

# CERTIS

Operator guide: **MOCAP<sup>®</sup> 15G**



**This guide is for operators of land-wheel driven granule applicators who will be applying and incorporating Mocap 15G prior to planting potato crops. It is primarily intended for those who will be using this product for the first time, but even if you have used the product before, it is good practice to refresh your knowledge in advance of the season.**

Although applicators are now available with electronic rate control for automatic calibration, there are still a significant number of land-wheel driven machines in use that have to be calibrated manually. While the general principles of calibration are the same for all granular insecticide/nematicide products, the machinery settings that must be used are specific to the chosen granule type and application rate. This guide takes you through the process of calibrating land-wheel driven machinery specifically for application and incorporation of Mocap 15G.

Certis is committed to ensuring accurate and safe use of all crop protection products so if, after working through this guide, you have any questions please call our technical hotline on 0044 (0)1223 894261 and we will be happy to help.

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## I. Product profile

Mocap 15G is a granular non-systemic insecticide/nematicide containing 15% w/w ethoprophos which is applied to the soil using recommended types of granule applicators for the reduction of wireworm damage and useful reduction in potato cyst nematode damage on all varieties of potatoes.

Maximum individual dose	40kg/ha
Maximum number of treatments	1 per crop
Latest time of application / harvest interval	Pre-planting of crop Do not harvest potatoes within 80 days of application

Mocap 15G contains 15% w/w ethoprophos and is supplied in 20kg Ultima returnable packs. Essential conditions of use are:

- It is a legal requirement that the operator is qualified to apply nematicides (NPTC PA4 or PA4G certification). It is the responsibility of farm management staff as well as the operator to ensure compliance;
- Read the product label and understand the environmental and operator safety statements prior to the season's work commencing;
- Completing COSHH (HSE website) and environmental risk assessments may suggest engineering solutions that will further minimise risk to both environment and operator;
- It is vital that the operator is aware of the need for accurate incorporation or placement in order to achieve optimum results.

Prior to use, growers must seek the latest stewardship recommendations. Always ensure work is carried out in compliance with the Code of Practice for using Plant Protection Products and the relevant product label. In addition, operators using Mocap 15G should follow Certis' operating instructions for the Ultima closed handling system.

By 2017 all staff applying nematicides shall have completed the additional Industry Stewardship Training module. Certification required.

If you require any further help or advice on the use of Mocap 15G or the Ultima system please call:

Certis hotline: **01223 894261**

Alternatively call us on **0845 3730305**. Lines open Monday to Friday 8.30 am to 5.00 pm.



## 2. Application and incorporation

### 2.1 Types of applicators

Application must comply with the directions for use on the Mocap 15G product label:

- Broadcast shortly before or during the final soil preparations before planting;
- Distribute evenly over the soil surface using a spreader calibrated to deliver the correct dose;
- Incorporate into the soil immediately following application.

Mocap 15G must only be applied through 'positive displacement type' specialist granule applicators: Horstine Farmery and Techneat manufacture appropriate applicators. Accurate application via orifice metering granule applicators is very difficult to achieve: these types of machines must not be used.

Before applying Mocap 15G machines must be individually calibrated for this product according to the manufacturer's settings. To calibrate your applicator you will need to know its manufacturer, model and metering drive type.

#### Horstine Farmery

Currently Horstine Farmery offer three types of applicator for overall application: Twin Air, TMAir, and Microband. There are also a significant number of TMA4 land-wheel driven applicators still in use, which are no longer manufactured and not appropriate for use under the new label guidelines.

The Twin Air applicator comes with hydraulic metering drive and RDS control for automatic calibration. Standard set-up for TMAir and Microband applicators is land-wheel drive but an optional upgrade to electric drive with RDS control is offered for automatic calibration. To calibrate applicators with RDS control, refer to manufacturer's instructions. Calibration of land-wheel driven TMAir and Microband applicators is covered by section 4 of this guide.



#### Techneat

Currently Techneat offer three types of applicator suitable for overall application: Maxicast, Microcast and Terracast GR. All come with electric metering drive and electronic rate control for automatic calibration. Techneat also produces Apcal cartridges for Horstine Microband. To calibrate the applicators, refer to the manufacturer's instructions.



