

Chemical Safety Data Sheet MSDS / SDS

Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl) aMino]ruthenium(II), Min.98% Ru-MACHO BH

Revision Date:2026-05-31 Revision Number:1

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

Product name : Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl) aMino]ruthenium(II), Min.98% Ru-MACHO BH

CBnumber : CB62709891

CAS : 1295649-41-0

Synonyms : Ru-MACHO-BH, Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl) aMino]ruthenium(II)

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : For R&D use only. Not for medicinal, household or other use.

Uses advised against : none

Company Identification

Company : Chemicalbook

Address : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing

Telephone : 010-86108875

SECTION 2: Hazards identification**GHS Label elements, including precautionary statements**

Symbol(GHS)



Signal word

Danger

Precautionary statements

P501 Dispose of contents/container to.....

P405 Store locked up.

P309+P311 IF exposed or if you feel unwell: call a POISON CENTER or doctor/physician.

P270 Do not eat, drink or smoke when using this product.

P264 Wash skin thoroughly after handling.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P501 Dispose of contents/container to.....

P314 Get medical advice/attention if you feel unwell.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

Hazard statements

H371 May cause damage to organs

H373 May cause damage to organs through prolonged or repeated exposure

H360 May damage fertility or the unborn child

H340 May cause genetic defects

SECTION 3: Composition/information on ingredients

Substance

Product name	: Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl) aMino]ruthenium(II), Min.98% Ru-MACHO BH
Synonyms	: Ru-MACHO-BH, Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl) aMino]ruthenium(II)
CAS	: 1295649-41-0
MF	: C29H35BNOP2Ru
MW	: 587.43

SECTION 4: First aid measures

If inhaled

Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician.

In case of skin contact

Take off all contaminated clothing immediately. If on skin, rinse well with water. Call a POISON CENTER or doctor/ physician.

In case of eye contact

Rinse with plenty of water. If easy to do, remove contact lens, if worn. Call a POISON CENTER or doctor/ physician.

If swallowed

Call a POISON CENTER or doctor/ physician. Rinse mouth.

Most important symptoms and effects, both acute and delayed

None known.

SECTION 5: Firefighting measures

Suitable extinguishing media

Dry powder, Foam, Water spray, Carbon dioxide (CO2)

Specific hazards during fire fighting

No information available.

Specific extinguishing methods

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Immediately evacuate personnel to safe areas. Remove undamaged containers from fire area if it is safe to do so.

Special protective equipment for fire-fighters

Use personal protective equipment.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear suitable protective equipment. Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.

Environmental precautions

Prevent product from entering drains.

Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust.

SECTION 7: Handling and storage

Handling

Technical measures

Prevent dispersion of dust.

Local/Total ventilation

Ensure adequate ventilation. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Use a local exhaust ventilation.

Advice on safe handling

Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Wash hands and face thoroughly after handling.

Avoidance of contact

Oxidizing agents

Storage

Conditions for safe storage

Keep container tightly closed. Store in a cool and shaded area. Keep under inert gas. Store locked up.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

Components	CAS RN	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
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Toluene	108-88-3	PC-TWA	50 mg/m3	CN OEL
	Further information: Skin			
		PC-STEL	100 mg/m3	CN OEL
	Further information: Skin			
		TWA	20 ppm	ACGIH
Ethanol	64-17-5	STEL	1,000 ppm	ACGIH

Components CAS RN Value type Control parameters Basis (Form of ex- / Permissible conposure) centration

Toluene 108-88-3 PC-TWA 50 mg/m3 CN OEL

Further information

Skin

PC-STEL 100 mg/m3 CN OEL

Further information

Skin

TWA 20 ppm ACGIH

Ethanol 64-17-5 STEL 1,000 ppm ACGIH

Engineering measures

Install a closed system or local exhaust.

Also install safety shower and eye bath.

Personal protective equipment

Respiratory protection

Dustproof gas mask

Self-contained breathing apparatus

Eye/face protection

Safety glasses

Safety goggles

Face-shield

Skin and body protection

Impervious protective clothing

Hand protection

Impervious gloves *Use personal protective equipment(PPE) approved under appropriate government standards and follow local and national regulations.

