

## 1. Identification

Product identifier:	Bolldex <sup>®</sup>	
Synonyms/alternate brand names:	Helicovex	
Company product code or Supplier code:	N/A	
Insecticide Group:	31 (IRAC MoA Classification)	
RSA Reg. No. (Act No. 36 of 1947):	L8895	
Supplier:	Andermatt Madumbi (Pty) Ltd Suite 105, 24 Hilton Ave, Hilton KZN 3245, South Africa Telephone: +27 (0) 33 342 3984 (09:00 to 16:00) Email address (technical): support@andermatt.co.za	
Recommended use:	Biological insecticide for reduction of larvae of African bollworm, <i>Helicoverpa armigera</i>	
Restrictions on use:	Do not use for any other purpose than described on the product label	
Emergency numbers:	+27 (0) 33 342 3984 +27 (0) 82 446 8946	(09:00 to 16:00) (24 H)

## 2. Hazards identification

Bolldex<sup>®</sup> is a liquid mixture.

Classification according to the GHS: Not classified. No hazard statements. No signal word.

Contains *Helicoverpa armigera* nucleopolyhedrovirus.  
Caution: microorganisms may have the potential to provoke sensitising reactions.

The product may cause irritation if inhaled and may cause eye irritation.

It may also cause allergic reactions in people who are repeatedly exposed to it at high concentrations. These reactions can be avoided if exposure is limited by following the label recommendation and precautions.



## Precautionary statements:

Wear protective gloves/protective clothing/eye protection.	P280
Do not eat, drink, or smoke when using this product.	P270
Wash hands and face thoroughly after handling. Do not touch eyes.	P264+P265
Avoid inhalation of mist or spray.	P261
Dispose of the product in a responsible manner. Avoid direct incineration.	P501

### 3. Composition/information on ingredients

Ingredient	CAS number	%
<i>Helicoverpa armigera</i> nucleopolyhedrovirus	Not assigned	< 1 ( $\geq 7.5 \times 10^{11}$ OB/100 ml)
Non-hazardous co-formulants	Confidential	> 99

### 4. First aid measures

Inhalation:	<p>Most important acute symptoms/effects: irritation of the upper airway, coughing may occur.</p> <p>IF INHALED: Remove person to fresh air and keep comfortable for breathing.</p> <p>Get medical help if the casualty feels unwell.</p>
Eye contact:	<p>Most important acute symptoms/effects: eye irritation, redness may occur.</p> <p>IF IN THE EYES: Rinse cautiously with water for several minutes.</p> <p>Remove contact lenses, if present and easy to do.</p> <p>Continue rinsing.</p> <p>If eye irritation persists, get medical help.</p>
Skin contact:	<p>Most important acute symptoms/effects: skin irritation, redness may occur.</p> <p>IF ON SKIN: Wash with plenty of water.</p> <p>Take off contaminated clothing and wash it before reuse.</p> <p>If skin irritation occurs, get medical help.</p>
Ingestion:	<p>Most important acute symptoms/effects: no symptoms or effects are known.</p> <p>IF SWALLOWED: Rinse cautiously with water for several minutes.</p> <p>Get medical help if you feel unwell.</p>
Most important delayed symptoms/effects after exposure:	<p>Prolonged exposure can cause nausea, headache and vomiting due to the ingredients. Repeated exposure to the microbial product can cause allergic sensitisation.</p>
Indication of immediate medical attention:	<p>If skin irritation or rash occurs, or if eye irritation persists, get medical help.</p> <p>Treat symptomatically. Pre-existing conditions may be aggravated, such as eye disorders or skin disorders.</p>
Protection of first responders:	<p>Avoid undue contact with the mixture. Wear gloves and a mask to prevent transmission of pathogens.</p>

## 5. Firefighting measures

- Appropriate/suitable extinguishing media: Water spray, alcohol resistant foam, carbon dioxide (CO<sub>2</sub>) or dry powder may be used but select extinguishing media that is appropriate for local circumstances and the surroundings.
- Inappropriate extinguishing media: Water jet and ordinary foam.
- Nature of hazardous combustion products: Fumes that are irritating to the upper respiratory tract may form. At temperatures above 200 °C the risk of exothermic polymerisation develops and above 280 °C acrolein, which is corrosive, reactive and toxic, is formed.
- Other hazards arising from the mixture: None known. (There is no direct explosion hazard, no sensitivity to mechanical impact or to static discharge for this mixture).
- Special protective equipment: Avoid breathing vapours and combustion by-products. Use self-contained breathing apparatus and complete protective clothing. Do not attempt to act without suitable protective equipment.
- Precautions and/or protective actions: Move containers from the fire area if it can be done without risk. Avoid contact with oxidising agents. Use water spray to cool down closed containers, but only after considering other material in the vicinity that may pose a hazard. Stay upwind and keep out of low areas. Take precautions to prevent extinguishing media contaminating surface water or ground water.

