



# SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:  
OSHA HCS2012

Revision date 18-Mar-2024

Revision Number 1.01

## 1. Identification

### Product identifier

Product Name 4,4'-Benzidine

### Other means of identification

Product Code(s) DRE-C10536000

Synonyms None

### Recommended use of the chemical and restrictions on use

Recommended use This product is for research and development only

Restrictions on use Not to be used for human or animal consumption

### Details of the supplier of the safety data sheet

#### Supplier Address

VHG  
LGC Standards  
276 Abby Road  
Manchester, NH 03103  
UNITED STATES OF AMERICA

Tel :+1 (603) 622-7660  
Fax : +1 (603) 622-5180  
Email : lgcusa@lgcgroup.com

Web : lgcstandards.com

E-mail sds-request@lgcgroup.com

### Emergency telephone number

#### **Emergency Telephone**

For Hazardous Materials or Dangerous Goods Incident  
Spill, Leak, Fire Exposure, or Accident  
Call CHEMTREC:  
USA & Canada 1-800-424-9300  
Rest of the world +1 703-741-5970

## 2. Hazard(s) identification



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## Classification

Classified according to OSHA.

|                          |             |
|--------------------------|-------------|
| Acute toxicity - Oral    | Category 4  |
| Carcinogenicity          | Category 1A |
| Acute aquatic toxicity   | Category 1  |
| Chronic aquatic toxicity | Category 1  |

## Hazards not otherwise classified (HNOC)

Not applicable

## Label elements

### **Danger**

### Hazard statements

Classified according to OSHA.

Harmful if swallowed

May cause cancer

Very toxic to aquatic life with long lasting effects



### **Precautionary Statements - Prevention**

Obtain special instructions before use

Do not handle until all safety precautions have been read and understood

Wear protective gloves/clothing and eye/face protection

Wash face, hands and any exposed skin thoroughly after handling

Do not eat, drink or smoke when using this product

### **Precautionary Statements - Response**

IF exposed or concerned: Get medical advice/attention

IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell

Rinse mouth

### **Precautionary Statements - Storage**

Store locked up

### **Precautionary Statements - Disposal**

Dispose of contents/container to an approved waste disposal plant



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## Other information

No information available.

## 3. Composition/information on ingredients

### Substance

Formula  $C_{12}H_{12}N_2$

| Chemical name | CAS No. | Weight-% | Trade secret |
|---------------|---------|----------|--------------|
| Benzidine     | 92-87-5 | 100      | *            |

## 4. First-aid measures

### Description of first aid measures

|                       |  |
|-----------------------|--|
| <b>General advice</b> | Show this safety data sheet to the doctor in attendance. IF exposed or concerned: Get medical advice/attention.      |
| <b>Inhalation</b>     | Remove to fresh air.   |
| <b>Eye contact</b>    | Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician. |
| <b>Skin contact</b>   | Wash skin with soap and water.   |
| <b>Ingestion</b>      | Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. Call a physician.        |

### Most important symptoms and effects, both acute and delayed

**Symptoms** No information available.

### Indication of any immediate medical attention and special treatment needed

**Note to physicians** Treat symptomatically.

## 5. Fire-fighting measures

**Suitable Extinguishing Media** Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**Large Fire** CAUTION: Use of water spray when fighting fire may be inefficient.



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|   |  |
|---|--|
| <b>Unsuitable extinguishing media</b>                                 | Do not scatter spilled material with high pressure water streams.  |
| <b>Specific hazards arising from the chemical</b>                     | No information available.  |
| <b>Explosion data</b>   |  |
| Sensitivity to mechanical impact                                      | None.  |
| Sensitivity to static discharge                                       | None.  |
| <b>Special protective equipment and precautions for fire-fighters</b> | Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment. |

## 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

|                             |  |
|-----------------------------|--|
| <b>Personal precautions</b> | Ensure adequate ventilation.                             |
| <b>Other information</b>    | Refer to protective measures listed in Sections 7 and 8. |

### Methods and material for containment and cleaning up

|                                |   |
|--------------------------------|---|
| <b>Methods for containment</b> | Prevent further leakage or spillage if safe to do so. |
| <b>Methods for cleaning up</b> | Pick up and transfer to properly labeled containers.  |

## 7. Handling and storage

### Precautions for safe handling

|                                |   |
|--------------------------------|---|
| <b>Advice on safe handling</b> | Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. |
|--------------------------------|---|

### Conditions for safe storage, including any incompatibilities

|                           |  |
|---------------------------|--|
| <b>Storage Conditions</b> | Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Please refer to the manufacturer's certificate for specific storage and transport temperature conditions. Store only in the original receptacle unless other advice is given on the CoA. |
|---------------------------|--|



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## 8. Exposure controls/personal protection

### Control parameters

#### Exposure Limits

| Chemical name        | ACGIH TLV   | OSHA PEL | NIOSH |
|----------------------|---|----------|-------|
| Benzidine<br>92-87-5 | Sk*<br>Exposure by all routes should be carefully controlled to levels as low as possible | -        | -     |

#### Biological occupational exposure limits

This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.

