SAFETY DATA SHEET

PACLOBUTRAZOL 23% SC

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. **Product identifier** ..... **PACLOBUTRAZOL 23% SC (LAGAN)**
Contains paclobutrazol

1.2. **Relevant identified uses of the substance or mixture and uses advised against** ..... Can be used as plant growth regulator only.

1.3. **Details of the supplier of the safety data sheet**

FMC INDIA PRIVATE LIMITED
TCG Financial Centre, 2nd Floor C-53,
Bandra Kurla Complex,
Bandra (E), Mumbai, Bandra Suburban,
Maharashtra- 400 098
India

1.4. **Emergency telephone number** 022-6704 5504/5404

SECTION 2: HAZARDS IDENTIFICATION

2.1. **Classification of the substance or mixture**

Eye irritation: Category 2 (H319)
Reproduction toxicity: Category 2 (H361d)
Hazards to the aquatic environment, acute: Category 1 (H400)
chronic: Category 1 (H410)

WHO classification ..... Class III, slightly hazardous

Health hazards ..... The product may cause eye irritation.

The active ingredient paclobutrazol is suspected of harming the unborn child.

Environmental hazards ..... The product is very toxic to aquatic organisms.

2.2. **Label elements**

According to EU Reg. 1272/2008 as amended

Product identifier ..... PACLOBUTRAZOL 23% SC
Contains paclobutrazol

Hazard pictograms (GHS07, GHS08, GHS09)

Signal word ..... Warning

Hazard statements
H319 ..... Causes serious eye irritation.
H361d ..... Suspected of damaging the unborn child.

H410 ..... Very toxic to aquatic life with long lasting effects.

Supplementary hazard statements
EUH208 ..... Contains 1,2-benzisothiazol-3(2H)-one. May produce an allergic reaction.
EUH401 ..... To avoid risks to human health and the environment, comply with the instructions of use.

Precautionary statements
P202 ..... Do not handle until all safety precautions have been read and understood.
P264 ..... Wash hands thoroughly after handling.
P280 ..... Wear protective gloves, protective clothing and eye protection.
P305+P351+P338 ..... IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 ..... IF exposed or concerned: Get medical attention/advice.
P501 ..... Dispose of contents/container as hazardous waste.

2.3. **Other hazards** ..... None of the ingredients in the product meets the criteria for being PBT or vPvB.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. **Substances** ..... The product is a mixture, not a substance.

3.2. **Mixtures** ..... See section 16 for full text of hazard statements.

Active ingredient
Paclobutrazol ..... Content: 25% by weight
CAS name ..... 1H-1,2,4-Triazole-1-ethanol, β-[(4-chlorophenyl)methyl]-α-(1,1-dimethylethyl)-, (R*,R*)-(+-)-
CAS no. 76738-62-0
IUPAC name(s) ..... (2RS,3RS)-1-(4-Chlorophenyl)-4,4-dimethyl-2-(1H-1,2,4-triazol-1-yl)pentan-3-ol
ISO name/EU name ..... Paclobutrazol
EC no. (EINECS no.) ..... None
EU index no. ..... None
Molecular weight 293.8
Classification of the ingredient ..... Acute oral toxicity: Category 4 (H302)
Acute inhalation toxicity: Category 4 (H332)
Eye irritation: Category 2 (H319)
Toxic to reproduction: Category 2 (H361d)
Hazards to the aquatic environment, acute: Category 1 (H400)
chronic: Category 1 (H410)

Reportable ingredients	Content (% w/w)	CAS no.	EC no. (EINECS no.)	Classification
Propane-1,2-diol Reg. no. 01-2119456809-23	10	57-55-6	200-338-0	None
1,2-Benzisothiazol-3(2H)-one	0.02 - 0.04	2634-33-5	220-120-9	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Dam. 1 (H318) Skin Sens. 1A (H317) Aquatic Acute 1 (H400)

SECTION 4: FIRST AID MEASURES

4.1. **Description of first aid measures**

Inhalation ..... If experiencing any discomfort, immediately remove from exposure. Light cases: Keep person under surveillance. Get medical attention immediately if symptoms develop. Serious cases: Get medical attention immediately or call for an ambulance.

