

RESTRICTED USE AGRICULTURAL REMEDY
THIS REMEDY IS RESTRICTED DUE TO ITS INCLUSION ON ANNEX III OF THE ROTTERDAM CONVENTION. THIS REMEDY MAY ONLY BE SOLD TO AND USED BY A REGISTERED PEST CONTROL OPERATOR, OR BY SOMEONE UNDER THE SUPERVISION OF A REGISTERED PEST CONTROL OPERATOR, AND ONLY FOR THOSE USES COVERED BY THE PEST CONTROL OPERATOR'S SCOPE OF REGISTRATION, AND ONLY AS DIRECTED ON THIS LABEL.

MARSHAL® 48 EC

SOUTH AFRICA Registration Number/Registrasie Nommer L3314, Act No. 36 of 1947/Wet 36 van 1947
NAMIBIA Registration Number/Registrasie Nommer N-AR0637

READ THE LABEL BEFORE USE
KEEP OUT OF REACH OF CHILDREN AND ANIMALS
RESTRICTED TO PROFESSIONAL USE

GROUP/GROEP	1A	INSECTICIDES	INSEKODODERS
A systemic insecticide and nematicide for the control of the pests mentioned on the crops listed.		'n Sisteemiese insek- en aalwurmdoder vir die beheer van plae soos vermeld op genoemde gewasse.	



HAZARD STATEMENTS:

- Toxic if swallowed or if inhaled
- May be fatal if swallowed and enters airways
- May cause an allergic skin reaction
- Causes serious eye irritation
- May cause respiratory irritation
- May cause drowsiness or dizziness
- Suspected of causing cancer
- Causes damage to organs
- Causes damage to organs through prolonged or repeated exposure
- Very toxic to aquatic life with long lasting effects

Physical Hazards

- Flammable liquid and vapor

PRECAUTIONARY STATEMENTS:

Prevention

- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
- No smoking
- Do not breathe mist or vapours
- Avoid release to the environment.
- Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection

Response

- **IF SWALLOWED:** Immediately call a **POISON CENTER/** doctor. Rinse mouth.
- IF exposed or concerned: Call a **POISON CENTER/** doctor. Do **NOT** induce vomiting.
- In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
- Collect spillage.

Storage

- Store in a well-ventilated place. Keep container tightly closed.

DANGER

Active ingredient
Carbosulfan (carbamate) – 480 g/L

Aktiewe bestanddeel
Karbosulfan (karbamaat) – 480 g/L

Net Volume

5L

Netto Volume

REGISTRATION HOLDER/REGISTRASIEHOUER:

FMC Chemicals (Pty) Ltd
Company Registration Number: 1988/001451/07
West End Office Park, Building C
Cnr West Ave & Hall Street, Centurion, 0014
www.ag.fmc.com/za/en

Batch Number
Date of Manufacture
Expiry Date

Printed on Container
Printed on Container
2 Years from manufacture

Lot Nommer
Datum van Vervaardiging
Vervaldatum

UN Number/VN Nommer

2991

For any emergency or poisoning contact: Griffon Poison Information Centre (24 hrs) Vir enige noodgeval of vergiftiging kontak Griffon vergiftiging Inligtingsentrum (24 hr)	+27-(0)-82-446-8946
Poison Center Helpline	0861 555 777

WARNINGS:

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- **Physical Hazards**
Flammable liquid and vapor

- **DO NOT APPLY WITHIN 84 DAYS OF HARVEST OF GRAPES**
- **DO NOT APPLY AFTER TASSELS ARE ENCLOSED BY THE FLAG LEAF STAGE IN MAIZE AND SWEETCORN**
- **DO NOT HARVEST SORGHUM WITHIN 28 DAYS AFTER TREATMENT**
- **DO NOT HARVEST ONIONS WITHIN 21 DAYS AFTER TREATMENT**
- **Do not allow animals to feed on treated plants within 12 weeks of application.**
- Handle with extreme care.
- Poisonous when absorbed through skin, swallowed or inhaled.
- Toxic to bees, fish and wildlife.
- Store under lock and key in a cool place away from food and feedstuffs.
- Keep out of reach of children, uninformed persons and animals.
- Under certain climatic conditions an application of **MARSHAL 480 EC** may cause a slight delay in emergence of the maize plant and this may be associated with temporary yellowing or scorching of the leaves.
- Re-entry interval: Do not enter treated area within 2 days after treatment unless wearing protective clothing.
- **FLAMMABLE**: Do not store near open flame
- In case of poisoning call a doctor and make this label available to him.
- Aerial application: Notify the inhabitants of the immediate area to be sprayed and issue the necessary warnings. Do not spray over or allow drift to contaminate adjacent areas. Adhere to the guidelines in the SANS Code of Practice 10118 for the aerial application of agricultural chemicals.
- Although Marshal 480 EC has been tested on most important cultivars and no significant phytotoxic effects have been recorded, this does not mean that a more susceptible cultivar cannot be commercialised in the future. Where new cultivars are encountered large areas should not be sprayed without prior testing of Marshal 480 EC on that cultivar.
- The withholding period or pre-harvest interval (PHI), i.e. number of days between last application and harvest, meets local maximum residue limits (MRL's), but may not necessarily meet all those for export crops. Before applying **MARSHAL® 48 EC** consult your local FMC representative.