## 6. Accidental release measures

Distinguish between large or small spills, leaks, or releases.

- Personal precautions: Spilled material may be slippery. Avoid contact with skin and eyes. Wash hands thoroughly after handling. Do not touch eyes. Do not eat, drink, or smoke during clean-up operations.
- Protective equipment: Wear protective gloves/protective clothing/eye protection.
- Emergency actions and procedures: No special emergency actions or procedures are required.
- Environmental precautions: The product is for terrestrial use only and not intended for aquatic applications. Do not apply directly to areas where surface water is present, or to aquatic habitats, estuaries, or marine habitats. Do not contaminate surface or ground water when disposing of rinsate or water used to wash equipment. Avoid release of spills to the environment. Prevent spills from entering storm sewers or drains. Report release to the appropriate authorities.

Methods and materials for containment and cleaning up:

Move intact containers from the spill area. The product is a water miscible liquid. Stop leaks if it can be done safely and prevent run-off as far as possible.

Small spills: Dilute spills with water containing a disinfectant and mop up. Place in an appropriate waste disposal container.

Large spills: Ensure adequate ventilation. If possible, recover the product, otherwise neutralise the micro-organism with disinfectant. Prevent entry into sewers, water courses, basements, or confined areas by diking if possible. Wash the spillage into an effluent treatment plant. Alternatively contain and collect the spillage by mopping up and transfer to containers for use or disposal. Flush the area with water if appropriate. Dispose of via a licensed waste disposal contractor.

## 7. Handling and storage

Precautions for safe handling: Wear protective gloves/protective clothing/eye protection, such as nitrile rubber gloves, safety glasses or shields, and long-sleeved clothing. Do not eat, drink, or smoke when using this product. Do not touch eyes. Wash hands and face thoroughly after handling.

Conditions for safe storage: Store locked in the original container below 30 °C, preferably below 4 °C. Store in a dry area out of direct sunlight. Store in a facility designed to contain liquid spills. Keep containers closed and upright to prevent leakage. Store separately from any food, feed, or drinks. Keep out of reach of children and uninformed persons.



Any incompatibilities: The product is sensitive to ultraviolet rays. It is also pH sensitive. Ensure that the pH of the water in a mixing vessel is between 5 and 8 before adding the virus product. Avoid mixing with copper containing formulations.

## 8. Exposure controls/personal protection

No occupational exposure limit values have been established for this mixture, but the 8-hour TWA (time weight average) for the liquid carrier (ingredient) is 5 mg/m<sup>3</sup> (respirable).

No biological limit values are available for this mixture.

Appropriate engineering controls include good general ventilation. No other control parameters are considered necessary. Safety showers and eye wash stations should be provided.

Occupational risks are of no concern when microbial pest control agents are used according to label directions, which include protective measures. Direct contact with these agents occurs through exposure of the skin or eyes, or by inhalation. Wear a long-sleeved shirt, long pants, shoes plus socks, water-proof gloves, eye goggles and a dust/mist filtering mask or respirator when handling these mixtures.

Do not enter areas treated with Bolldex for 4 hours following application or until sprays have dried.

## 9. Physical and chemical properties

Physical state	Liquid
Clarity:	Cloudy
Colour:	Grey-brown
Odour:	Data not available
Odour threshold:	Not known
Melting point/freezing point:	< 18 °C
Boiling point (or initial point and range):	105 to 290 °C with decomposition
Flammability (gases, liquids, solids):	Non-flammable
Lower and upper explosion limits:	None
Lower and upper flammability limits:	None
Flash point:	> 100 °C
Autoignition temperature:	Does not auto-ignite
Decomposition temperature:	Starts at 200 °C
pH, neat:	6 to 7
pH, aqueous dilution (10%):	Data not available
Dissociation in water, pKa:	Data not available
Kinematic viscosity (of liquids) in mm <sup>2</sup> /s:	No reliable data available
Solubility in water:	Miscible with water
Solubility in a specified non-polar solvent:	Not miscible with non-polar solvents
Partition coefficient (n-octanol/water):	Not applicable
Vapour pressure (at 25 °):	Data not available
Density and/or relative density:	1.100 g/ml
Relative vapour density:	Data not available
Particle characteristics:	Not applicable
Evaporation rate:	Data not available