Skin contact ..... Immediately flush skin with much water while removing contaminated clothing and footwear. Wash with water and soap. See physician if any symptom develops.

Eye contact ..... Immediately rinse eyes with much water or eyewash solution, occasionally opening eyelids, until no evidence of chemical remains. Remove contact lenses after a few minutes and rinse again. See physician if irritation persists.

Ingestion ..... Let the exposed person rinse mouth and let him/her drink several glasses of water or milk, but not induce vomiting. If vomiting does occur, let him/her rinse mouth and drink fluids again. Get medical attention immediately.

4.2. **Most important symptoms and effects, both acute and delayed** — To our knowledge, signs of adverse effects in humans have not been reported. When the active ingredient was fed to animals, only non-specific symptoms were seen.

4.3. **Indication of any immediate medical attention and special treatment needed** — Immediate medical attention is required in case of ingestion.

It may be helpful to show this safety data sheet to physician.

Note to physician ..... A specific antidote for exposure to this material is not known. Gastric lavage and/or administration of activated charcoal can be considered.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. **Extinguishing media** ..... Dry chemical or carbon dioxide for small fires, water spray or foam for large fires. Avoid heavy hose streams.

5.2. **Special hazards arising from the substance or mixture** — The essential breakdown products are volatile, toxic, irritant and inflammable compounds such as nitrogen oxides, hydrogen chloride, nitrogen oxides, carbon monoxide, carbon dioxide, phosphorous pentoxide and various chlorinated organic compounds.

5.3. **Advice for firefighters** ..... Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapours and toxic decomposition products. Fight fire from protected location or maximum possible distance. Dike area to prevent water runoff. Firemen should wear self-contained breathing apparatus and protective clothing.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. **Personal precautions, protective equipment and emergency procedures** — It is recommended to have a predetermined plan for the handling of spills. Empty, sealable vessels for the collection of spills should be available.

In case of large spill (involving 10 tonnes of the product or more):
1. use personal protection equipment; see section 8
2. call emergency telephone no.; see section 1

3. alert authorities.

Observe all safety precautions when cleaning up spills. Use personal protection equipment. Depending on the magnitude of the spill this may mean wearing respirator, face mask or eye protection, chemical resistant clothing, gloves and boots.

Stop the source of the spill immediately if safe to do so. Keep unprotected persons away from the spill area. Avoid and reduce mist formation as much as possible.

6.2. **Environmental precautions** ..... Contain the spill to prevent any further contamination of surface, soil or water. Wash waters must be prevented from entering surface water drains. Uncontrolled discharge into water courses must be alerted to the appropriate regulatory body.

6.3. **Methods and materials for containment and cleaning up** It is recommended to consider possibilities to prevent damaging effects of spills, such as bunding or capping. See GHS (Annex 4, Section 6).

If appropriate, surface water drains should be covered. Minor spills on the floor or other impervious surface should immediately be absorbed onto an absorptive material such as universal binder, hydrated lime, Fuller's earth or other absorbent clays. Collect the contaminated absorbent in suitable containers. Clean area with much water and detergent. Absorb wash liquid with absorbent and transfer to suitable containers. The used containers should be properly closed and labelled.

Large spills which soak into the ground should be dug up and transferred to suitable containers.

Spills in water should be contained as much as possible by isolation of the contaminated water. The contaminated water must be collected and removed for treatment or disposal.

6.4. **Reference to other sections** ..... See subsection 8.2. for personal protection.
See section 13 for disposal.

SECTION 7: HANDLING AND STORAGE

7.1. **Precautions for safe handling** .... Pregnant women must avoid working with the substance, because it may have an effect on the unborn child.