DISCLAIMER:

Although this remedy has been extensively tested under a large variety of conditions the registration holder does not warrant that it will be efficacious under all conditions because the action and effect thereof may be affected by factors such as abnormal soil, climatic and storage condition; quality of dilution water, compatibility with other substances not indicated on the label and the occurrence of resistance of the pest against the remedy concerned as well as by the method, time and accuracy of application. the registration holder furthermore does not accept responsibility for damage to crops, vegetation the environment or harm to man or animal or for lack of performance of the remedy concerned due to the failure of the user to follow label instructions or to the occurrence of conditions which could not have been foreseen in terms of the registration. Consult the supplier in the event of any uncertainty.

PRECAUTIONS:

PRECAUTIONARY STATEMENTS:

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HAZARDOUS INGREDIENTS:

Carbosulfan (ISO)

Solvent Naphtha (Petroleum), light arom.

- Avoid contact with spray mist. Wear protected clothing – protective gloves, boots and face shield during mixing and application.
- Wash hands and face with soap and water after use and accidental skin contact.
- Do not eat, drink or smoke during application or before washing hands and face.
- Prevent drift of spray mist onto other crops, grazing, rivers, dams and areas not under treatment
- Clean applicator after use or before using with other remedies. Dispose of wash water where it will not contaminate crops, grazing, rivers or dams.
- Prevent contamination of food, feed, drinking water or eating utensils.
- **TRIPLE RINSE THE empty container as follows:** Invert the empty container over the spray or mixing tank and drain for at least 30 seconds after the flow has slowed down to dripping. Thereafter rinse the empty container *three times in succession* with one quarter of the container volume fresh water and decant the rinsate into the spray or mixing tank. Puncture the triple rinsed container and dispose of *via* an approved collector or recycler (www.croplife.co.za). Do not bury, burn or donate the container to any other parties that may use it as a container for food or beverages.

SYMPTOMS OF POISONING:

Headache, fatigue, faintness, giddiness, excessive sweating, nausea, abdominal pain, vomiting, muscle twitching, unusually small pupils, respiratory distress, coma.

FIRST AID TREATMENT:

Remove patient from source of poisoning and keep him quiet and reassured. Remove contaminated clothing and rinse contaminated body area thoroughly with plenty of soap and water. Do not rub skin. Flush contamination out of eyes with clean water for 15 minutes. If concentrate or water diluted mixture has been swallowed, do not induce vomiting – call a doctor. Vomiting should be supervised by a physician because of possible pulmonary damage by aspiration of the solvent.

NOTE TO PHYSICIAN:

The active ingredient is a reversible cholinesterase inhibitor. Administer atropine sulphate 2 – 4 mg intravenously, repeated at 10 minute intervals until atropinisation appears. Do not use oximes such as 2 – PAM. If in eye install one drop of homotropine.

MODE OF ACTION:

Conversion to Carbofuran which is itself a Cholinesterase inhibitor and acts as a systemic insecticide with contact and stomach action.

RESISTANCE WARNING:

For resistance management **MARSHAL 48 EC** is a group code 1A insecticide/nematicide. Any insect population may contain individuals naturally resistant to **MARSHAL 48 EC** and other group code 1A insecticides.

The resistant individuals can eventually dominate the insect population if these insecticides are used repeatedly.

These resistant insects may not be controlled by **MARSHAL 48 EC** or any other group code 1A insecticide.

To delay insecticide resistance:

- Avoid exclusive repeated use of insecticide from the same insecticide group code. Alternate or tank mix with products from different insecticide group codes.
- Integrate the control methods (chemical, cultural, biological) into insects control programmes.