SECTION 9: Physical and chemical properties

Information on basic physicochemical properties

solid

Color

white - yellow

Odor

No data available

Odor Threshold

No data available

pH

No data available

Melting point/freezing point

No data available

Boiling point/boiling range

No data available

Flash point

No data available

Evaporation rate

No data available

Flammability

No data available

Upper explosion limit / Upper flammability limit

No data available

Lower explosion limit / Lower flammability limit

No data available

Vapor pressure

No data available

Solubility(ies)**Water solubility**

No data available

Solubility in other solvents

No data available

Partition coefficient: n-octanol/water (log value)

No data available

Autoignition temperature

No data available

Decomposition temperature

No data available

Viscosity**Viscosity, dynamic**

No data available

Viscosity, kinematic

No data available

Molecular weight

586.42 g/mol

Physical state

Powder

SECTION 10: Stability and reactivity

Reactivity

No data available

Chemical stability

Stable under normal conditions.

Possibility of hazardous reactions

None under normal processing.

Conditions to avoid

Exposure to air.

Incompatible materials

Oxidizing agents

Hazardous decomposition products

Carbon monoxide, Carbon dioxide (CO₂), Nitrogen oxides (NO_x), Oxides of phosphorus, Boron oxides, Metal oxides

SECTION 11: Toxicological information

Acute toxicity**Components****Toluene**

Acute oral toxicity

LDLo (Humans): 50 mg/kg Assessment: The component/mixture is minimally toxic after single ingestion.

LD50 (Rat)

636 mg/kg

Acute inhalation toxicity

LCLo (Humans): 15,000 mg/m³ Exposure time: 1 h Test atmosphere: dust/mist Assessment: The component/mixture is moderately toxic after short term inhalation.

LC50 (Rat)

49 g/m³ Exposure time: 4 h Test atmosphere: dust/mist

Acute dermal toxicity

LD50 (Rabbit): 12,267 mg/kg Assessment: The substance or mixture has no acute dermal toxicity

Ethanol

Acute oral toxicity

LDLo (Humans): 1,400 mg/kg Assessment: The substance or mixture has no acute oral toxicity

LD50 (Rat)

7 g/kg

Acute inhalation toxicity

LC50 (Rat): 124,700 mg/m³ Exposure time: 4 h Test atmosphere: dust/mist Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity

LDLo (Rabbit): 20,000 mg/kg Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation

Components

Toluene

Result

Skin irritation

Serious eye damage/eye irritation

Components

Toluene

Result

Mild eye irritation

Ethanol

Result

Eye irritation

Respiratory or skin sensitization

Classified based on available data. For more details, see section 2.

Germ cell mutagenicity

Product

Germ cell mutagenicity - Assessment

Presumed to induce heritable mutations in the germ cells of humans.

Components

Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl)amino]ruthenium(II)

Germ cell mutagenicity - Assessment

Presumed to induce heritable mutations in the germ cells of humans.

Ethanol

Germ cell mutagenicity - Assessment

Presumed to induce heritable mutations in the germ cells of humans.

Carcinogenicity

Classified based on available data. For more details, see section 2.

Reproductive toxicity

Product

Reproductive toxicity - Assessment

Known human reproductive toxicant

Components

Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl)amino]ruthenium(II)

Reproductive toxicity - Assessment

Known human reproductive toxicant

Toluene

Reproductive toxicity - Assessment

Known human reproductive toxicant

Ethanol

Reproductive toxicity - Assessment

Known human reproductive toxicant

STOT-single exposure

Product

Target Organs

Central nervous system

Assessment

May cause damage to organs.

Components

Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl)amino]ruthenium(II)

Target Organs

Central nervous system

Assessment

May cause damage to organs.

Toluene

Assessment

May cause respiratory irritation.

Target Organs

Central nervous system

Assessment

Causes damage to organs.

Ethanol

Assessment

May cause respiratory irritation. May cause drowsiness or dizziness.

STOT-repeated exposure

Product**Target Organs**

Liver, Kidney, Central nervous system

Assessment

May cause damage to organs through prolonged or repeated exposure.

Components**Carbonylhydrido(tetrahydroborato)[bis(2-diphenylphosphinoethyl)amino]ruthenium(II)****Target Organs**

Liver, Kidney, Central nervous system

Assessment

May cause damage to organs through prolonged or repeated exposure.

Toluene**Target Organs**

Liver, Kidney, Central nervous system

Assessment

Causes damage to organs through prolonged or repeated exposure.

Ethanol**Target Organs**

Liver

Assessment

Causes damage to organs through prolonged or repeated exposure.

Target Organs

Nervous system

Assessment

May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Classified based on available data. For more details, see section 2.

