OzCrop Isoxaflutole 750 WG Herbicide
OzCrop Pty Ltd

Chemwatch Hazard Alert Code: **2**

Chemwatch: **5339-79**
Version No: **3.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **01/11/2019**
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S.GHS.AUS.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	OzCrop Isoxaflutole 750 WG Herbicide
Synonyms	APVMA Code: 81887
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains isoxaflutole)
Other means of identification	Not Available

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

Relevant identified uses	Agricultural herbicide.

Details of the supplier of the safety data sheet

Registered company name	**OzCrop Pty Ltd**
Address	G13/25 Solent Circuit Norwest NSW 2153 Australia
Telephone	(02) 8123 0170
Fax	(02) 8123 0171
Website	http://www.ozcrop.com.au
Email	orders@ozcrop.com.au

Emergency telephone number

Association / Organisation	**In Transport Emergency DIAL 000**
Emergency telephone numbers	1800 033 111 (24 hours - Australia wide)
Other emergency telephone numbers	Not Available

SECTION 2 Hazards identification

Classification of the substance or mixture

Poisons Schedule	S5
Classification [1]	Skin Corrosion/Irritation Category 2, Carcinogenicity Category 2, Reproductive Toxicity Category 2, Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation), Chronic Aquatic Hazard Category 1
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

Label elements

Hazard pictogram(s)	
Signal word	**Warning**

Hazard statement(s)

H315	Causes skin irritation.
H351	Suspected of causing cancer.
H361d	Suspected of damaging the unborn child.
H335	May cause respiratory irritation.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P271	Use only outdoors or in a well-ventilated area.

Page 1 continued...

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P261	Avoid breathing dust/fumes.
P273	Avoid release to the environment.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/attention.
P321	Specific treatment (see advice on this label).
P362	Take off contaminated clothing and wash before reuse.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P391	Collect spillage.
P302+P352	IF ON SKIN: Wash with plenty of water.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P332+P313	If skin irritation occurs: Get medical advice/attention.

Precautionary statement(s) Storage

P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
141112-29-0	>60	isoxaflutole
Not Available		(750g/kg)
Not Available	balance	Ingredients determined not to be hazardous

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	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. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ For advice, contact a Poisons Information Centre or a doctor at once. ▸ Urgent hospital treatment is likely to be needed. ▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Transport to hospital or doctor without delay.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- Water spray or fog.
- Foam.
- Dry chemical powder.

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- BCF (where regulations permit).
- Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility	‣ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves in the event of a fire. ‣ Prevent, by any means available, spillage from entering drains or water courses. ‣ Use fire fighting procedures suitable for surrounding 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.
Fire/Explosion Hazard	‣ Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions. ‣ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions). ‣ 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 (420 micron or less) may burn rapidly and fiercely if ignited - particles exceeding this limit will generally not form flammable dust clouds; once initiated, however, larger particles up to 1400 microns diameter will contribute to the propagation of an explosion. ‣ In the same way as gases and vapours, dusts in the form of a cloud are only ignitable over a range of concentrations; in principle, the concepts of lower explosive limit (LEL) and upper explosive limit (UEL) are applicable to dust clouds but only the LEL is of practical use; - this is because of the inherent difficulty of achieving homogeneous dust clouds at high temperatures (for dusts the LEL is often called the "Minimum Explosible Concentration", MEC). ‣ When processed with flammable liquids/vapors/mists,ignitable (hybrid) mixtures may be formed with combustible dusts. Ignitable mixtures will increase the rate of explosion pressure rise and the Minimum Ignition Energy (the minimum amount of energy required to ignite dust clouds - MIE) will be lower than the pure dust in air mixture. The Lower Explosive Limit (LEL) of the vapour/dust mixture will be lower than the individual LELs for the vapors/mists or dusts. ‣ A dust explosion may release of large quantities of gaseous products; this in turn creates a subsequent pressure rise of explosive force capable of damaging plant and buildings and injuring people. ‣ Usually the initial or primary explosion takes place in a confined space such as plant or machinery, and can be of sufficient force to damage or rupture the plant. If the shock wave from the primary explosion enters the surrounding area, it will disturb any settled dust layers, forming a second dust cloud, and often initiate a much larger secondary explosion. All large scale explosions have resulted from chain reactions of this type. ‣ 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. ‣ All movable parts coming in contact with this material should have a speed of less than 1-meter/sec. ‣ A sudden release of statically charged materials from storage or process equipment, particularly at elevated temperatures and/ or pressure, may result in ignition especially in the absence of an apparent ignition source. ‣ One important effect of the particulate nature of powders is that the surface area and surface structure (and often moisture content) can vary widely from sample to sample, depending of how the powder was manufactured and handled; this means that it is virtually impossible to use flammability data published in the literature for dusts (in contrast to that published for gases and vapours). ‣ Autoignition temperatures are often quoted for dust clouds (minimum ignition temperature (MIT)) and dust layers (layer ignition temperature (LIT)); LIT generally falls as the thickness of the layer increases. Combustion products include: carbon monoxide (CO) carbon dioxide (CO2) hydrogen fluoride nitrogen oxides (NOx) sulfur oxides (SOx) other pyrolysis products typical of burning organic material.
HAZCHEM	2Z

