th>ENCS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(S)-3-[3-(tert-buty lamino)-2-hydroxypropoxy]-4-morpholino-</td>
<td>26921-17-5</td>
<td>&gt;= 0.1 - &lt; 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,2,5-thiadiazole monomaleate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Benzodecinium bromide</td>
<td>7281-04-1</td>
<td>&gt;= 0.0025 - &lt; 0.025</td>
<td>1-105 / 3-2694,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-326 / 1-105</td>
</tr>
<tr>
<td></td>
<td>Benzododecinium chloride</td>
<td>139-07-1</td>
<td>&gt;= 0.0025 - &lt; 0.025</td>
<td>1-215 / 3-2694,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-326 / 1-215</td>
</tr>
<tr>
<td></td>
<td>Miristalkonium chloride</td>
<td>139-08-2</td>
<td>&gt;= 0.0002 - &lt; 0.0025</td>
<td>3-2694 / 1-215,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1-215 / 3-326</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.
Get medical attention.

In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water.
Remove contaminated clothing and shoes.
Get medical attention.
Wash clothing before reuse.
Thoroughly clean shoes before reuse.

In case of eye contact : Flush eyes with water as a precaution.
Get medical attention if irritation develops and persists.

If swallowed : If swallowed, DO NOT induce vomiting.
Get medical attention.
Rinse mouth thoroughly with water.

Most important symptoms and effects, both acute and delayed : Causes damage to organs through prolonged or repeated exposure.

Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).

Notes to physician : Treat symptomatically and supportively.

5. FIREFIGHTING MEASURES

Suitable extinguishing media : Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

Unsuitable extinguishing : None known.
SAFETY DATA SHEET

Timolol Formulation

Specific hazards during firefighting:
- Exposure to combustion products may be a hazard to health.
- Carbon oxides
- Metal oxides
- Phosphorus compounds

Hazardous combustion products:
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Use water spray to cool unopened containers.
- Remove undamaged containers from fire area if it is safe to do so.
- Evacuate area.

Specific extinguishing methods:
- In the event of fire, wear self-contained breathing apparatus.
- Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
- Use personal protective equipment.
- Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

Environmental precautions:
- Avoid release to the environment.
- Prevent further leakage or spillage if safe to do so.
- Prevent spreading over a wide area (e.g. by containment or oil barriers).
- Retain and dispose of contaminated wash water.
- Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up:
- Soak up with inert absorbent material.
- For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.
- Clean up remaining materials from spill with suitable absorbent.
- Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
- Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

7. HANDLING AND STORAGE

Handling:
- See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
- Use only with adequate ventilation.
- Do not breathe mist or vapours.
- Do not swallow.
- Avoid contact with eyes.
- Avoid prolonged or repeated contact with skin.
- Wash skin thoroughly after handling.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment.

Do not eat, drink or smoke when using this product.

Take care to prevent spills, waste and minimize release to the environment.

Avoidance of contact: Oxidizing agents

Hygiene measures: If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.

When using do not eat, drink or smoke.

Wash contaminated clothing before re-use.

Storage

Conditions for safe storage: Keep in properly labelled containers.

Store in accordance with the particular national regulations.

Materials to avoid: Do not store with the following product types:

Strong oxidizing agents

Packaging material: Unsuitable material: None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Threshold limit value and permissible exposure limits for each component in the work environment

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Reference concentration / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate</td>
<td>26921-17-5</td>
<td>TWA</td>
<td>10 µg/m3 (OEB 3)</td>
<td>Internal</td>
</tr>
<tr>
<td>Further information: Eye, Skin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wipe limit</td>
<td>100 µg/100 cm²</td>
<td>Internal</td>
</tr>
</tbody>
</table>

Engineering measures: Ensure adequate ventilation, especially in confined areas. Minimize workplace exposure concentrations.

Personal protective equipment

Respiratory protection: If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection.