In an industrial environment, it is recommended to avoid all personal contact with the product, if possible by using closed systems with remote system control. The material should be handled by mechanical means as much as possible. Adequate ventilation or local exhaust ventilation is required. The exhaust gases should be filtered or treated otherwise. For personal protection in this situation, see section 8.

For its use as a pesticide, first look for precautions and personal protection measures on the officially approved label on the packaging or for other official guidance or policy in force. If these are lacking, see section 8.

Keep all unprotected persons and children away from working area.

Remove contaminated clothing immediately. Wash thoroughly after handling. Before removing gloves, wash them with water and soap. After work, take off all work clothes and footwear. Take a shower, using water and soap. Wear only clean clothes when leaving job. Wash protective clothing and protective equipment with water and soap after each use.

Do not discharge to the environment. Do not contaminate soil or water when disposing of equipment wash waters. Collect all waste material and remains from cleaning equipment, etc., and dispose of as hazardous waste. See section 13 for disposal.

7.2. **Conditions for safe storage, including any incompatibilities**

The product is stable under normal conditions of warehouse storage.

Store in closed, labelled containers. The storage room should be constructed of incombustible material, closed, dry, ventilated and with impermeable floor, without access of unauthorised persons or children. A warning sign reading "POISON" is recommended. The room should only be used for storage of chemicals. Food, drink, feed and seed should not be present. A hand wash station should be available.

7.3. **Specific end use(s)** .....

The product is a registered pesticide which may only be used for the applications it is registered for, in accordance with a label approved by the regulatory authorities.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. **Control parameters**

Personal exposure limits ..... To our knowledge, not established for paclobutrazol.

		Year	
Propane-1,2-diol	AIHA (USA) WEEL	2015	10 mg/m^3
	MAK (Germany)	2014	Cannot be established at present
	HSE (UK) WEL	2011	8-hr TWA 150 ppm (474 mg/m^3), total (vapour and particulates) 10 mg/m^3 (particulates)

However, other personal exposure limits defined by local regulations may exist and must be observed.

Paclobutrazol

DNEL, ... 0.1 mg/kg bw/day
PNEC, aquatic environment ..... 6.4 µg/l

Propane-1,2-diol

DNEL, inhalation, systemic ..... 183 mg/m^3
DNEL, inhalation, local ..... 10 mg/m^3
PNEC, fresh water ..... 260 mg/l
PNEC, marine water ..... 26 mg/l

8.2. **Exposure controls** .....

When used in a closed system, personal protection equipment will not be required. The following is meant for other situations, when the use of a closed system is not possible, or when it is necessary to open the system. Consider the need to render equipment or piping systems non-hazardous before opening.

The precautions mentioned below are primarily meant for handling of the undiluted product and for preparing the spray solution, but can be

recommended for spraying as well.

In cases of incidental high exposure, more personal protection equipment may be necessary, such as respirator, face mask, chemical resistant coveralls.

Respiratory protection — In the event of an accidental discharge of the material which produces a vapour or mist, workers should put on officially approved respiratory protection equipment with a universal filter type including particle filter.

Protective gloves ..... — Wear long chemical resistant gloves, such as barrier laminate, butyl rubber or nitrile rubber. The breakthrough times of these materials for epoxiconazole are unknown. Generally, however, the use of protective gloves will give only partial protection against dermal exposure. Small tears in the gloves and cross-contamination can easily occur. It is recommended to limit the work to be done manually and to change the gloves frequently. Be careful not to touch anything with contaminated gloves.

Eye protection ..... — Wear safety glasses. It is recommended to have an eye wash fountain immediately available in the workplace when there is a potential for eye contact.