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	‣ Clean up waste regularly and abnormal spills immediately. ‣ Avoid breathing dust and contact with skin and eyes. ‣ Wear protective clothing, gloves, safety glasses and dust respirator. ‣ Use dry clean up procedures and avoid generating dust. ‣ Vacuum up or sweep up. **NOTE:** Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use). ‣ Dampen with water to prevent dusting before sweeping. ‣ Place in suitable containers for disposal. Environmental hazard - contain spillage.
Major Spills	Environmental hazard - contain spillage. Moderate hazard. ‣ **CAUTION**: Advise personnel in area. ‣ Alert Emergency Services and tell them location and nature of hazard.

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	▸ 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.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe 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 storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. ▸ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ▸ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame. ▸ Establish good housekeeping practices. ▸ Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. ▸ Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a "secondary" explosion. According to NFPA Standard 654, dust layers 1/32 in.(0.8 mm) thick can be sufficient to warrant immediate cleaning of the area. ▸ Do not use air hoses for cleaning. ▸ Minimise dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used. ▸ Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition. ▸ Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance. ▸ Do not empty directly into flammable solvents or in the presence of flammable vapors. ▸ The operator, the packaging container and all equipment must be grounded with electrical bonding and grounding systems. Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges. 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.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry area protected from environmental extremes. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. For major quantities: ▸ Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams}. ▸ Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Polyethylene or polypropylene container. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents ▸ Avoid strong acids, bases.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
OzCrop Isoxaflutole 750 WG Herbicide	Not Available	Not Available	Not Available	Not Available

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Ingredient	Original IDLH	Revised IDLH
isoxaflutole	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
isoxaflutole	E	≤ 0.01 mg/m³
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

Exposure controls

Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.
An approved self contained breathing apparatus (SCBA) may be required in some situations.
Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
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 favourable to capture	1: Disturbing room air currents
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 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 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.

Personal protection

Eye and face protection

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

Skin protection

See Hand protection below

Hands/feet protection

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

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	· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. · Contaminated gloves should be replaced. As defined in ASTM F-739-96 in any application, gloves are rated as: · Excellent when breakthrough time > 480 min · Good when breakthrough time > 20 min · Fair when breakthrough time < 20 min · Poor when glove material degrades For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended. It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: · Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. · Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. 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. ▸ fluorocaoutchouc. ▸ polyvinyl chloride. Gloves should be examined for wear and/ or degradation constantly.
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. ▸ Skin cleansing cream. ▸ Eye wash unit.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- 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 protection. 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.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Off white columnar granules with no odour; disperses in water.

Physical state	Divided Solid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Applicable
pH (as supplied)	Not Applicable	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Applicable

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Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Negligible
Vapour pressure (kPa)	Negligible	**Gas group**	Not Available
Solubility in water	Partly miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. 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. If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Open cuts, abraded or irritated skin should not be exposed to this material 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.
Eye	There is some evidence to suggest that this material can cause eye irritation and damage in some persons.
Chronic	There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Based on experience with animal studies, exposure to the material may result in toxic effects to the development of the foetus, at levels which do not cause significant toxic effects to the mother. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. 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.