Filter type: Particulates type

Hand protection

Material: Chemical-resistant gloves

Remarks: Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to...
Eye protection: Wear the following personal protective equipment: Safety glasses
Skin and body protection: Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Aqueous solution</td>
</tr>
<tr>
<td>Colour</td>
<td>Colorless to pale yellow</td>
</tr>
<tr>
<td>Odour</td>
<td>No data available</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point, initial boiling point and boiling range</td>
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</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (liquids)</td>
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</tr>
<tr>
<td>Lower explosion limit and upper explosion limit / flammability limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper explosion limit / Upper flammability limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Lower explosion limit / Lower flammability limit</td>
<td>No data available</td>
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<tr>
<td>Flash point</td>
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<tr>
<td>Decomposition temperature</td>
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</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
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<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
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<tr>
<td>Solubility(ies)</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>soluble</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No data available</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

Timolol Formulation

Vapour pressure: No data available
Density and/or relative density:
Density: No data available
Relative vapour density: No data available
Explosive properties: Not explosive
Oxidizing properties: The substance or mixture is not classified as oxidizing.
Molecular weight: Not applicable
Particle characteristics:
Particle size: Not applicable

10. STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.
Chemical stability: Stable under normal conditions.
Possibility of hazardous reactions: Can react with strong oxidizing agents.
Conditions to avoid: None known.
Incompatible materials: Oxidizing agents
Hazardous decomposition products: No hazardous decomposition products are known.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:
Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity:
Not classified based on available information.

Components:
(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:
Acute oral toxicity: LD50 (Rat): 1,000 mg/kg
LD50 (Mouse): 1,140 mg/kg
Acute toxicity (other routes of administration):
LD50 (Mouse): 300 mg/kg
Application Route: Intraperitoneal
LD50 (Mouse): 800 mg/kg
Application Route: Subcutaneous

Benzodecinium bromide:
SAFETY DATA SHEET

Timolol Formulation

Version: 5.2  Revision Date: 2021/08/27  SDS Number: 1598367-00011  Date of last issue: 2020/10/10  Date of first issue: 2017/05/01

Acute oral toxicity: LD50 (Rat): 230 mg/kg
Acute inhalation toxicity: Assessment: Corrosive to the respiratory tract.
Acute dermal toxicity: LD50 (Rabbit): > 2,000 - 5,000 mg/kg  Remarks: Based on data from similar materials

Benzododecinium chloride:
Acute oral toxicity: LD50 (Rat): > 300 - 2,000 mg/kg  Remarks: Based on data from similar materials
Acute inhalation toxicity: Assessment: Corrosive to the respiratory tract.
Acute dermal toxicity: LD50 (Rabbit): > 2,000 mg/kg  Remarks: Based on data from similar materials

Miristalkonium chloride:
Acute oral toxicity: LD50 (Rat): 397.5 mg/kg  Method: OECD Test Guideline 401  Remarks: Based on data from similar materials
Acute inhalation toxicity: Assessment: Corrosive to the respiratory tract.
Acute dermal toxicity: LD50 (Rabbit): 3,412 mg/kg  Remarks: Based on data from similar materials

Skin corrosion/irritation
Not classified based on available information.

Components:

(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadazole monomaleate:
Species: Rabbit
Method: Draize Test
Result: No skin irritation

Benzodecinium bromide:
Species: Rabbit
Result: Corrosive after 4 hours or less of exposure
Remarks: Based on data from similar materials

Benzododecinium chloride:
Species: Rabbit
Result: Corrosive after 3 minutes to 1 hour of exposure
Remarks: Based on data from similar materials

Miristalkonium chloride:
Species: Rabbit
Result: Corrosive after 3 minutes to 1 hour of exposure
Remarks: Based on data from similar materials
Serious eye damage/eye irritation
Not classified based on available information.

Components:
(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:
Species: Rabbit
Result: Mild eye irritation

Species: Dog
Result: No eye irritation

Benzodecinium bromide:
Species: Rabbit
Result: Irreversible effects on the eye
Remarks: Based on data from similar materials

Benzododecinium chloride:
Species: Rabbit
Result: Irreversible effects on the eye
Remarks: Based on data from similar materials

Miristalkonium chloride:
Species: Rabbit
Result: Irreversible effects on the eye
Remarks: Based on data from similar materials

Respiratory or skin sensitisation
Skin sensitisation
Not classified based on available information.