Other skin protection — Wear appropriate chemical resistant clothing to prevent skin contact depending on the extent of exposure. During most normal work situations where exposure to the material cannot be avoided for a limited time span, waterproof pants and apron of chemical resistant material or coveralls of polyethylene (PE) will be sufficient. Coveralls of PE must be discarded after use if contaminated. In cases of excessive or prolonged exposure, coveralls of barrier laminate may be required.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. **Information on physical and chemical properties**

Appearance	White to light beige liquid	
Odour	Characteristic	
Odour threshold	Not determined	
pH	Undiluted: 7.6 at 25°C	
Melting point/freezing point	Not determined	
Initial boiling point and boiling range	Not determined	
Flash point	> 100°C	
Evaporation rate	Not determined	
Flammability (solid/gas)	Not applicable (liquid)	
Upper/lower flammability or explosive limits	Not determined	
Vapour pressure	**Paclobutrazol**	: 1.9 x 10^{-6} Pa at 20°C
Vapour density	Not determined	
Relative density	Not determined	
	Density: 1.06 g/ml at 20°C	
Solubility(ies)	Solubility of **paclobutrazol** at 20°C in:	
	ethyl acetate	45.1 g/l
	n-heptane	0.199 g/l
	water	24.8 mg/l
Partition coefficient n-octanol/water	**Paclobutrazol**	: log K_{ow} = 3.11 at 23°C

Autoignition temperature	Not determined
Decomposition temperature	Not determined
Viscosity	Not determined
Explosive properties	Not explosive
Oxidising properties	Not oxidising

9.2. **Other information**

Miscibility ..... The product is dispersible in water.

SECTION 10: STABILITY AND REACTIVITY

10.1. **Reactivity** ..... To our knowledge, the product has no special reactivities.

10.2. **Chemical stability** ..... The product is stable during normal handling and storage at ambient temperatures.

10.3. **Possibility of hazardous reactions** None known.

10.4. **Conditions to avoid** ..... Heating of the product will produce harmful and irritant vapours.

10.5. **Incompatible materials** ..... Strong acids and alkalis.

10.6. **Hazardous decomposition products** See subsection 5.2.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. **Information on toxicological effects** * = Based on available data, the classification criteria are not met.

Product

Acute toxicity		The product is not considered harmful by single exposure. * The acute toxicity is estimated as:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: > 5000 mg/kg
		LD_{50}, oral, guinea pig: 2000 - 3000 mg/kg
		LD_{50}, oral, rabbit: 3000 - 4000 mg/kg
	- skin	LD_{50}, dermal, rat: > 2000 mg/kg
	- inhalation	LC_{50}, inhalation, rat: > 5.0 mg/l/4 h
Skin corrosion/irritation		Not expected to be irritating to skin. *
Serious eye damage/irritation		May be irritating to eyes.
Respiratory or skin sensitisation ...		Not expected to be sensitising. *
Germ cell mutagenicity		The product contains no ingredient known to be mutagenic. *
Carcinogenicity		The product contains no ingredient known to be carcinogenic. *
Reproductive toxicity		The active ingredient paclobutrazol is suspected of harming the unborn child.
STOT – single exposure		To our knowledge, specific effects after single exposure have not been observed. *
STOT – repeated exposure		The following has been found for the active ingredient paclobutrazol: Target organ: liver

NOAEL: 250 ppm (20 mg/kg bw/day) in a 90-day rat study (method OECD 408) based on increased body weight in females. *

Aspiration hazard ..... The product does not present an aspiration pneumonia hazard. *

Symptoms and effects, acute and delayed: To our knowledge, signs of adverse effects in humans have not been reported. When the active ingredient was fed to animals, only non-specific symptoms were seen.

Paclobutrazol

Toxicokinetics, metabolism and distribution: Paclobutrazol is rapidly absorbed and excreted. It is mainly distributed to the liver and almost completely metabolised. There is no evidence of accumulation.