### Appropriate engineering controls

**Engineering controls**                      Showers  
   Eyewash stations  
   Ventilation systems.

### Individual protection measures, such as personal protective equipment

**Eye/face protection**                      Avoid contact with eyes. Wear safety glasses with side shields (or goggles).

**Hand protection**                              Wear suitable gloves. The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374. Wear protective Viton™ gloves. Polyvinyl chloride (PVC).

**Skin and body protection**                      Wear suitable protective clothing.

**Respiratory protection**                      No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

**Environmental exposure controls**              Do not allow into any sewer, on the ground or into any body of water.

**General hygiene considerations**              Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Wash hands before breaks and after work. Wear suitable gloves and eye/face protection. Wash hands before breaks and immediately after handling the product.

## 9. Physical and chemical properties

### Information on basic physical and chemical properties

**Physical state**                                      Solid



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**Appearance** Crystalline  
**Color** Tan or dark gray; to; black  
**Odor** No information available  
**Odor threshold** No information available

| <u>Property</u>                                | <u>Values</u>     | <u>Remarks • Method</u> |
|--|-------------------|-------------------------|
| <b>pH</b>                                      | No data available | None known              |
| <b>Melting point / freezing point</b>          | 120 °C / 248 °F   | None known              |
| <b>Initial boiling point and boiling range</b> | 401 °C / 753.8 °F | None known              |
| <b>Flash point</b>                             | No data available | None known              |
| <b>Evaporation rate</b>                        | No data available | None known              |
| <b>Flammability</b>                            | No data available | None known              |
| <b>Flammability Limit in Air</b>               |                   | None known              |
| <b>Upper flammability or explosive limits</b>  | No data available |                         |
| <b>Lower flammability or explosive limits</b>  | No data available |                         |
| <b>Vapor pressure</b>                          | No data available | None known              |
| <b>Relative vapor density</b>                  | No data available | None known              |
| <b>Relative density</b>                        | 1.25              | @ 20 °C                 |
| <b>Water solubility</b>                        |                   | @ 25 °C                 |
| <b>Solubility(ies)</b>                         | No data available | None known              |
| <b>Partition coefficient</b>                   | 1.34              | None known              |
| <b>Autoignition temperature</b>                | No data available | None known              |
| <b>Decomposition temperature</b>               |                   | None known              |
| <b>Kinematic viscosity</b>                     | No data available | None known              |
| <b>Dynamic viscosity</b>                       | No data available | None known              |

**Other information**

|                             |                          |
|-----------------------------|--------------------------|
| <b>Explosive properties</b> | No information available |
| <b>Oxidizing properties</b> | No information available |
| <b>Softening point</b>      | No information available |
| <b>Molecular weight</b>     | 184.24                   |
| <b>VOC content</b>          | No information available |
| <b>Liquid Density</b>       | No information available |
| <b>Bulk density</b>         | No information available |

## 10. Stability and reactivity

**Reactivity** No information available.

**Chemical stability** Stable under normal conditions.

**Possibility of hazardous reactions** None under normal processing.

**Conditions to avoid** None known based on information supplied.

**Incompatible materials** None known based on information supplied.



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**Hazardous decomposition products** None known based on information supplied.

## 11. Toxicological information

### Information on likely routes of exposure

#### Product Information

|                     |  |
|---------------------|--|
| <b>Inhalation</b>   | Specific test data for the substance or mixture is not available.  |
| <b>Eye contact</b>  | Specific test data for the substance or mixture is not available.  |
| <b>Skin contact</b> | Specific test data for the substance or mixture is not available.  |
| <b>Ingestion</b>    | Specific test data for the substance or mixture is not available. Harmful if swallowed. (based on components). |

### Symptoms related to the physical, chemical and toxicological characteristics

**Symptoms** No information available.

### Acute toxicity

#### Numerical measures of toxicity

#### Component Information

| Chemical name        | Oral LD50           | Dermal LD50 | Inhalation LC50 |
|----------------------|---------------------|-------------|-----------------|
| Benzidine<br>92-87-5 | = 309 mg/kg ( Rat ) | -           | -               |

### Delayed and immediate effects as well as chronic effects from short and long-term exposure

**Skin corrosion/irritation** No information available.

**Serious eye damage/eye irritation** No information available.

**Respiratory or skin sensitization** No information available.

**Germ cell mutagenicity** No information available.



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**Carcinogenicity** Contains a known or suspected carcinogen. Classification based on data available for ingredients. May cause cancer.