OzCrop Isoxaflutole 750 WG Herbicide	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
isoxaflutole	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[2]	Eye (rabbit): mild *
	Oral (rat) LD50: 5000 mg/kg[2]	Skin (rabbit): slight *
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

ISOXAFLUTOLE	Does not exhibit sensitisation potential * *EPA Pesticide Fact Sheet (September 1998) The main mechanisms of action of 4-hydroxyphenylpyruvate dioxygenase (HPPD) inhibitors are the development of tyrosinemia and alterations in thyroid hormone level as a result of hepatic enzyme induction. The main target organs of its action are the eyes, liver and thyroid gland. It was proved that the most adequate model for extrapolation of the effects of tyrosinemia on humans are mice, because their tyrosine aminotransferase activity level is similar to that in humans. Based on the parameters of acute oral toxicity and dermal toxicity, all the examined herbicides are classified into toxicity class 4 (low-risk). The majority are moderately hazardous or toxic only by inhalation (Class 2 or 3); only pyrazoxyphen is extremely hazardous (Class 1). It was found that in subchronic and chronic experiments the magnitudes of subthreshold doses for male and female rats do not differ. However, the severity and range of symptoms in males are much larger, confirming their greater sensitivity to the negative impact of 4-HPPD inhibitors In particular, changes in most of the studied parameters in females occur at dose levels which are one or two times higher than that of males. Some toxicologically significant effects in females are absent. It was also discovered in subchronic and chronic experiments that the major target organs under the action of 4-HPPD inhibitors are the liver (hepatocellular hypertrophy in rats and mice), thyroid gland (follicular cell hypertrophy in rats and dogs), and the eye (corneal opacity and chronic keratitis in rats)