Acute toxicity ..... Paclobutrazol is harmful by ingestion and inhalation. The acute toxicity is measured as:

Route(s) of entry - ingestion: LD_{50}, oral, rat (male): 1954 mg/kg (method OECD 401)

LD_{50}, oral, rat (female): 1336 mg/kg

LD_{50}, oral, guinea pig: 542 mg/kg

LD_{50}, oral, rabbit: 835 mg/kg

- skin: LD_{50}, dermal, rat: > 2000 mg/kg (method OECD 402) *

- inhalation: LC_{50}, inhalation, rat (male): 4.79 mg/l/4 h (method OECD 403)

LC_{50}, inhalation, rat (female): 3.13 mg/l/4 h

Skin corrosion/irritation ..... Very slightly irritating to skin (method OECD 404). *

Serious eye damage/irritation ..... Not irritating to eyes (method OECD 405). *

Respiratory or skin sensitisation ... Not a skin sensitizer (method OECD 406). *

1,2-Benzisothiazol-3(2H)-one

Acute toxicity ..... The substance is harmful by ingestion.

Route(s) of entry - ingestion: LD_{50}, oral, rat (male): 670 mg/kg

LD_{50}, oral, rat (female): 784 mg/kg
(method OPPTS 870.1100, measured on 73% solution)

- skin: LD_{50}, dermal, rat: > 2000 mg/kg *
(method OPPTS 870.1200, measured on 73% solution)

- inhalation: LC_{50}, inhalation, rat: not available

Skin corrosion/irritation ..... Slightly irritating to skin (method OPPTS 870.2500).

Serious eye damage/irritation ..... Severely irritating to eyes (method OPPTS 870.2400).

Respiratory or skin sensitisation ... Moderate dermal sensitizer to guinea pigs (method OPPTS 870.2600). The substance appears to be significantly more sensitising to humans.

SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity** ..... The product is very toxic to aquatic plants. It is harmful to algae, aquatic invertebrates and fish. It is considered as non-toxic to soil micro- and macroorganisms and birds.

The measured ecotoxicity of the active ingredient **paclobutrazol** is:

- Fish	Rainbow trout (*Salmo gairdneri*)	96-h LC_{50}: 27.8 mg/l 28-day NOEC: 3.3 mg/l
	Bluegill sunfish (*Lepomis macrochirus*)	96-h LC_{50}: 23.6 mg/l
- Invertebrates	Daphnids (*Daphnia magna*)	48-h EC_{50}: 35 mg/l 21-day NOEC: 0.32 mg/l
	Mysid shrimp (*Mysidopsis bahia*)	LC_{50}: > 9.0 mg/l
- Algae	Green algae (*Pseudokirchneriella subcapitata*) ..	96-h E_rC_{50}: > 15.2 mg/l
- Plants	Duckweed (*Lemna gibba*)	7-day E_rC_{50}: 0.0283 mg/l
- Birds	Mallard duck (*Anas platyrhynchos*)	LD_{50}: > 7913 mg/kg
- Earthworms	*Eisenia fetida*	14-day LC_{50}: 1000 mg/kg soil
- Insects	Honeybees (*Apis mellifera*)	48-h LD_{50}, oral: > 2 µg/bee 48-h LD_{50}, contact: > 40 µg/bee

12.2. **Persistence and degradability** .... **Paclobutrazol** can be persistent in the environment. Primary degradation half-lives vary with circumstances but are generally several months in aerobic soil and water. Degradation occurs microbiologically.

The product contains minor amounts of not readily biodegradable components, which may not be degradable in waste water treatment plants.

12.3. **Bioaccumulative potential** ..... See section 9 for octanol-water partition coefficient.

Paclobutrazol has a low potential to bioaccumulate. The measured bioaccumulation factor (BCF) is 44 for whole fish.

12.4. **Mobility in soil** ..... Under normal conditions, **paclobutazol** is of moderate mobility in soil.

12.5. **Results of PBT and vPvB assessment** ..... None of the ingredients meets the criteria for being PBT or vPvB.

12.6. **Other adverse effects** ..... Other relevant hazardous effects in the environment are not known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. **Waste treatment methods** ..... Remaining quantities of the material and empty but unclean packaging should be regarded as hazardous waste.

Disposal of waste and packagings must always be in accordance with all applicable local regulations.