## 10. Stability and reactivity

Chemical stability:	The mixture is chemically stable and not reactive when handled or stored at ambient temperatures and below. It is not combustible (except at high temperatures).
Safety significance of any change in physical appearance:	The mixture is not expected to change in physical appearance over time, except for reversible settling, which has no safety significance.
Possibility of hazardous reactions:	Hazardous reactions such as polymerisation occur only when the mixture is heated (> 200 °C).
Conditions to avoid:	Do not allow the mixture to heat up excessively. Pressure, shock, static discharge, and vibrations have no known effect.
Incompatible materials:	The mixture is incompatible with oxidising agents and materials with pH lower than 5 or higher than 8. Avoid mixing with copper containing formulations.
Hazardous decomposition products:	The mixture is not expected to produce hazardous decomposition products when used and stored properly, but will decompose when heated, producing toxic and corrosive vapours of acrolein above 280 °C.

## 11. Toxicological information

The following information is available for the active ingredient  
*Helicoverpa armigera* nucleopolyhedrovirus:

Acute toxicity	Rat, oral NOAEL 5 x 10 <sup>9</sup> PIB/kg body weight Rat, inhalation NOAEL 3.6 x 10 <sup>10</sup> PIB/kg Guinea pig, inhalation NOAEL 2 x 10 <sup>13</sup> granules/ℓ
Skin corrosion/irritation	Rabbit NOAEL 0.5 ml of 2.2 x 10 <sup>13</sup> granules/ℓ, 4 h
Serious eye damage/irritation	Rabbit, 0.1 ml of 2.2 x 10 <sup>13</sup> granules/ℓ for 24 h, non-irritating
Respiratory/skin sensitization	Guinea pig, inhalation: 7 x 10 <sup>8</sup> granules/m <sup>3</sup> for 15 min, no adverse effects
Germ cell mutagenicity	Not mutagenic
Carcinogenicity	Not carcinogenic
Reproductive toxicity	Not a reproductive toxicant
STOT-single exposure	No adverse effects anticipated
STOT-repeated exposure	No adverse effects anticipated
Aspiration hazard	No severe acute effects expected after aspiration

The following information is available for the end-use product:

Acute toxicity	The product is not acutely toxic.
Skin corrosion/irritation	Exposure of the skin or eyes to microbial pest control products (end-use products) may cause irritation due to the presence of larval debris.
Serious eye damage/irritation	
STOT-single exposure	Inhalation of these end-use products may also cause respiratory irritation.
Respiratory/skin sensitization	Microbial pest control agents contain substances that can cause allergic reactions in people who are repeatedly exposed to it at high concentrations.

**Symptoms** related to the physical, chemical, and toxicological characteristics of the mixture include possible irritation and redness upon skin contact. Eye contact may cause irritation, redness, and excessive tearing (epiphora). Prolonged exposure may cause nausea, headache and vomiting due to the co-formulants.

**Effects of exposure:** Apart from irritation, no data on immediate, delayed, or chronic effects from short- or long-term exposure is available. The potential for toxicity is low but the end-use product may cause irritation if inhaled or when the skin and eyes are exposed to it. Repeated exposure to microbial products can cause allergic sensitisation.

The mixture is not classified in accordance with the GHS for any of the health hazard classes and there are no hazard statements. There is a warning: microorganisms may have the potential to provoke sensitising reactions.

## 12. Ecological information

Acute aquatic hazard, fish	Rainbow trout, 96 h LC <sub>50</sub>	> 100 mg/l (2.0 × 10 <sup>9</sup> OB/l)
Acute aquatic hazard, invertebrates	<i>Daphnia magna</i> , 48 h LC <sub>50</sub>	> 100 mg/l (2.0 × 10 <sup>9</sup> OB/l)
Acute aquatic hazard, aquatic plants	Algae, 72 h EC <sub>50</sub>	> 100 mg/l (2.0 × 10 <sup>9</sup> OB/l)
Chronic aquatic hazard, fish, invertebrates, aquatic plants		Not determined
Acute (short-term) aquatic toxicity:	Not classified based on available data.	
Chronic (long-term) aquatic toxicity:	Not determined but not expected to have any significant effect.	
Toxicity for birds:	No test data available but the risk is expected to be low.	
Toxicity for earthworms:	LC <sub>50</sub> is more than 2 x 10 <sup>10</sup> OB/kg soil (> 1 000 mg/kg soil).	
Toxicity for terrestrial plants:	No data available.	
Toxicity for honeybees:	Oral and contact LD <sub>50</sub> is more than 3.5 x 10 <sup>7</sup> OB/bee (> 5 000 µg/bee).	
Toxicity for soil micro-organisms:	Not expected based on type of ingredients.	
Possible impact on sewage treatment:	No data available.	