#### Other applicator types

Mocap 15G should not be applied through any of the following applicator types:



- Planter-mounted in-furrow applicators e.g. Horstine Farmery Microband Air, Stocks Rotor Meter;
- Seeder-mounted applicators e.g. Matco, Microsem, Stanhay/Granyl;
- Fertiliser spreaders e.g. Nodet Gougis DPS12;
- TMA2 and TMA4 applicators - these applicators will allow granules to be left on the soil surface.

### 2.2 Incorporation methods

General guidelines: Incorporate Mocap 15G evenly to the depth of planting, normally 10 to 15cm. Deeper incorporation may reduce efficacy. One pass with a powered rotary cultivator is preferred. Where incorporation is made with stone separating equipment, efficacy will be reduced.

Nematicides must be applied and incorporated in the same operation. Efficacy will be reduced if not incorporated immediately.

Trial work has shown good results from application of Mocap 15G using Microband applicators on the bed-tiller or webbed stone separators. Certis does not recommend application on Star separators.

Ensure that application equipment has an effective shutoff system. This should be a pneumatic lift on the land-wheel, or clutch to disengage the rotor drive shaft.

This requirement is needed for stopping the application within three metres of the row end. This is so no granules are left on the headland soil surface.



#### Web separator

Mocap 15G can be incorporated via a webbed stone separator. Ensure the applicator is located as close to the front of the machine as possible. Incorporation via this method will result in a lower level of efficacy compared with a rotavator.

#### Rotavator

Rotavators are the most reliable way of incorporating nematicides to 15cm depth in the seedbed.

Rotavators with blades will do an adequate job, but those with spiked tines will give even better incorporation. Applicators are normally mounted on the rotavator to deliver the granules immediately in front of the rotating blades. This method ensures that granules are incorporated immediately after application.

#### Power harrow

This method is no longer approved for use.

#### Bed tiller

Applicators are normally mounted on the bed former to deliver the granules immediately in front of its rotating blades. This ensures granules are incorporated immediately.

Application should occur on the bed tiller if a star based separator is used for stone and clod separation. Do not place Microband hoppers on the bed tiller if stone and clod separation is done using a webbed machine, as there is a risk of incorporating the granules too deep.

- Mount fishtails vertically side by side to treat the full bed width;
- Beware of fouling the machine or dragging in soil;
- Angle slightly backwards to avoid blockage.



Combination machines may also be used, with the rotavator and granule applicator mounted at the front of the tractor, and the planter mounted at the rear.

Ensure that the planting depth is not excessively deeper (more than 25cm) than incorporation depth.

Mocap 15G users must ensure all granules are fully incorporated immediately and to the correct depth irrespective of the equipment used.



#### Star stone separators

Incorporation via a star stone separator is not approved.

### 2.3 Container handling

Before starting to apply granules, arrange a safe system of work for container handling.

Hoppers should be filled from a raised platform such as a trailer, positioned within easy reach of the hoppers. This will enable you to lift packs from waist height to avoid the risk of back strain and avoid climbing over machinery while handling the containers. Use one position in the field for filling the hoppers.

## 3. Calibration

### 3.1 Machinery settings

The output of Horstine Farmery land-wheel driven applicators is governed by three factors: size of rotors, drive combination and spacing of fishtails. Before checking output, ensure your machine has the correct settings. The tables on page 7 list advisory settings by machine type (Microband and TMAir) for application of Mocap 15G overall at 40kg/ha.

Currently machines are fitted with a chain and sprocket drive system. As illustrated below, the drive combination refers to the combination of sprockets fitted as 'driver' and 'driven'. Machines come with a full set of 'change sprockets' for accurate calibration.

The chain and sprocket system was introduced some years ago to give a more positive drive.

If you have an older Microband machine, this may still have the previous v-belt and pulley drive system. The principles of operation and calibration are identical, but the 'change pulleys' are designated by diameter in inches, rather than number of teeth. You may need to refer to the machine manufacturer for assistance in such cases.



Topshaft 'driven' sprocket

Land-wheel 'drive' sprocket

#### Microband – TMAir: 2 bed, 8 outlet

Four fishtail spreaders (10cm) per 1.83m bed (45.7cm spread per outlet).

Machine fitted with two-off 100l hoppers, four outlets per hopper.