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The severity of tyrosinemia provoked by 4-HPPD inhibitors depends on the tyrosine aminotransferase (TAT) activity which in mice is 3-5 times higher, and the level of tyrosinemia is lower than in rats At the inhibition of 4-HPPD action, TAT becomes the main enzyme catalyzing the conversion of tyrosine. However, in rats, especially males, the activity of this enzyme is insufficient for tyrosinemia occurrence and to maintain the level of tyrosine which would be below toxic level.
TAT is the first and dose-dependent enzyme in the cascade of tyrosine conversion into 4-hydroxyphenylpyruvate (4-HPP), which then converts into homogentisic acid with the help of 4-HPPD. If this pathway is limited due to the inhibition of 4-HPPD, its substrate 4-HPP is excreted in the urine directly, or turned into other phenolic acids (e.g. p-hydroxyphenylacetic acid), before excretion with the urine. Since the reaction involving TAT is reversible, the 4-HPP may again convert into tyrosine. Severe tyrosinemia in rats leads to the occurrence of so-called critical effects – eye damage In contrast, in mice, 4-HPPD inhibition develops to a much lesser degree due to the higher basal TAT activity and, consequently, much lower tyrosinemia, that does not lead to the occurrence of critical effects. TAT activity in mice and in humans is at the same level, but is much higher than in rats, suggesting that humans will not develop such a severe tyrosinemia as rats. These arguments suggest that the extrapolation of tyrosinemia caused by 4-HPPD inhibitors in rats to human s is not justified.
There are three ways of tyrosine metabolism in mammals:
1) in the liver – converting it into 4-hydroxyphenylpyruvate (4-HPP) with the help of TAT, followed by decarboxylation to homogentisate which, in turn, then converts into acetylacetate and fumarate;
2) in the nervous tissue – conversion using tyrosine hydroxylase to 3,4-dihydroxyphenylalanine (DOPA) and conversion to dopamine by DOPA-decarboxylase participation, formation of norepinephrine and epinephrine;
3) in melanocytes – dopaquinone is formed from DOPA which is then spontaneously converted to melanin.
The pesticides only affects the first pathway of tyrosine metabolism.
Antonenko et al: Mechanism of action of 4-hydroxyphenylpyruvate dioxygenase inhibitor herbicide on homoterm animals and humans Journal of Pre-clinical and Clinical Research 9 149-154: December 2015
http://www.researchgate.net/publication/287390485_Mechanism_of_action_of_4-hydroxyphenylpyruvate_dioxygenase_inhibitor_herbicide_on_homoterm_animals_and_humans/citation/download
The inhibition of the enzyme 4-hydroxyphenylpyruvate dioxygenase (HPPD), the second enzyme in the tyrosine catabolic pathway, results in excess plasma tyrosine (tyrosinemia). When HPPD is completely inhibited, the clearance of excess tyrosine is dependent upon catabolism by the first and rate-limiting enzyme in the catabolic pathway, tyrosine aminotransferase (TAT) and elimination of the products of this catabolism via the urine.
Investigation of the effects of HPPD inhibition, as it relates to herbicides frequently employs rodents in experimental models..
The inherent activity of TAT is low in rats (in contrast to humans) and hence they catabolize tyrosine slowly and accumulate tyrosine to very high concentrations in plasma which results in a spectrum of adverse effects that are related to excess tyrosine. There is a large database showing a positive correlation between a range of biological endpoints and elevations in plasma tyrosine. Although plausible in humans, the extent and duration of plasma tyrosine elevation in humans is not sufficient to cause adverse effects resulting from the intended use of HPPD herbicides.
In laboratory animals, treatment with nitisinone (an HPPD inhibitor of the triketone class) leads to the elevation of plasma tyrosine (tyrosinaemia). In rats and Beagle dogs, repeat low-dose exposure to nitisinone leads to corneal opacities whilst similar studies in the mouse and Rhesus monkey showed no comparable toxicities or other treatment related findings. The differences in toxicological sensitivities have been related to the upper limit of the concentration of tyrosine that accumulates in plasma, which is driven by the amount/activity of tyrosine aminotransferase (TAT).
Dysregulation of enzymes involved in the phenylalanine-tyrosine (Phe-Tyr) catabolic pathway is linked to various human diseases. As an example,deficiency of the TAT enzyme caused by mutations in the TAT gene is found in type II tyrosinemia (Richner-Hanhart syndrome), an autosomal recessive inherited disease.The disease is characterized by hypertyrosinemia (elevated levels of tyrosine) with eye-skin (oculocutaneous) manifestations and, in some cases, mental retardation. Management of the disease includes dietary restriction of phenylalanine and tyrosine. Such a controlled diet allows lowering of plasma Tyr levels and rapid resolution of the oculocutaneous manifestations, though the effects on CNS are less clear..
Moreover, deficiency of HPPD caused by mutations in the 4-hydroxyphenylpyruvate dioxygenase (HPD) gene is responsible for type III tyrosinemia, where the accumulation of 4-hydroxyphenylpyruvate (HPP) might eventually lead to elevated blood Tyr levels due to reversibility of the TAT-catalyzed reaction. The disease is characterized by mild hypertyrosinemia and variable clinical picture
