

## MATERIAL SAFETY DATA SHEET

### Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION








<b>Product name</b>	METFORMIN HYDROCHLORIDE
<b>Chemical Name</b>	1,1-Dimethylbiguanide hydrochloride
<b>Synonyms</b>	C4-H11-N5.HCl, H2NC(=NH)NHC(=NH)N(CH3)2.HCl, "biguanide, 1, 1-dimethyl-, hydrochloride", "biguanide, 1, 1-dimethyl-, hydrochloride", "dimethylbiguanide hydrochloride", "1, 1-dimethylbiguanide hydrochloride", "1, 1-dimethylbiguanide hydrochloride", "imidodicarbonimidic diamide, N, N-dimethyl-, monohydrochloride", "imidodicarbonimidic diamide, N, N-dimethyl-, monohydrochloride", Diabefagos, Diabex, Diaformin, Diformin, Gliformin, Glucophage, Haurymellin, Meguan, Metformin, Metiguanide, antidiabetic
<b>Molecular Formula</b>	C4-H11-N5.HCl
<b>Usage</b>	Biguanide derivative given by mouth in the treatment of diabetes mellitus, Used only in treatment of maturity-onset diabetes not responsive to diet alone or to diet plus treatment with a sulfonylurea.
<b>Manufacture/supplier identification :</b>	
<b>Company</b>	Ipca Laboratories Limited, 48, Kandivli Industrial Estate, Kandivli (West), Mumbai - 400 067 Telephone : 66474747:Telefax 2868 2875
<b>Contact for information:</b>	Ipca Laboratories Limited, Post Box No. 33, P.O. Sejavta, Dist. Ratlam (M.P.) 457 002
<b>Emergency telephone No.:</b>	Telephone:(07412)278000,279080-81,Telefax (07412)279083
<b>E Mail</b>	<a href="mailto:ipcartm@ipca.co.in">ipcartm@ipca.co.in</a>

### Section 2 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS NO.	%
metformin hydrochloride	1115-70-4	>98
	<b>EINECS-NO.</b> 214-230-6	

### Section 3 - HAZARDS IDENTIFICATION

HAZARD RATINGS

	Min	Max	
Flammability:	1		
Toxicity:	2		Min/Nil=0
Body Contact:	1		Low=1
Reactivity:	1		Moderate=2
Chronic:	0		High=3
			Extreme=4
			
CANADIAN WHMIS SYMBOLS			
			
EMERGENCY OVERVIEW			
RISK			
Harmful if swallowed.			
POTENTIAL HEALTH EFFECTS			
ACUTE HEALTH EFFECTS			
SWALLOWED			
» Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.			
» Biguanides, drugs used in treating type II diabetes mellitus, have been associated with the metabolic condition lactic acidosis which is highly dangerous and often fatal especially if taken with alcohol. Overexposure may cause fixed dilated pupils and lack of eye reflexes, nausea, vomiting, diarrhea, loss of appetite and weight, abdominal discomfort, blood in vomit, agitation, confusion, lethargy, spasticity, and coma. Increased heart rate, decreased blood pressure and heart attack may occur. The skin is dry and dehydration is common. Biguanides do not elicit a therapeutic response in the non-diabetic.			
EYE			
» Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.			
SKIN			
» Skin contact is not thought to produce harmful health effects (as classified using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.			
» Open cuts, abraded or irritated skin should not be exposed to this material.			

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» Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

### INHALED

» The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified using animal models). Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

» Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

### CHRONIC HEALTH EFFECTS

» Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified using animal models); nevertheless exposure by all routes should be minimized as a matter of course.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

## Section 4 - FIRST AID MEASURES

### SWALLOWED

»

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
- For advice, contact a Poisons Information Center or a doctor.
- Urgent hospital treatment is likely to be needed.
- If conscious, give water to drink.
- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further

action will be the responsibility of the medical specialist.

- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

#### EYE

» If this product comes in contact with the eyes:

- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- If pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

#### SKIN

» If skin or hair contact occurs:

- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

#### INHALED

»

- If dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear passage of breathing.
- If irritation or discomfort persists seek medical attention.

#### NOTES TO PHYSICIAN

» Treat symptomatically.

Suggested treatment regime for biguanide intoxication:

- Establish airway and assist ventilation with positive end expiratory pressure, if required, after endotracheal intubation. Circulatory competence must be maintained - monitor blood pressure carefully.
- Induction of emesis with Ipecac may be contraindicated as a result of biguanide-induced gastric mucosal irritation.
- Gastric lavage, following endotracheal intubation may be preferred. Activated charcoal and cathartics placed through the lavage tube may be useful.
- Forcing fluids may be counterproductive and result in fluid overload.
- Hemodialysis may be useful as, in addition to facilitating the removal of biguanide and excess lactate, it permits the administration of adequate amounts of sodium bicarbonate without the risk of fluid overload or hypernatremia.
- Hypoglycemia can be treated immediately with 50 ml of 50% glucose intravenously in

adults or 0.5 g/kg per dose in children.