For specific information on resistance management contact the registration holder of this product.

AERIAL APPLICATION:

Aerial application of this product may only be done by a registered Aerial Application Operator using a correctly calibrated, registered aircraft according to the instructions of SANS Code 10118 (Aerial Application of Agricultural Pesticides). It is important to ensure that the spray mixture is distributed evenly over the target area and that the loss of spray material during application is restricted to a minimum. It is therefore essential that the following criteria be met:

- Volume: A spray mixture volume of 30 litres per hectare is recommended. As this product has not been evaluated at a reduced volume rate, the registration holder cannot guarantee efficacy, or be held responsible for any adverse effects if this product is applied aerially at a lower volume rate than recommended above.
- Droplet coverage: A droplet coverage of 30 to 40 droplets per cm² must be recovered at the target.
- Droplet size: A droplet spectrum with a VMD of 250 to 280 microns is recommended. Limit the production of fine droplets less than 150 microns (high drift and evaporation potential) to a minimum.
- Flying height: The height of the spray boom should be maintained at 3 to 4 metres above the target. Do not spray when aircraft dives, is in a climb or when banking.
- Use suitable atomising equipment that will produce the desired droplet size and coverage, but which will ensure the minimum loss of product. The spray system must produce a droplet spectrum with the lowest possible Relative Span. Position all the atomisers within the inner 60 % to 75 % of the wingspan to prevent droplets from entering the wingtip vortices.
- The difference in temperature between the wet and dry bulb thermometers, of a whirling hygrometer, should not exceed 8°C.
- Stop aerial application if the wind speed exceeds 15 km/h.
- Stop aerial application under turbulent, unstable and dry conditions during the heat of the day.
- Aerial application under temperature inversion conditions (spraying in or above the inversion layer), and/or high humidity conditions (relative humidity 80% and above) may lead to the following:
 - a) Reduced efficacy due to suspension and evaporation of small droplets in the air (inadequate coverage).
 - b) Damage to other sensitive crops and/or non-target areas through the movement of the suspended spray cloud away from the target field.
- Ensure that the Aerial Application Operator knows exactly which fields to spray.

Obtain an assurance from the Aerial Spray Operator that the above requirements will be met and that relevant data will be compiled in a logbook and kept for future reference.

DIRECTIONS FOR USE: USE ONLY AS INDICATED.

METHODS OF APPLICATION:

A. Preventive treatment at planting time of maize

MARSHAL 48 EC should be applied in a small volume of water while planting is taking place. This requires the use of low pressure spraying equipment mounted on the tractor/planter. The equipment must be capable of applying low volumes of spray mixture and must be accurately calibrated.

The spray nozzles of the spray equipment should be mounted on a planter in such a way that a 50 mm wide band of spray mixture can be sprayed into the open planting furrow, before it is closed and compressed by the press wheel. It is preferable that the nozzle should be angled slightly backwards towards the press wheel so that some soil (5 – 10 mm) will have fallen over the seed by the time the spray mixture is sprayed into the furrow.

Calibration should be carried out as follows: -

- i) Determine the time which it takes the tractor and planter to cover 100 m when planting. This will be X minutes.

- ii) Add some clean water to the spray tank and run the spray equipment for X minutes as determined above, whilst simultaneously collecting water from each nozzle. All nozzles should deliver the same amount of liquid. Find the average delivery per nozzle. This gives Y ml in X minutes or Y ml per 100 m row length.
- iii) Divide the average delivery per nozzle into the volume of the spray tank x 1000 thus:-

$$\frac{\text{Volume of spray tank} \times 1000}{\text{Ave. delivery per nozzle in ml}} = \text{Number of rows of 100 meters which can be sprayed}$$
- iv) To find the amount of **MARSHAL 48 EC** to be added per tank load, one must multiply the Marshal 480 EC dosage required, viz. 50 ml/100 m row length or 40 ml/100 m row length, by the number of rows (determined above) that can be sprayed.
- v) Mix this amount of **MARSHAL 48 EC** with an equivalent amount of water. Mix thoroughly and pour into the spray tank. Top up the tank with clean water while agitating.

NOTE: Ensure that each nozzle delivers at least 450 ml over the 100 m distance. On this basis a spray tank with a capacity of 150 l will hold enough spray mixture for 3 ha of maize planted in 0,9 m rows.