Disposal of product ..... The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing.

Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

It is recommended to consider possible ways of disposal in the following order:
1. Reuse or recycling should first be considered. Reuse is prohibited except by the authorisation holder. If offered for recycling, containers

Disposal of packaging .....

must be emptied and triply rinsed (or equivalent). Do not discharge rinsing water to sewer systems.
2. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.
3. Delivery of the packaging to a licensed service for disposal of hazardous waste.
4. Disposal in a landfill or burning in open air should only occur as a last resort. For disposal in a landfill, containers should be emptied completely, rinsed and punctured to make them unusable for other purposes. If burned, stay out of smoke.

SECTION 14: TRANSPORT INFORMATION

ADR/RID/IMDG/IATA/ICAO classification

14.1.	**UN number**	3082
14.2.	**UN proper shipping name**	Environmentally hazardous substance, liquid, n.o.s. (paclobutrazol)
14.3.	**Transport hazard class(es)**	9
14.4.	**Packing group**	III
14.5.	**Environmental hazards**	Marine pollutant
14.6.	**Special precautions for user**	Avoid any unnecessary contact with the product. Misuse can result in damage to health. Do not discharge to the environment.
14.7.	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code**	The product is not transported in bulk by ship.

SECTION 15: REGULATORY INFORMATION

15.1. **Safety, health and environmental regulations/legislation specific for the substance or mixture**

Seveso category (Dir. 2012/18/EU): dangerous for the environment

The employer shall assess any risks to the safety or health and any possible effect on the pregnancies or breastfeeding of workers and decide what measures should be taken (Dir. 92/85/EEC).

Young people under the age of 18 are not allowed to work with the product.

All ingredients are covered by EU chemical legislation.

15.2. **Chemical safety assessment** ..... A chemical safety assessment is not required to be included for this product.

SECTION 16: OTHER INFORMATION

List of abbreviations .....

AIHA	American Industrial Hygiene Association
CAS	Chemical Abstracts Service
Dir.	Directive
DNEL	Derived No Effect Level
EC	European Community
EC_{50}	50% Effect Concentration
E_rC_{50}	50% Effect Concentration based on growth
EINECS	European INventory of Existing Commercial Chemical

	Substances
GHS	Globally Harmonized classification and labelling System of chemicals, Fifth revised edition 2013
HSE	Health & Safety Executive, UK
IBC	International Bulk Chemical code
ISO	International Organisation for Standardization
IUPAC	International Union of Pure and Applied Chemistry
LC_{50}	50% Lethal Concentration
LD_{50}	50% Lethal Dose
MAK	Maximale Arbeitspaltz-Konzentration
MARPOL	Set of rules from the International Maritime Organisation (IMO) for prevention of sea pollution
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effects Concentration
n.o.s.	Not otherwise specified
OECD	Organisation for Economic Cooperation and Development
OPPTS	Office of Prevention, Pesticides & Toxic Substances
PBT	Persistent, Bioaccumulative, Toxic
PNEC	Predicted No Effect Concentration
Reg.	Registration, or Regulation
SC	Suspension Concentrate
STOT	Specific Target Organ Toxicity
vPvB	very Persistent, very Bioaccumulative
WEEL	Workplace Environmental Exposure Limit
WEL	Workplace Exposure Limit
WHO	World Health Organisation

References ..... Data on ingredients are available from published literature and can be found several places.

Method for classification ..... Calculation rules

Used hazard statements .....

H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361d	Suspected of damaging the unborn child.
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects.
EUH208	Contains 1,2-benzisothiazol-3(2H)-one. May produce an allergic reaction.
EUH401	To avoid risks to human health and the environment, comply with the instructions of use.

Advice on training ..... This material should only be used by persons who are made aware of its hazardous properties and have been instructed in the required safety precautions.

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 given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The above information relates only to the specific material(s) designated herein and may not be valid for such material(s) used in combination with any other materials or in any process or if the material is altered or processed, unless specified in the text.