The table below indicates whether each agency has listed any ingredient as a carcinogen.

| Chemical name        | ACGIH | IARC    | NTP   | OSHA |
|----------------------|-------|---------|-------|------|
| Benzidine<br>92-87-5 | A1    | Group 1 | Known | X    |

## Legend

**ACGIH (American Conference of Governmental Industrial Hygienists)**

A1 - Known Human Carcinogen

**NTP (National Toxicology Program)**

Known - Known Carcinogen

**OSHA (Occupational Safety and Health Administration of the US Department of Labor)**

X - Present

**Reproductive toxicity** No information available.

**STOT - single exposure** No information available.

**STOT - repeated exposure** No information available.

**Target organ effects** Liver, Kidney, Skin, Blood, Bladder.

**Aspiration hazard** No information available.

**Other adverse effects** No information available.

**Interactive effects** No information available.

## 12. Ecological information

**Ecotoxicity** Very toxic to aquatic life with long lasting effects.

| Chemical name        | Algae/aquatic plants | Fish  | Toxicity to microorganisms | Crustacea                           |
|----------------------|----------------------|---|----------------------------|-------------------------------------|
| Benzidine<br>92-87-5 | -                    | LC50: =20mg/L (96h,<br>Pimephales promelas)<br>LC50: =7.4mg/L (96h,<br>Oncorhynchus mykiss) | -                          | EC50: 0.6 mg/l (Daphnia magna, 48h) |

**Persistence and degradability** No information available.



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**Bioaccumulation** There is no data for this product.

## Component Information

| Chemical name        | Partition coefficient |
|----------------------|-----------------------|
| Benzidine<br>92-87-5 | 1.34                  |

**Other adverse effects** No information available.

## 13. Disposal considerations

### Disposal methods

**Waste from residues/unused products** Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

**Contaminated packaging** Do not reuse empty containers.

**US EPA Waste Number** U021

## 14. Transport information

### DOT

**UN number or ID number** UN1885  
**Extended proper shipping name** Benzidine  
**Transport hazard class(es)** 6.1  
**Packing group** II  
**Reportable Quantity (RQ)** (Benzidine: RQ (kg)= 0.454) Benzidine: RQ (lb)= 1  
**Reportable quantity (kg) (calculated)** Benzidine: RQ (kg)= 0  
**Reportable quantity (lbs) (calculated)** Benzidine: RQ (lb)= 1  
**Special Provisions** IB8, IP2, IP4, T3, TP33  
**DOT Marine Pollutant** I  
**Description** UN1885, Benzidine, 6.1, II, Marine pollutant  
**Emergency Response Guide Number** 153

### TDG

**UN number or ID number** UN1885  
**UN proper shipping name** Benzidine  
**Transport hazard class(es)** 6.1



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**Packing group** II  
**Marine pollutant** NP  
**Description** UN1885, Benzidine, 6.1, II

## MEX

**UN number or ID number** UN1885  
**UN proper shipping name** Benzidine  
**Transport hazard class(es)** 6.1  
**Packing group** II  
**Description** UN1885, Benzidine, 6.1, II

## IATA

**UN number or ID number** UN1885  
**UN proper shipping name** Benzidine  
**Transport hazard class(es)** 6.1  
**Packing group** II  
**Description** UN1885, Benzidine, 6.1, II  
**ERG Code** 6L

## IMDG

**UN number or ID number** UN1885  
**UN proper shipping name** Benzidine  
**Transport hazard class(es)** 6.1  
**Packing group** II  
**EmS-No.** F-A, S-A  
**Marine pollutant** P  
**Description** UN1885, Benzidine, 6.1, II, Marine pollutant

## 15. Regulatory information

### International Inventories

#### TSCA

Complies. LGC, to the best of its ability, has confirmed that the chemical substances in this product are listed as "Active" in the EPA (Environmental Protection Agency) "TSCA Inventory Notification (Active-Inactive) Requirements Rule" ("the Final Rule") of Feb 2019, as amended Feb 2021."

| Chemical name | CAS No. | Inventory Listing Status | Commercial Activity Designation |
|---------------|---------|--------------------------|---------------------------------|
| Benzidine     | 92-87-5 | Present                  | Active                          |

**DSL/NDSL**  
**EINECS/ELINCS**  
**ENCS**

Contact supplier for inventory compliance status.  
Contact supplier for inventory compliance status.  
Contact supplier for inventory compliance status.