Respiratory sensitisation
Not classified based on available information.

Components:
Benzodecinium bromide:
Test Type: Buehler Test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative
Remarks: Based on data from similar materials

Benzododecinium chloride:
Test Type: Buehler Test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative
### Miristalkonium chloride:

**Test Type**: Buehler Test  
**Exposure routes**: Skin contact  
**Species**: Guinea pig  
**Method**: OECD Test Guideline 406  
**Result**: negative  
**Remarks**: Based on data from similar materials

### Germ cell mutagenicity

Not classified based on available information.

### Components:

#### (S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:

**Genotoxicity in vitro**:  
Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative  
**Genotoxicity in vivo**:  
Test Type: In vivo micronucleus test  
Species: Mouse  
Method: OECD Test Guideline 474  
Result: negative

#### Benzodecinium bromide:

**Genotoxicity in vitro**:  
Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: Based on data from similar materials  
Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative  
Remarks: Based on data from similar materials  
Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: negative  
Remarks: Based on data from similar materials  
**Genotoxicity in vivo**:  
Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Ingestion  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: Based on data from similar materials

#### Benzododecinium chloride:

**Genotoxicity in vitro**:  
Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471
Resul: negative
Remarks: Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative
Remarks: Based on data from similar materials

**Genotoxicity in vivo**

Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

**Miristalkonium chloride:**

Genotoxicity in vitro

Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative
Remarks: Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo

Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

**Carcinogenicity**

Not classified based on available information.

**Components:**

(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:

Species: Rat
Application Route: Oral
Exposure time: 2 Years
LOAEL : 300 mg/kg body weight
Result : negative
Target Organs : Adrenal gland
Remarks : The significance of these findings for humans is not certain.

Species : Mouse, female
Application Route : Oral
Exposure time : 18 Months
LOAEL : 500 mg/kg body weight
Result : negative
Target Organs : Lungs, Mammary gland, Uterus (including cervix)
Remarks : The significance of these findings for humans is not certain.

Carcinogenicity - Assessment : Weight of evidence does not support classification as a carcinogen

Benzodecinium bromide:
Species : Rat
Application Route : Ingestion
Exposure time : 2 Years
Method : OECD Test Guideline 453
Result : negative
Remarks : Based on data from similar materials

Benzododecinium chloride:
Species : Rat
Application Route : Ingestion
Exposure time : 104 weeks
Method : OECD Test Guideline 453
Result : negative
Remarks : Based on data from similar materials

Miristalkonium chloride:
Species : Rat
Application Route : Ingestion
Exposure time : 2 Years
Method : OECD Test Guideline 453
Result : negative
Remarks : Based on data from similar materials

Reproductive toxicity
Not classified based on available information.

Components:
(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:
Effects on fertility : Test Type: Fertility/early embryonic development
Species: Rat
Application Route: Oral
Fertility: NOAEL Mating/Fertility: 150 mg/kg body weight
Early Embryonic Development: NOAEL F1: 150 mg/kg body weight
Effects on foetal development:

- **Test Type**: Embryo-foetal development
- **Species**: Rabbit
- **Developmental Toxicity**: LOAEL F1: 50 mg/kg body weight
- **Result**: Some evidence of adverse effects on development, based on animal experiments.

Reproductive toxicity - Assessment:

- **Result**: Some evidence of adverse effects on development, based on animal experiments.

**Benzodecinium bromide**:

Effects on fertility:

- **Test Type**: Two-generation reproduction toxicity study
- **Species**: Rat
- **Application Route**: Ingestion
- **Method**: OECD Test Guideline 416
- **Result**: negative
- **Remarks**: Based on data from similar materials

Effects on foetal development:

- **Test Type**: Embryo-foetal development
- **Species**: Rabbit
- **Application Route**: Ingestion
- **Method**: OECD Test Guideline 414
- **Result**: negative
- **Remarks**: Based on data from similar materials

**Benzododecinium chloride**:

Effects on fertility:

- **Test Type**: Two-generation reproduction toxicity study
- **Species**: Rat
- **Application Route**: Ingestion
- **Method**: OECD Test Guideline 416
- **Result**: negative
- **Remarks**: Based on data from similar materials

Effects on foetal development:

- **Test Type**: Embryo-foetal development
- **Species**: Rabbit
- **Application Route**: Ingestion
- **Method**: OECD Test Guideline 414
- **Result**: negative
- **Remarks**: Based on data from similar materials

**Miristalkonium chloride**:

Effects on fertility:

- **Test Type**: Two-generation study
- **Species**: Rat
- **Application Route**: Ingestion
- **Method**: OECD Test Guideline 416
- **Result**: negative
- **Remarks**: Based on data from similar materials

Effects on foetal development:

- **Test Type**: Embryo-foetal development
- **Species**: Rabbit
- **Application Route**: Ingestion
- **Method**: OECD Test Guideline 414
- **Result**: negative
Remarks: Based on data from similar materials

**STOT - single exposure**
Not classified based on available information.

**STOT - repeated exposure**
Causes damage to organs (Cardio-vascular system, Lungs) through prolonged or repeated exposure.

**Product:**
- **Target Organs**: Cardio-vascular system, Lungs
- **Assessment**: Causes damage to organs through prolonged or repeated exposure.

**Components:**

(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:
- **Target Organs**: Lungs, Cardio-vascular system
- **Assessment**: Causes damage to organs through prolonged or repeated exposure.

**Repeated dose toxicity**

**Components:**

(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:

**Benzododecinium chloride:**
- **Species**: Rat
- **NOAEL**: > 25 mg/kg
- **Application Route**: Ingestion
- **Exposure time**: 52 Weeks
- **Method**: OECD Test Guideline 453
- **Remarks**: Based on data from similar materials

**Miristalkonium chloride:**
- **Species**: Rat
- **NOAEL**: 56 - 65 mg/kg
- **LOAEL**: 109 - 133 mg/kg
- **Application Route**: Ingestion
- **Exposure time**: 52 Weeks
- **Remarks**: Based on data from similar materials
Aspiration toxicity
Not classified based on available information.

Experience with human exposure

Product:
General Information : May cause
Stomach/intestinal disorders
Respiratory disorders
Symptoms: Irregular cardiac activity, central nervous system
effects

Eye contact : Symptoms: burning or stinging of the eye

Components:
(S)-3-[3-(tert-buty lamino)-2-hydroxyprop oxy]-4-morpholino-1,2,5-thiadiazole monomaleate:
Eye contact : Symptoms: burning or stinging of the eye, dryness of the
eyes, Headache, Nausea, Dizziness, dry mouth, changes in
libido, hair loss, Allergic reactions

Ingestion : Symptoms: Headache, Fatigue, Respiratory disorders, Gas-
trointestinal discomfort, Allergic reactions, Rash, hair loss,
altered mental status, Dizziness, changes in libido

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:
(S)-3-[3-(tert-buty lamino)-2-hydroxyprop oxy]-4-morpholino-1,2,5-thiadiazole monomaleate:
Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 411 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 161 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to microorganisms : EC50: > 1,000 mg/l
Exposure time: 3 h
Test Type: Respiration inhibition
EC50 (Photobacterium phosphoreum): > 1,800 mg/l

Benzodecinium bromide:
Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 0.1 - 1 mg/l
Exposure time: 96 h
Remarks: Based on data from similar materials

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): > 0.01 - 0.1 mg/l
### aquatic invertebrates

Exposure time: 48 h  
Remarks: Based on data from similar materials

### Toxicity to algae/aquatic plants

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ErC50 (Pseudokirchneriella subcapitata (green algae))</td>
<td>&gt; 0.01 - 0.1 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>72 h</td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 201</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC10 (Pseudokirchneriella subcapitata (green algae))</td>
<td>&gt; 0.001 - 0.01 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>72 h</td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 201</td>
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</table>