PREVENTIVE TREATMENT:

CROP/PEST	APPLICATION RATE	REMARKS
MAIZE Nematodes <i>Protostrongylus</i> (ground weevils) Leafhopper (Vector of Streak Virus Disease) False wire worms	40ml / 100 m planting furrow in not less than 400 ml water	This treatment will only suppress black maize beetle and stalk borer
All of the pests listed above, plus Black maize beetle and Stalk borer	50 ml / 100 m planting furrow in not less than 400 ml water	This treatment will control Stalk borer for up to 6 weeks.

B. Corrective control of *Protostrongylus* (ground weevils) in maize

Apply **MARSHAL 48 EC** when the first signs of infestation on the young seedlings are noticed. The sprayer should be rigged up in such a way that each nozzle sprays a band 300 mm wide over the maize row. In order to achieve good coverage calibrate the sprayer to deliver 2 l of spray mixture per 100 m row length.

CROP/PEST	APPLICATION RATE	REMARKS
MAIZE <i>Protostrongylus</i> (ground weevils)	10ml in 2l water /100m row	Ground weevils will only be killed after feeding – limited insect damage can therefore still occur after application to young plant.

C. Early corrective control of 1st and 2nd generation maize stalk borer (*Busseola fusca*) and sorghum stalk borer (*Chilo partellus*) in maize, sorghum and sweetcorn

Apply **MARSHAL 48 EC** in tank mixture with a registered pyrethroid eg. **Fury 10 EW (L6696)**, **Sumi-Alpha 200 EC (L6452)** or **Sumi-Alpha 200 EW (L8821)** once the first signs of shot-hole damage are observed and not later than 10% of the plants show shot-hole damage on leaves. Follow all directions for use on the relevant pyrethroid label.

EARLY CORRECTIVE TREATMENT:

CROP/PEST	APPLICATION RATE/HA	REMARKS
MAIZE SORGHUM SWEETCORN Maize stalkborer (<i>Busseola fusca</i>) Sorghum stalk borer (<i>Chilo partellus</i>)	420 mℓ + 80 mℓ Fury 10 EW or + 50 mℓ Sumi-Alpha 200 EC or + 50mℓ Sumi-Alpha 200 EW	For optimal efficacy apply Marshal in tank mix with a registered pyrethroid as an early corrective spray against young larvae. Treatment must be applied before the larvae enter the stalks otherwise control will be adversely affected. Do not apply to plants that are drought stressed. Systemic activity declines in mature plants. Only apply to plants that are actively growing and no later than the stage when the tassels/ears are enclosed by the flag leaf. Ground application: Apply as an early corrective treatment in 300 ℓ/ha when young larvae are noticed and for stalk borer not later than when 10% of the plants show shot-hole damage. A second application 10 – 12 days later may be necessary when larvae are bigger than 10mm or re-infestation occurs. Aerial application: As above. Apply in 30 – 40 ℓ/ha.

D. Control of Aphids in Cotton.

Apply **MARSHAL 48 EC** as a full cover spray in sufficient water to thoroughly wet the foliage (ground application) and in a minimum of 30 l of water per hectare (aerial application).

CROP/PEST	APPLICATION RATE	REMARKS
COTTON Cotton aphid (<i>Aphis gossypii</i>)	Plants up to 60 cm in height – 500 mℓ/ha. Plants taller than 60 cm – 750 mℓ/ha	Commence spraying when aphids are noted in dry land cotton or when honeydew is noted in irrigation cotton.

E. Control of Budmite in grapevines.

Budmite migrate to new growth in the spring from their over wintering position, thus application is made during the migratory stage.

CROP/PEST	APPLICATION RATE	REMARKS
GRAPEVINES Budmite (<i>Colomerus vitis</i>)	50 mℓ/100 ℓ water	Apply three sprays. The first when shoots are 5 – 10 cm long. The second and third at 14 day intervals after the first.*

- NOTE:** Contact ARC-Infruitec Nietvoorbij for their latest recommendation.

F. Control of Thrips in onions

Apply **MARSHAL® 48 EC** as a full cover spray in sufficient water to thoroughly wet the foliage.

CROP/PEST	APPLICATION RATE	REMARKS
ONIONS Thrips (<i>Thrips tabaci</i>)	1000 ml/ha	Apply 4 applications, using a 7-day spray interval. Apply the first application at the beginning of infestation. The use of a registered adjuvant will improve efficacy.

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Sumi-Alpha® is the registered trademark of Sumitomo Chemical Company, Japan