- Acidosis may be treated with IV sodium bicarbonate (1-2 mEq/kg); doses of 44-50 mEq every 15 minutes may be required. Ensure that arterial blood gases, serum sodium chloride, potassium and ECG are monitored. The patient may require 200-400 mEq of sodium bicarbonate.
- Dehydration and hypovolemia may require placement of a central venous line.
- Hypotension may be treated by placing the patient in Trendelenburg's position and the cautious use of IV fluids. Pressor amines should be used cautiously, with blood lactate monitoring, as they may increase lactic acid production.

ELLENHORN and BARCELOUX: Medical Toxicology; Diagnosis and Treatment of Human Poisoning. 1988.

In the treatment of lactic acidosis, sodium bicarbonate (not lactate) is promptly given by transfusion; it may be necessary to give diuretics to avoid sodium overload. Insulin has been given, with dextrose, although the rationale for this treatment is not universally accepted. Such treatment however relieves associated ketoanaemia. Peritoneal dialysis or haemodialysis are reported to have been used successfully.

## Section 5 - FIRE FIGHTING MEASURES

Flash Point (°F): Not available

Lower Explosive Limit (%): Not available

Upper Explosive Limit (%): Not available.

Autoignition Temp (°F): Not available

### EXTINGUISHING MEDIA

»

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

### FIRE FIGHTING

»

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Use water delivered as a fine spray to control fire and cool adjacent area.

- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

#### GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

»

- Combustible solid which burns but propagates flame with difficulty.
- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
- Build-up of electrostatic charge may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), hydrogen chloride, phosgene, nitrogen oxides (NO<sub>x</sub>), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

#### FIRE INCOMPATIBILITY

» Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

#### PERSONAL PROTECTION

Glasses:

Safety Glasses.

Chemical goggles.

Gloves:

Respirator:

Particulate

### Section 6 - ACCIDENTAL RELEASE MEASURES

#### MINOR SPILLS

»

- Remove all ignition sources.
- Clean up all spills immediately.

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- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

### MAJOR SPILLS

» Moderate hazard.

- CAUTION: Advise personnel in area.
- Alert Emergency Responders and tell them location and nature of hazard.
- Control personal contact by wearing protective clothing.
- Prevent, by any means available, spillage from entering drains or water courses.
- Recover product wherever possible.
- IF DRY: Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. IF WET: Vacuum/shovel up and place in labelled containers for disposal.
- ALWAYS: Wash area down with large amounts of water and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

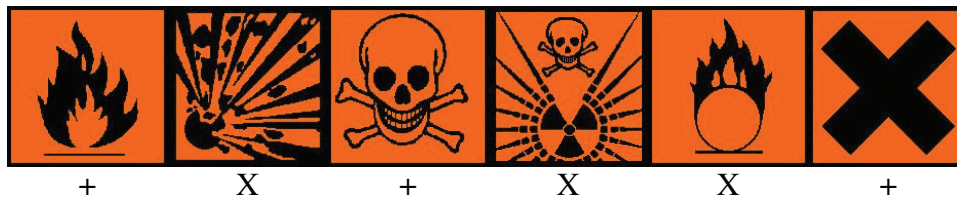
### ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

### SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



*X: Must not be stored together*

*O: May be stored together with specific preventions*

*+: May be stored together*

## **Section 7 - HANDLING AND STORAGE**

### **PROCEDURE FOR HANDLING**

»

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

### **RECOMMENDED STORAGE METHODS**

»

- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

### **STORAGE REQUIREMENTS**

»



- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m <sup>3</sup>	STEL ppm	STEL mg/m <sup>3</sup>	Peak ppm	Peak mg/m <sup>3</sup>	TWA F/CC
US - Oregon Permissible Exposure Limits (Z3)	metformin hydrochloride (Inert or Nuisance Dust: (d) Total dust)		10					
US OSHA Permissible Exposure Levels (PELs) - Table Z3	metformin hydrochloride (Inert or Nuisance Dust: (d) Respirable fraction)		5					
US OSHA Permissible Exposure Levels (PELs) - Table Z3	metformin hydrochloride (Inert or Nuisance Dust: (d) Total dust)		15					
US - Hawaii Air Contaminant Limits	metformin hydrochloride (Particulates not other wise regulated - Total dust)		10					
US - Hawaii Air Contaminant Limits	metformin hydrochloride (Particulates not other wise		5					

	regulated - Respirable fraction)		
US - Oregon Permissible Exposure Limits (Z3)	metformin hydrochloride (Inert or Nuisance Dust: (d) Respirable fraction)	5	
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	metformin hydrochloride (Particulates not otherwise regulated Respirable fraction)	5	
US - Michigan Exposure Limits for Air Contaminants	metformin hydrochloride (Particulates not otherwise regulated, Respirable dust)	5	

#### MATERIAL DATA

» It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

#### PERSONAL PROTECTION



EYE

»

- Safety glasses with side shields
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

#### HANDS/FEET

» Suitability and durability of glove type is dependent on usage. Factors such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity,

are important in the selection of gloves.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocautchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

#### OTHER

»

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

»

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be

an option).

- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

## RESPIRATOR

»

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x PEL	P1	-	PAPR-P1
	Air-line*	-	-
50 x PEL	Air-line**	P2	PAPR-P2
100 x PEL	-	P3	-
		Air-line*	-
100+ x PEL	-	Air-line**	PAPR-P3

\* - Negative pressure demand \*\* - Continuous flow

Explanation of Respirator Codes:

Class 1 low to medium absorption capacity filters.

Class 2 medium absorption capacity filters.

Class 3 high absorption capacity filters.

PAPR Powered Air Purifying Respirator (positive pressure) cartridge.

Type A for use against certain organic gases and vapors.

Type AX for use against low boiling point organic compounds (less than 65°C).

Type B for use against certain inorganic gases and other acid gases and vapors.

Type E for use against sulfur dioxide and other acid gases and vapors.

Type K for use against ammonia and organic ammonia derivatives

Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.

Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.

Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In

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conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

### ENGINEERING CONTROLS

»

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:

(a): particle dust respirators, if necessary, combined with an absorption cartridge;

(b): filter respirators with absorption cartridge or canister of the right type;

(c): fresh-air hoods or masks

- Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

Type of Contaminant:	Air Speed:
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)
Within each range the appropriate value depends on:	
Lower end of the range	Upper end of the range
1: Room air currents minimal or favorable to	1: Disturbing room air currents

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capture

2: Contaminants of low toxicity or of nuisance value only

2: Contaminants of high toxicity

3: Intermittent, low production.

3: High production, heavy use

4: Large hood or large air mass in motion

4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

#### PHYSICAL PROPERTIES

Solid.

Mixes with water.

Molecular Weight: 165.6

Boiling Range (°F): Not available

Melting Range (°F): 433.4- 438.8

Specific Gravity (water=1): Not available

Solubility in water (g/L): Miscible

pH (as supplied): Not applicable

pH (1% solution): Not available

Vapour Pressure (mmHG): Negligible

Volatile Component (%vol): Negligible

Evaporation Rate: Not applicable

Relative Vapor Density (air=1): >1

Flash Point (°F): Not available

Lower Explosive Limit (%): Not available

Upper Explosive Limit (%): Not available.

Autoignition Temp (°F): Not available

Decomposition Temp (°F): Not available.

State: Divided solid

Viscosity: Not Applicable

#### APPEARANCE

White, almost, odourless, hygroscopic, crystalline powder with bitter taste; mixes with water (1:2), alcohol (1:100).

### Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

#### CONDITIONS CONTRIBUTING TO INSTABILITY

»

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

#### STORAGE INCOMPATIBILITY

» Avoid reaction with oxidizing agents.

### Section 11 - TOXICOLOGICAL INFORMATION

metformin hydrochloride

#### TOXICITY AND IRRITATION

» unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 1000 mg/kg	Skin (rabbit): 500 mg - Mild
Subcutaneous (rat) LD50: 300 mg/kg	Eye (rabbit): 100 mg - Mild
Oral (mouse) LD50: 1450 mg/kg	Eye (rabbit): 100 g/4s(rinse) Mild
Intraperitoneal (mouse) LD50: 420 mg/kg	
Subcutaneous (mouse) LD50: 225 mg/kg	
Intravenous (mouse) LD50: 180 mg/kg	
Oral (rabbit) LD50: 350 mg/kg	
Subcutaneous (rabbit) LD50: 150 mg/kg	
Oral (g.pig) LD50: 500 mg/kg	
Intraperitoneal (g.pig) LD50: 200 mg/kg	
Subcutaneous (g.pig) LD50: 150 mg/kg	
Intramuscular (g.pig) LD50: 200 mg/kg	

» The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

### Section 12 - ECOLOGICAL INFORMATION

» DO NOT discharge into sewer or waterways.

### Section 13 - DISPOSAL CONSIDERATIONS

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### Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

» Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory.

Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction,
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: Burial in a licensed land-fill or Incineration in a licensed apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

### Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

### Section 15 - REGULATORY INFORMATION



#### REGULATIONS

metformin hydrochloride (CAS: 1115- 70- 4) is found on the following regulatory lists;

Canada National Pollutant Release Inventory (NPRI)

US - Hawaii Air Contaminant Limits



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US - Michigan Exposure Limits for Air Contaminants  
 US - Oregon Permissible Exposure Limits (Z3)  
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants  
 US OSHA Permissible Exposure Levels (PELs) - Table Z3  
 metformin hydrochloride (CAS: 15537- 72- 1) is found on the following regulatory lists;  
 Canada National Pollutant Release Inventory (NPRI)  
 US - Hawaii Air Contaminant Limits  
 US - Michigan Exposure Limits for Air Contaminants  
 US - Oregon Permissible Exposure Limits (Z3)  
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants  
 US OSHA Permissible Exposure Levels (PELs) - Table Z3

### Section 16 - OTHER INFORMATION

This information given in the safety data sheet is believed to be accurate and is based on our present knowledge. We take no guarantee with respect to such information and assume no liability resulting from its use.