### M-Factor (Acute aquatic toxicity)

<table>
<thead>
<tr>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

### Toxicity to fish (Chronic toxicity)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOEC (Pimephales promelas (fathead minnow))</td>
<td>&gt; 0.01 - 0.1 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>28 d</td>
<td></td>
</tr>
</tbody>
</table>

### Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOEC (Daphnia magna (Water flea))</td>
<td>&gt; 0.01 - 0.1 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>21 d</td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 211</td>
<td></td>
</tr>
</tbody>
</table>

### M-Factor (Chronic aquatic toxicity)

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

### Toxicity to microorganisms

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50</td>
<td>&gt; 10 - 100 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>30 min</td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 209</td>
<td></td>
</tr>
</tbody>
</table>

### Benzododecinium chloride:

### Toxicity to fish

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50</td>
<td>&gt; 0.1 - 1 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>96 h</td>
<td></td>
</tr>
</tbody>
</table>

### Toxicity to daphnia and other aquatic invertebrates

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 (Daphnia magna (Water flea))</td>
<td>&gt; 0.01 - 0.1 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>48 h</td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 202</td>
<td></td>
</tr>
</tbody>
</table>

### Toxicity to algae/aquatic plants

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ErC50</td>
<td>&gt; 0.01 - 0.1 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>72 h</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC10</td>
<td>&gt; 0.001 - 0.01 mg/l</td>
<td>Based on data from similar materials</td>
</tr>
<tr>
<td>Exposure time</td>
<td>72 h</td>
<td></td>
</tr>
</tbody>
</table>

### M-Factor (Acute aquatic toxicity)

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET
Timolol Formulation

Version 5.2 Revision Date: 2021/08/27 SDS Number: 1598367-00011 Date of last issue: 2020/10/10
Date of first issue: 2017/05/01

Toxicity to fish (Chronic toxicity):
NOEC (Pimephales promelas (fathead minnow)): > 0.01 - 0.1 mg/l
Exposure time: 28 d
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC (Daphnia magna (Water flea)): > 0.001 - 0.01 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211
Remarks: Based on data from similar materials

M-Factor (Chronic aquatic toxicity):
1

Toxicity to microorganisms:
EC50: > 10 - 100 mg/l
Exposure time: 30 min
Method: OECD Test Guideline 209
Remarks: Based on data from similar materials

Miristalkonium chloride:

Toxicity to fish:
LC50 (Oncorhynchus mykiss (rainbow trout)): 0.85 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates:
EC50 (Daphnia magna (Water flea)): 0.016 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants:
ErC50 (Pseudokirchneriella subcapitata (green algae)): 0.049 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

NOEC (Pseudokirchneriella subcapitata (green algae)): 0.0012 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

M-Factor (Acute aquatic toxicity):
10

M-Factor (Chronic aquatic toxicity):
1

Toxicity to microorganisms:
EC10: 4 mg/l
Exposure time: 30 min
Method: OECD Test Guideline 209
Remarks: Based on data from similar materials
**Persistence and degradability**

**Components:**

(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradability</td>
<td>Result: Not readily biodegradable. Biodegradation: 0 % Exposure time: 30 d</td>
</tr>
<tr>
<td>Stability in water</td>
<td>Hydrolysis: 0 % (61 d) Method: FDA 3.09</td>
</tr>
</tbody>
</table>

Benzodecinium bromide:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradability</td>
<td>Result: Readily biodegradable. Remarks: Based on data from similar materials</td>
</tr>
</tbody>
</table>

Benzododecinium chloride:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradability</td>
<td>Result: Readily biodegradable. Remarks: Based on data from similar materials</td>
</tr>
</tbody>
</table>

Mirisalkonium chloride:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradability</td>
<td>Result: Readily biodegradable. Biodegradation: 95.5 % Exposure time: 28 d Method: OECD Test Guideline 301B Remarks: Based on data from similar materials</td>
</tr>
</tbody>
</table>

**Bioaccumulative potential**

**Components:**

(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: 1.48</td>
</tr>
</tbody>
</table>

Benzodecinium bromide:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: &lt; 4 Remarks: Expert judgement</td>
</tr>
</tbody>
</table>