Increased blood tyrosine amounts and consequent ocular manifestations are found also in T1T and in alkaptonuria patients treated with nitisinone (NTBC). Both T1T and alkaptonuria are metabolic diseases arising from defects downstream of production of homogentisate (HGA) in the Tyr degradation pathway. In particular, mutations affecting the activity of the enzyme fumarylacetoacetate hydrolase (FAH) cause Type I tyrosinemia (T1T), a fatal disease with autosomal recessive inheritance.The inability of fumarylacetoacetate hydrolase (FAH), an enzyme downstream of HPPD, to finalize the Tyr metabolic pathway leads to the nonenzymatic reduction of both fumarylacetoacetate and its precursor maleylacetoacetate into succinylacetoacetate, which is in turn decarboxylated to give succinylacetone The last two compounds accumulate in high amounts in the liver and kidneys, affecting cellular morphology and organ architecture because of altered redox equilibria. Hepatotoxicity, hepatic lesions, failure, and cirrhosis, as well as primary liver cancer can occur. The mutagenic effects of fumarylacetoacetate may contribute to the initiation steps that lead to cancer.
Alkaptonuria is consequent to gene mutations that cause the inability of the enzyme homogentisate dioxygenase (HGD) to catabolize homogentisate (HGA), which then accumulates. Evidence suggests that homogentisate can undergo oxidation into the corresponding benzoquinone derivative (benzoquinone acetate, BQA) whose polymerization yields a black pigment found in connective tissues and urine of affected individuals . Deposition of such a black pigment (a phenomenon known asochronosis) causes dramatic degeneration of connective tissues in affected organs, mainly joints and cardiac valves, although any tissue expressing HGD may be involved.
The application of nitisinone as a therapeutic agent for T1T also stimulated work on fumarylacetoacetate and its involvement in mutagenic changes hypothetically responsible for liver tumors in infancy and childhood.
Nitisinone has been evaluated in clinical trials for its efficacy and safety in alkaptonuria As expected, one major side effect found was a combined effect of accumulation of 4-hydroxyphenylpyruvate and its reconversion into Tyr, which was responsible for corneal opacity and ocular lesions very similar to those found in type II tyrosinemia.
A role for Nitisinone was hypothesized also for hawkinsinuria, a disease characterized by the presence of the unusual cyclic amino acid hawkinsin in urine. The HPD gene mutation responsible for hawkinsinuria in humans leads to loss of enzyme activity and production of hawkinsin through a quinolacetic acid intermediate . Hawkinsinuria is a temporary disease whose symptoms, described as failure or inability to thrive, disappear after the first 1-2 years of life.
Many of the currently available HPPD inhibitors, are characterized by a rapid inactivation of the enzyme and a long residence time. This means that the HPPD-inhibitor complex is formed very quickly, but it dissociates very slowly (quasi-irreversible inhibition). As a result of the rapid and persistent HPPD inactivation, an unbalanced ratio between suppressed production of homogentisate and high Tyr accumulation led to important side effects. In this context, a fine modulation of HPPD activity is required by means of compounds with reduced residence time. By this way, a partial reactivation of HPPD will guarantee a limited production of homogentisate and avoid too high levels of tyrosinemia. In particular, a rapid complex dissociation will result in the desired pharmacology, while prolonged residence time will cause unwanted effects.
Santucci et al: 4-Hydroxyphenylpyruvate Dioxygenase and Its Inhibition in Plants and Animals: Small Molecules as Herbicides and Agents for the Treatment of Human Inherited Disease: Jnl Medicinal Chemistry: January 2017
http://www.aimaku.it/documenti/lavori/Santucci_JMC_2017.pdf
It is widely accepted that markedly elevated tyrosine in rats is a direct consequence of HPPD inhibition; therefore, the ocular effects observed following exposure to HPPD inhibitors is due to elevated tyrosine. The observed increased incidences of corneal keratitis and regenerative hyperplasia in rats but parallel the increases in tyrosine, which are maximal at dietary concentrations of = 500 ppm. Additionally, it has been noted previously with another HPPD inhibiting herbicide that mice tended to be less susceptible to the toxicity of the herbicide, with a lack of ocular effects up to the limit dose of 1000 mg/kg bw/d and rats are more susceptible. .
A review of the literature revealed that evidence from human cases of hereditary diseases that affect tyrosine metabolism indicates that corneal opacity is observed in human with plasma tyrosine concentration of approximately 3000 nmol/mL. This can be considered to be the threshold of plasma tyrosine concentration for ocular effects in humans and in the event of complete inhibition of HPPD, this threshold is unlikely to be exceeded in humans.
Additionally, it has also been reported in the literature that ocular lesions are seen in humans with tyrosinaemia type II who have a deficiency in the enzyme tyrosine aminotransferase, and high tyrosine levels. In contrast, exposure of humans with tyrosinaemia type I who have a deficiency