Degradability:	No data available.
Persistence and mobility in soil:	Persists in the soil in the immobilised state and does not accumulate.
Environmental fate	No data available.
Bio-accumulative potential:	No data available.
Ozone depletion potential:	None – does not contain halocarbon molecules.
Photochemical ozone creation potential:	Not expected based on type of ingredients.
Endocrine disrupting potential:	No adverse effects to the endocrine system are anticipated.
Climate change potential:	Not expected based on type of ingredients.
Other adverse effects:	None expected.

There is no ecological concern, as baculoviruses are commonly found in nature at relatively high levels, but they are highly host specific and have only been found in arthropods.

### 13. Disposal considerations

Avoid release to the environment. Dispose of waste residues responsibly as low-hazard chemical waste through a licensed waste removal company.

Dispose of the containers by disinfecting them and rinsing properly. Do not re-use. Destroy mechanically and dispose of as ordinary waste through a licensed waste removal company.

Refer to the manufacturer or supplier for information on recovery or recycling, for options on reclamation, and on disposal of unused material.

The physical/chemical properties of the product should have no significant effect on disposal procedures.

Microbial products should not be directly incinerated. Depending on the volume, waste should be decontaminated by autoclave sterilization, UV-radiation, or disinfection in a suitable container prior to disposal.

Incineration should be avoided due to the risk of exothermic polymerisation that develops above 200 °C and the formation at temperatures above 280 °C of acrolein, which is corrosive, reactive and toxic.

There are no special precautions for landfill. The ingredients occur naturally and are of no environmental concern.

There is no other relevant information.



## 14. Transport information

UN number:	Not classified as dangerous in the context of transport regulations.
UN proper shipping name:	Not applicable.
UN packing group number:	Not applicable.
UN transport hazard class(es):	Not applicable.
A known marine pollutant (IMDG Code)?	Not a marine pollutant.
A known severe marine pollutant?	Not a marine pollutant.
Environmentally hazardous, ADR?	Not classified as dangerous in the context of transport regulations.
Environmentally hazardous, RID?	Not classified as dangerous in the context of transport regulations.
Environmentally hazardous, ADN?	Not classified as dangerous in the context of transport regulations.
Transport in bulk by sea, IMO?	Not classified as dangerous in the context of transport regulations.
There are no special precautions which a user needs to be aware of or needs to comply with.	

## 15. Regulatory information

Relevant safety regulations:	Regulations for hazardous chemical agents 2021, Department of Employment and Labour (March 2021).
Relevant health regulations:	Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).
Relevant environmental regulations:	The National Environmental Management Act, 107 of 1998 (NEMA). Guidelines on the administration of incidents, as described in section 30 of the NEMA, Department of Environmental Affairs (2019).
Subject to the Montreal Protocol?	No.
Subject to the Stockholm Convention?	No.
Subject to the Rotterdam Convention?	No.
Subject to any prohibitions?	No.
Subject to any restrictions?	No.

## 16. Other information

SDS identification or reference number: 006

Date of the previous revision of this SDS: Not dated. Previous revision number: Not numbered.

There is no additional information relevant to the material's nature or use, or any other relevant information.

Abbreviations that may have been used in this document:

- AND means European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways.
- ADR means Agreement Concerning the International Carriage of Dangerous Goods by Road.
- CAS means Chemical Abstract Service.
- Cat. means Category.
- GHS means Globally Harmonised System of Classification and Labelling of Chemicals.
- IMDG Code means International Maritime Dangerous Goods Code.
- IMO means International Maritime Organisation.
- IRAC MoA means Insecticide Resistance Action Committee Mode of Action (Classification Scheme)
- NEMA means National Environmental Management Act.
- NOAEL means no observed adverse effect level
- OB means occlusion body
- PIB means polyhedral inclusion body
- RID means Regulations Concerning the International Carriage of Dangerous Goods by Rail.
- SDS means safety data sheet.
- STOT means specific target organ toxicity.
- UN means United Nations.

This safety data sheet was compiled in compliance with the following regulations and guidelines:

- a. Regulations for hazardous chemical agents 2021, Department of Employment and Labour (March 2021).
- b. The globally harmonised system of classification and labelling of chemicals (GHS), 9th Revised Edition, United Nations (2021).
- c. Globally harmonised system of classification and labelling of chemicals (GHS), SANS 10234:2019, Ed. 2.00 (2019).