Benzododecinium chloride:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioaccumulation</td>
<td>Species: Lepomis macrochirus (Bluegill sunfish) Bioconcentration factor (BCF): &lt; 500 Remarks: Based on data from similar materials</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: &lt; 4 Remarks: Expert judgement</td>
</tr>
</tbody>
</table>

Mirisalkonium chloride:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioaccumulation</td>
<td>Species: Lepomis macrochirus (Bluegill sunfish) Bioconcentration factor (BCF): 79 Remarks: Based on data from similar materials</td>
</tr>
</tbody>
</table>
Mobility in soil
No data available

Hazardous to the ozone layer
Not applicable

Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues : Dispose of in accordance with local regulations.
Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
If not otherwise specified: Dispose of as unused product.

14. TRANSPORT INFORMATION

International Regulations

UNRTDG
UN number : Not applicable
Proper shipping name : Not applicable
Class : Not applicable
Subsidiary risk : Not applicable
Packing group : Not applicable
Labels : Not applicable

IATA-DGR
UN/ID No. : Not applicable
Proper shipping name : Not applicable
Class : Not applicable
Subsidiary risk : Not applicable
Packing group : Not applicable
Labels : Not applicable
Packing instruction (cargo aircraft) : Not applicable
Packing instruction (passenger aircraft) : Not applicable

IMDG-Code
UN number : Not applicable
Proper shipping name : Not applicable
Class : Not applicable
Subsidiary risk : Not applicable
Packing group : Not applicable
Labels : Not applicable
EmS Code : Not applicable
Marine pollutant : Not applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.
SAFETY DATA SHEET

Timolol Formulation

Version: 5.2
Revision Date: 2021/08/27
SDS Number: 1598367-00011
Date of last issue: 2020/10/10
Date of first issue: 2017/05/01

15. REGULATORY INFORMATION

National Regulations
Refer to section 15 for specific national regulation.

Special precautions for user
Not applicable

Related Regulations

Fire Service Law
Not applicable to dangerous materials / designated flammables.

Chemical Substance Control Law
Priority Assessment Chemical Substance

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt of alkyl(C=12-16)(benzyl)(dimethyl)ammonium</td>
<td>184</td>
</tr>
</tbody>
</table>

Industrial Safety and Health Law

Harmful Substances Prohibited from Manufacture
Not applicable

Harmful Substances Required Permission for Manufacture
Not applicable

Substances Prevented From Impairment of Health
Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 2: Information on Existing Chemicals having Mutagenicity
Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 1: Information on Notified Substances having Mutagenicity
Not applicable

Substances Subject to be Notified Names
Not applicable

Substances Subject to be Indicated Names
Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 1: Information on Notified Substances having Mutagenicity
Not applicable

Ordinance on Prevention of Hazards Due to Specified Chemical Substances
Not applicable

Ordinance on Prevention of Lead Poisoning
Not applicable

Ordinance on Prevention of Tetraalkyl Lead Poisoning
Not applicable

Ordinance on Prevention of Organic Solvent Poisoning
Not applicable

Enforcement Order of the Industrial Safety and Health Law - Attached table 1 (Dangerous Substances)
Not applicable
Poisonous and Deleterious Substances Control Law
Not applicable

Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof
Not applicable

High Pressure Gas Safety Act
Not applicable

Explosive Control Law
Not applicable

Vessel Safety Law
Not regulated as a dangerous good

Aviation Law
Not regulated as a dangerous good

Marine Pollution and Sea Disaster Prevention etc Law
Bulk transportation : Not classified as noxious liquid substance
Pack transportation : Not classified as marine pollutant

Narcotics and Psychotropics Control Act
Narcotic or Psychotropic Raw Material (Export / Import Permission)
Not applicable
Specific Narcotic or Psychotropic Raw Material (Export / Import permission)
Not applicable

Waste Disposal and Public Cleansing Law
Industrial waste
The components of this product are reported in the following inventories:
AICS : not determined
DSL : not determined
IECSC : not determined

16. OTHER INFORMATION

Further information

Date format : yyyy/mm/dd

Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user’s end product, if applicable.