Continued...

	in the enzyme fumarylacetoacetate hydrolase, to the pharmaceutical compound nitisinone (NTBC) which is a complete HPPD inhibitor, does not result in the same marked elevation in tyrosine levels and does not cause ocular toxicity similar to that seen in the rat. While under treatment for tyrosinaemia type I dietary restriction to prevent significant tyrosine elevation is recommended, NTBC has also been used in clinical trials for alkaptonuria, another metabolic defect in the tyrosine catabolic pathway, without any dietary restriction and 1/40 patients developed corneal opacity which was reversed following discontinuation of treatment. Therefore, there is evidence that although humans can develop ocular lesions when tyrosine levels are highly elevated for prolonged periods of time, as is the case in tyrosinaemia type II, the administration of HPPD inhibitors, at doses which are intended to completely inhibit the HPPD enzyme rarely elevates tyrosine sufficiently to cause ocular lesions. Thus, in contrast to rats there is a substantially reduced risk of adverse ocular effects occurring in humans following exposure to HPPD inhibitors It is reported in the scientific literature that in the rat, free tyrosine can create conditions in the thyroid analogous to mild iodine deficiency, while the HPPD inhibitor NTBC has been used for the treatment of type I tyrosinaemia since 1991, with some patients therefore taking the drug for >20 years, and during this time there have been no reports of effects on thyroid function. Thus, it is clear that humans are significantly less sensitive than rats to elevated tyrosine levels due to HPPD inhibition and associated thyroid hormone disturbances that can lead to histopathological changes in the thyroid. No significant acute toxicological data identified in literature search. Isoxaflutole does not cause mutations, birth defects or reproductive toxicity. In animal testing, liver tumours occurred with long-term feeding. This was at doses far higher than any exposure envisaged by humans, and hence isoxaflutole presents a negligible, if any, increased cancer risk in humans. Isoxaflutole causes cancer in animals. Birth defects and developmental toxicity were also observed. There does not seem to be any adverse effects on reproduction.

Acute Toxicity	✗	**Carcinogenicity**	✓
Skin Irritation/Corrosion	✓	**Reproductivity**	✓
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✓
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✓ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

OzCrop Isoxaflutole 750 WG Herbicide	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
isoxaflutole	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. Otherwise: ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority.

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SECTION 14 Transport information

Labels Required

	
Marine Pollutant	
HAZCHEM	2Z

Land transport (ADG)

UN number	3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains isoxaflutole)
Transport hazard class(es)	Class: 9 Subrisk: Not Applicable
Packing group	III
Environmental hazard	Environmentally hazardous
Special precautions for user	Special provisions: 274 331 335 375 AU01 Limited quantity: 5 kg

Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082
are not subject to this Code when transported by road or rail in;
(a) packagings;
(b) IBCs; or
(c) any other receptacle not exceeding 500 kg(L).
- Australian Special Provisions (SP AU01) - ADG Code 7th Ed.

Air transport (ICAO-IATA / DGR)

UN number	3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. * (contains isoxaflutole)
Transport hazard class(es)	ICAO/IATA Class: 9 ICAO / IATA Subrisk: Not Applicable ERG Code: 9L
Packing group	III
Environmental hazard	Environmentally hazardous
Special precautions for user	Special provisions: A97 A158 A179 A197 Cargo Only Packing Instructions: 956 Cargo Only Maximum Qty / Pack: 400 kg Passenger and Cargo Packing Instructions: 956 Passenger and Cargo Maximum Qty / Pack: 400 kg Passenger and Cargo Limited Quantity Packing Instructions: Y956 Passenger and Cargo Limited Maximum Qty / Pack: 30 kg G

Sea transport (IMDG-Code / GGVSee)

UN number	3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains isoxaflutole)
Transport hazard class(es)	IMDG Class: 9 IMDG Subrisk: Not Applicable
Packing group	III
Environmental hazard	Marine Pollutant
Special precautions for user	EMS Number: F-A , S-F Special provisions: 274 335 966 967 969 Limited Quantities: 5 kg

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Continued...

SECTION 15 Regulatory information

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

isoxaflutole is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Chemical Footprint Project - Chemicals of High Concern List

National Inventory Status

National Inventory	Status
Australia - AIIC	No (isoxaflutole)
Australia Non-Industrial Use	No (isoxaflutole)
Canada - DSL	No (isoxaflutole)
Canada - NDSL	No (isoxaflutole)
China - IECSC	No (isoxaflutole)
Europe - EINEC / ELINCS / NLP	No (isoxaflutole)
Japan - ENCS	No (isoxaflutole)
Korea - KECI	No (isoxaflutole)
New Zealand - NZIoC	No (isoxaflutole)
Philippines - PICCS	No (isoxaflutole)
USA - TSCA	No (isoxaflutole)
Taiwan - TCSI	Yes
Mexico - INSQ	No (isoxaflutole)
Vietnam - NCI	Yes
Russia - ARIPS	No (isoxaflutole)
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	01/11/2019
Initial Date	24/12/2018

SDS Version Summary

Version	Issue Date	Sections Updated
3.1.1.1	01/11/2019	One-off system update. NOTE: This may or may not change the GHS classification

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

end of SDS