Aspiration toxicity**Components**

Toluene

RTECS No.

XS5250000 (Toluene) KQ6300000 (Ethanol)

SECTION 12: Ecological information

Ecotoxicity

Components:

Toluene:

Toxicity to fish

LC50 (*Oryzias latipes* (Japanese medaka)): 25 mg/l Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates

EC50 (*Daphnia magna* (Water flea)): 4.1 mg/l Exposure time: 48 h

Toxicity to algae/aquatic plants

EC50 (*Selenastrum capricornutum* (green algae)): 29 mg/l Exposure time: 72 h

Ecotoxicology Assessment

Acute aquatic toxicity

Toxic to aquatic life.

Chronic aquatic toxicity

This product has no known ecotoxicological effects.

Ethanol:

Toxicity to fish

LC50 (*Oryzias latipes* (Japanese medaka)): 1,350 mg/l Exposure time: 48 h LC50 (*Pimephales promelas* (fathead minnow)): 12,720 mg/l Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates

EC50 (*Daphnia magna* (Water flea)): 2 mg/l Exposure time: 48 h

Toxicity to algae/aquatic plants

EC50 (*Selenastrum capricornutum* (green algae)): 8.09 mg/l Exposure time: 48 h

Ecotoxicology Assessment

Acute aquatic toxicity

Toxic to aquatic life.

Chronic aquatic toxicity

This product has no known ecotoxicological effects.

Persistence and degradability

No data available

Bioaccumulative potential

Components:

Toluene:

octanol/water (log value)

Partition coefficient: octanol/water (log value)

2.73

Ethanol:

octanol/water (log value)

Partition coefficient: octanol/water (log value)

-0.31

Mobility in soil

Components:

Toluene:

tal compartments

Distribution among environmental compartments

Koc: 166

Ethanol:

tal compartments

Distribution among environmental compartments

Koc: 0.20

Other adverse effects

No data available

SECTION 13: Disposal considerations

Disposal methods

Waste from residues

Disposal in accordance with local and national regulations. Entrust disposal to a licensed waste disposal company.

Contaminated packaging

Disposal in accordance with local and national regulations. Before disposal of used container, remove contents completely.

SECTION 14: Transport information

International Regulations

IATA-DGR

UN/ID No.

Not applicable

Proper shipping name

Not applicable

Class

Not applicable

Subsidiary risk

Not applicable

Packing group

Not applicable

IMDG-Code**UN number**

Not applicable

Proper shipping name

Not applicable

Class

Not applicable

Subsidiary risk

Not applicable

Packing group

Not applicable

EmS Code

Not applicable

Domestic regulation**GB 6944/12268****UN number**

Not applicable

Proper shipping name

Not applicable

Class

Not applicable

Subsidiary risk

Not applicable

Packing group

Not applicable

SECTION 15: Regulatory information

Measures on the Environmental Administration of New Chemical Substances Registration**Registration/Notification number**

B1A232215683

Downstream users need to comply with the conditions of safe use of the chemical, understand the environmental and health hazard and risk management measures identified on the SDS as well as the local/national regulations concerning the chemical.

The ingredients of this product are reported in the following inventories

CH BAGREG

Not in compliance with the inventory

TSCA

Substance(s) not listed on TSCA inventory

AICS

Not in compliance with the inventory

DSL

This product contains the following components that are not on the Canadian DSL nor NDSL.

Carbonylhydrido(tetrahydroborato)[bis(2diphenylphosphinoethyl)amino]ruthenium(II)

ENCS

Not in compliance with the inventory

ISHL

Not in compliance with the inventory

KECI

Not in compliance with the inventory

PICCS

Not in compliance with the inventory

IECSC

Not in compliance with the inventory

NZIoC

Not in compliance with the inventory

SECTION 16: Other information

Abbreviations and acronyms

CAS: Chemical Abstracts Service

TWA: Time-Weighted Average

STEL: Short-Term Exposure Limit

LD50: Lethal Dose 50%

LC50: Lethal Concentration 50%

EC50: Effective Concentration 50%

PEL: Permissible Exposure Limit

TLV: Threshold Limit Value

IMDG: International Maritime Dangerous Goods Code

IATA: International Air Transport Association

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

DOT: US Department of Transportation

NFPA: National Fire Protection Association

NIOSH: National Institute for Occupational Safety and Health

OSHA: Occupational Safety and Health Administration

Disclaimer:

The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.