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IECSC Contact supplier for inventory compliance status.  
KECL Contact supplier for inventory compliance status.  
PICCS Contact supplier for inventory compliance status.  
AIIIC Contact supplier for inventory compliance status.

## Legend:

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory  
**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List  
**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances  
**ENCS** - Japan Existing and New Chemical Substances  
**IECSC** - China Inventory of Existing Chemical Substances  
**KECL** - Korean Existing and Evaluated Chemical Substances  
**PICCS** - Philippines Inventory of Chemicals and Chemical Substances  
**AICS** - Australian Inventory of Chemical Substances

## US Federal Regulations

### SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

| Chemical name       | SARA 313 - Threshold Values % |
|---------------------|-------------------------------|
| Benzidine - 92-87-5 | 0.1                           |

### SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

### CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

| Chemical name        | CWA - Reportable Quantities | CWA - Toxic Pollutants | CWA - Priority Pollutants | CWA - Hazardous Substances |
|----------------------|-----------------------------|------------------------|---------------------------|----------------------------|
| Benzidine<br>92-87-5 | -                           | X                      | X                         | -                          |

### CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302).

| Chemical name        | Hazardous Substances RQs | Extremely Hazardous Substances RQs | Reportable Quantity (RQ)                 |
|----------------------|--------------------------|------------------------------------|--|
| Benzidine<br>92-87-5 | 1 lb                     | -                                  | RQ 1 lb final RQ<br>RQ 0.454 kg final RQ |

## US State Regulations



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## California Proposition 65

This product contains the following Proposition 65 chemicals:

| Chemical name       | California Proposition 65 |
|---------------------|---------------------------|
| Benzidine - 92-87-5 | Carcinogen                |

## U.S. State Right-to-Know Regulations

| Chemical name        | New Jersey | Massachusetts | Pennsylvania |
|----------------------|------------|---------------|--------------|
| Benzidine<br>92-87-5 | X          | X             | X            |

## U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

## 16. Other information

**NFPA** Health hazards 0 Flammability 0 Instability 0 Special hazards -  
**HMIS** Health hazards \* Flammability 0 Physical hazards 0 Personal protection X  
*Chronic Hazard Star Legend \* = Chronic Health Hazard*

### Key or legend to abbreviations and acronyms used in the safety data sheet

#### Legend Section 8: Exposure controls/personal protection

TWA TWA (time-weighted average) STEL STEL (Short Term Exposure Limit)  
Ceiling Maximum limit value Sk\* Skin designation

### Key literature references and sources for data used to compile the SDS

Agency for Toxic Substances and Disease Registry (ATSDR)  
U.S. Environmental Protection Agency ChemView Database  
European Food Safety Authority (EFSA)  
EPA (Environmental Protection Agency)  
Acute Exposure Guideline Level(s) (AEGl(s))  
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act  
U.S. Environmental Protection Agency High Production Volume Chemicals  
Food Research Journal  
Hazardous Substance Database  
International Uniform Chemical Information Database (IUCLID)  
Japan GHS Classification  
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)  
NIOSH (National Institute for Occupational Safety and Health)  
National Library of Medicine's ChemID Plus (NLM CIP)  
National Library of Medicine's PubMed database (NLM PUBMED)  
National Toxicology Program (NTP)  
New Zealand's Chemical Classification and Information Database (CCID)  
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications



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Organization for Economic Co-operation and Development High Production Volume Chemicals Program  
Organization for Economic Co-operation and Development Screening Information Data Set  
World Health Organization

**Revision date** 18-Mar-2024  
**Revision Note** No information available.

**Disclaimer**

The information in this Safety Data Sheet meets the requirements of the United States OCCUPATIONAL SAFETY AND HEALTH ACT and regulations promulgated thereunder (29 CFR 1910.1200 et. seq.) This document is intended only as a guide to the appropriate precautionary handling of the material by a person trained in, or supervised by a person trained in, chemical handling. The user is responsible for determining the application. Depending on usage, protective clothing including eye and face guards and respirators must be used to avoid contact with material or breathing chemical vapors/fumes. Exposure to this product may have serious adverse health effects. This chemical may interact with other substances. Since the potential uses are so varied, we cannot warn of all of the potential dangers of use or interaction with other chemicals or materials. We warrant that the chemical meets the specifications set forth on the label. We (LGC/VHG/ARMI) disclaim any other warranties, expressed or implied with regard to the product supplied hereunder, its merchantability or its fitness for a particular purpose. The user should recognize that this product can cause severe injury and even death, especially if improperly handled or the known dangers of use are not heeded. Read all precautionary information.

**End of Safety Data Sheet**