

## Timolol Formulation

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
Date of first issue: 2017/05/01

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**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

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**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.

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# SAFETY DATA SHEET



## Timolol Formulation

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
Date of first issue: 2017/05/01

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

#### Components

Chemical name	CAS-No.	Concentration (% w/w)	ENCS No.
(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-4-morpholino-1,2,5-thiadiazole monomaleate	26921-17-5	$\geq 0.1 - < 1$	
Benzodecinium bromide	7281-04-1	$\geq 0.0025 - < 0.025$	3-2694 / 1-105, 3-326 / 1-105
Benzododecinium chloride	139-07-1	$\geq 0.0025 - < 0.025$	1-215 / 3-2694, 3-326 / 1-215
Miristalkonium chloride	139-08-2	$\geq 0.0002 - < 0.0025$	1-215 / 3-2694, 3-326 / 1-215

### 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 (CO<sub>2</sub>)  
Dry chemical
- Unsuitable extinguishing : None known.

## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

---

media

Specific hazards during fire-fighting : Exposure to combustion products may be a hazard to health.

Hazardous combustion products : Carbon oxides  
Metal oxides  
Phosphorus compounds

Specific extinguishing methods : 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.

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.  
Use personal protective equipment.

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**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.

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**7. HANDLING AND STORAGE****Handling**

Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Local/Total ventilation : Use only with adequate ventilation.

Advice on safe handling : 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.

---

## Timolol Formulation

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
 Date of first issue: 2017/05/01

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**

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

**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 chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the

## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

---

Eye protection	:	end of workday. 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).

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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

## Timolol Formulation

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
Date of first issue: 2017/05/01

---

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

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**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.

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**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

**Benzodocinium bromide:**

Acute oral toxicity : LD50 (Rat): 230 mg/kg

**Timolol Formulation**

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
Date of first issue: 2017/05/01

---

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.  
Remarks: Based on data from similar materials

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-thiadiazole 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

## Timolol Formulation

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
Date of first issue: 2017/05/01

---

**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

**Benzodocinium 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:****Benzodocinium 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  
Remarks : Based on data from similar materials





## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

---

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

**Miristakonium 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

## Timolol Formulation

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
 Date of first issue: 2017/05/01

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

## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

---

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 : 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

## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

---

**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:**

Species	:	Rat
NOAEL	:	25 mg/kg
Application Route	:	Oral
Exposure time	:	67 Weeks

Species	:	Dog
NOAEL	:	10 mg/kg
Application Route	:	Oral
Exposure time	:	54 Weeks
Target Organs	:	Kidney

**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

## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

---

**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-butylamino)-2-hydroxypropoxy]-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, Gastrointestinal discomfort, Allergic reactions, Rash, hair loss, altered mental status, Dizziness, changes in libido

**12. ECOLOGICAL INFORMATION****Ecotoxicity****Components:****(S)-3-[3-(tert-butylamino)-2-hydroxypropoxy]-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 : EC50 (Daphnia magna (Water flea)): 161 mg/l  
aquatic invertebrates : 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  
Method: Directive 67/548/EEC, Annex V, C.2.

## Timolol Formulation

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
 Date of first issue: 2017/05/01

- Remarks: Based on data from similar materials
- Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 0.01 - 0.1 mg/l  
 Exposure time: 72 h  
 Method: OECD Test Guideline 201  
 Remarks: Based on data from similar materials
- EC10 (Pseudokirchneriella subcapitata (green algae)): > 0.001 - 0.01 mg/l  
 Exposure time: 72 h  
 Method: OECD Test Guideline 201  
 Remarks: Based on data from similar materials
- M-Factor (Acute aquatic toxicity) : 10
- 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)): > 0.01 - 0.1 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
- Benzododecinium chloride:**
- Toxicity to fish : LC50: > 0.1 - 1 mg/l  
 Exposure time: 96 h  
 Remarks: Based on data from similar materials
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 0.01 - 0.1 mg/l  
 Exposure time: 48 h  
 Method: OECD Test Guideline 202  
 Remarks: Based on data from similar materials
- Toxicity to algae/aquatic plants : ErC50: > 0.01 - 0.1 mg/l  
 Exposure time: 72 h  
 Remarks: Based on data from similar materials
- EC10: > 0.001 - 0.01 mg/l  
 Exposure time: 72 h  
 Remarks: Based on data from similar materials
- M-Factor (Acute aquatic toxicity) : 10
- Toxicity to fish (Chronic toxicity) : NOEC (Pimephales promelas (fathead minnow)): > 0.01 - 0.1

## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

---

icity) 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:**  
Biodegradability : Result: Not readily biodegradable.



## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

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Biodegradation: 0 %

Exposure time: 30 d

Stability in water : Hydrolysis: 0 %(61 d)  
Method: FDA 3.09

**Benzodecinium bromide:**

Biodegradability : Result: Readily biodegradable.  
Remarks: Based on data from similar materials

**Benzododecinium chloride:**

Biodegradability : Result: Readily biodegradable.  
Remarks: Based on data from similar materials

**Miristalkonium chloride:**

Biodegradability : Result: Readily biodegradable.  
Biodegradation: 95.5 %  
Exposure time: 28 d  
Method: OECD Test Guideline 301B  
Remarks: Based on data from similar materials

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

Partition coefficient: n-octanol/water : log Pow: 1.48

**Benzodecinium bromide:**

Partition coefficient: n-octanol/water : log Pow: < 4  
Remarks: Expert judgement

**Benzododecinium chloride:**

Bioaccumulation : Species: Lepomis macrochirus (Bluegill sunfish)  
Bioconcentration factor (BCF): < 500  
Remarks: Based on data from similar materials

Partition coefficient: n-octanol/water : log Pow: < 4  
Remarks: Expert judgement

**Miristalkonium chloride:**

Bioaccumulation : Species: Lepomis macrochirus (Bluegill sunfish)  
Bioconcentration factor (BCF): 79  
Remarks: Based on data from similar materials

**Mobility in soil**

No data available

**Hazardous to the ozone layer**

Not applicable

## Timolol Formulation

Version 5.1      Revision Date: 2020/10/10      SDS Number: 1598367-00010      Date of last issue: 2020/03/23  
 Date of first issue: 2017/05/01

**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**

Not regulated as a dangerous good

**IATA-DGR**

Not regulated as a dangerous good

**IMDG-Code**

Not regulated as a dangerous good

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Not applicable for product as supplied.

**National Regulations**

Refer to section 15 for specific national regulation.

**15. REGULATORY INFORMATION****Related Regulations****Fire Service Law**

Not applicable to dangerous materials / designated flammables.

**Chemical Substance Control Law**

Priority Assessment Chemical Substance

Chemical name	Number
Salt of alkyl(C=12-16)(benzyl)(dimethyl)ammonium	184

**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

**Timolol Formulation**

Version            Revision Date:            SDS Number:            Date of last issue: 2020/03/23  
5.1                2020/10/10              1598367-00010        Date of first issue: 2017/05/01

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**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

**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

## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

---

**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

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**16. OTHER INFORMATION****Further information**

Sources of key data used to compile the Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

Date format : yyyy/mm/dd

**Full text of other abbreviations**

AIIIC - 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 Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

## Timolol Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 2020/03/23
5.1	2020/10/10	1598367-00010	Date of first issue: 2017/05/01

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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.

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