#### Microband: gravity applicators

As fitted to cultivators when applying with 9" fishtails each spreading across a 12" (30.4cm) bandwidth.

Linear rate on 30.4cm per outlet 122g per 100m per outlet = 40kg/ha.

Standard rotor and drive setting	MOCAP 15G dose rate 40kg/ha	
8.5mm Rotor (1- rotor per outlet) 9-deep fluted alloy Pt. No. H094049	Chain drive	22T driving 34T
	Pulley drive	4.5" driving 7"
15mm Rotor (1- rotor per outlet) 18-fluted white nylon Pt. No. H094007	Chain drive	22T driving 34T
	Pulley drive	4.5" driving 7"
Cassette and drive setting	MOCAP 15G dose rate 40kg/ha	
Microband Cassette 2-outlet (Assy Pt. No.H762210) 13.5mm Rotor (1-rotor per outlet) 9-deep fluted alloy Pt. No. H094050	Chain drive	22T driving 34T
	Pulley drive	4.5" driving 7"
Microband Cassette 3-outlet (Assy Pt. No. H762240) 13.5mm Rotor (1-rotor per outlet) 9-deep fluted alloy Pt. No. H094050	Chain drive	22T driving 34T
	Pulley drive	4.5" driving 7"
Microband Cassette 2-outlet (Assy Pt. No. H762216) 4mm Rotor (2-rotors per outlet) 12-fluted stainless steel Pt. No. H094060	Chain drive	25T driving 22T
	Pulley drive	5" driving 4.5"
Microband Cassette 3-outlet (Assy Pt. No. H762245) 4mm Rotor (2-rotors per outlet) 12-fluted stainless steel Pt. No. H094060	Chain drive	25T driving 22T
	Pulley drive	5" driving 4.5"

**Important: If fishtails are at slightly different centres other than 30.4cm the overall rates will need adjusting according to the manufacturers' instructions.**

#### TMAir: pneumatic applicators

As fitted to 2/3 bed cultivators etc. applying with 10cm fishtails each spreading across a 45.7cm (18") band width.

Normally 4 fishtail spreaders (10cm) per 1.83m bed (72").

Two bed machines fitted with 2-off 100l hoppers and 4 outlets per hopper.

Three bed machines fitted with 2-off 100l hoppers and 6 outlets per hopper.

Linear rate on 45.7cm per outlet 183g per 100m per outlet = 40kg/ha.

Standard rotor and drive setting	MOCAP 15G dose rate 40kg/ha	
8.5mm Rotor (1-rotor per outlet) 9-deep fluted alloy Pt. No. H094049	Chain drive	28T driving 31T
	Pulley drive	4.5" driving 5"
15mm Rotor (1-rotor per outlet) 18-fluted white nylon Pt. No. H094007	Chain drive	22T driving 23T
	Pulley drive	4" driving 4"
Cassette and drive setting	MOCAP 15G dose rate 40kg/ha	
Microband Cassette 2-outlet (Assy Pt. No.H762210) 13.5mm Rotor (1-rotor per outlet) 9-deep fluted alloy Pt. No. H094050	Chain drive	22T driving 22T
	Pulley drive	4" driving 4"
Microband Cassette 3-outlet (Assy Pt. No. H762240) 13.5mm Rotor (1-rotor per outlet) 9-deep fluted alloy Pt. No. H094050	Chain drive	22T driving 22T
	Pulley drive	4" driving 4"
Microband Cassette 2-outlet (Assy Pt. No. H762216) 4mm Rotor (2-rotors per outlet) 12-fluted stainless steel Pt. No. H094060	Chain drive	31T driving 19T
	Pulley drive	7" driving 4"
Microband Cassette 3-outlet (Assy Pt. No. H762245) 4mm Rotor (2-rotors per outlet) 12-fluted stainless steel Pt. No. H094060	Chain drive	31T driving 19T
	Pulley drive	7" driving 4"

Please note that existing cassettes or cartridges, provided they are not worn, may be suitable for Mocap 15G granules. However, use the correct chain/pulley drives as recommended by the manufacturer. Finally, fully calibrate the equipment and test output from each outlet.

### 3.2 Checking output

Application rate should be checked by collecting and weighing the output over a measured area: 100m is an appropriate representative distance. By following the flow chart on the right, this information can be used to calculate application rate.

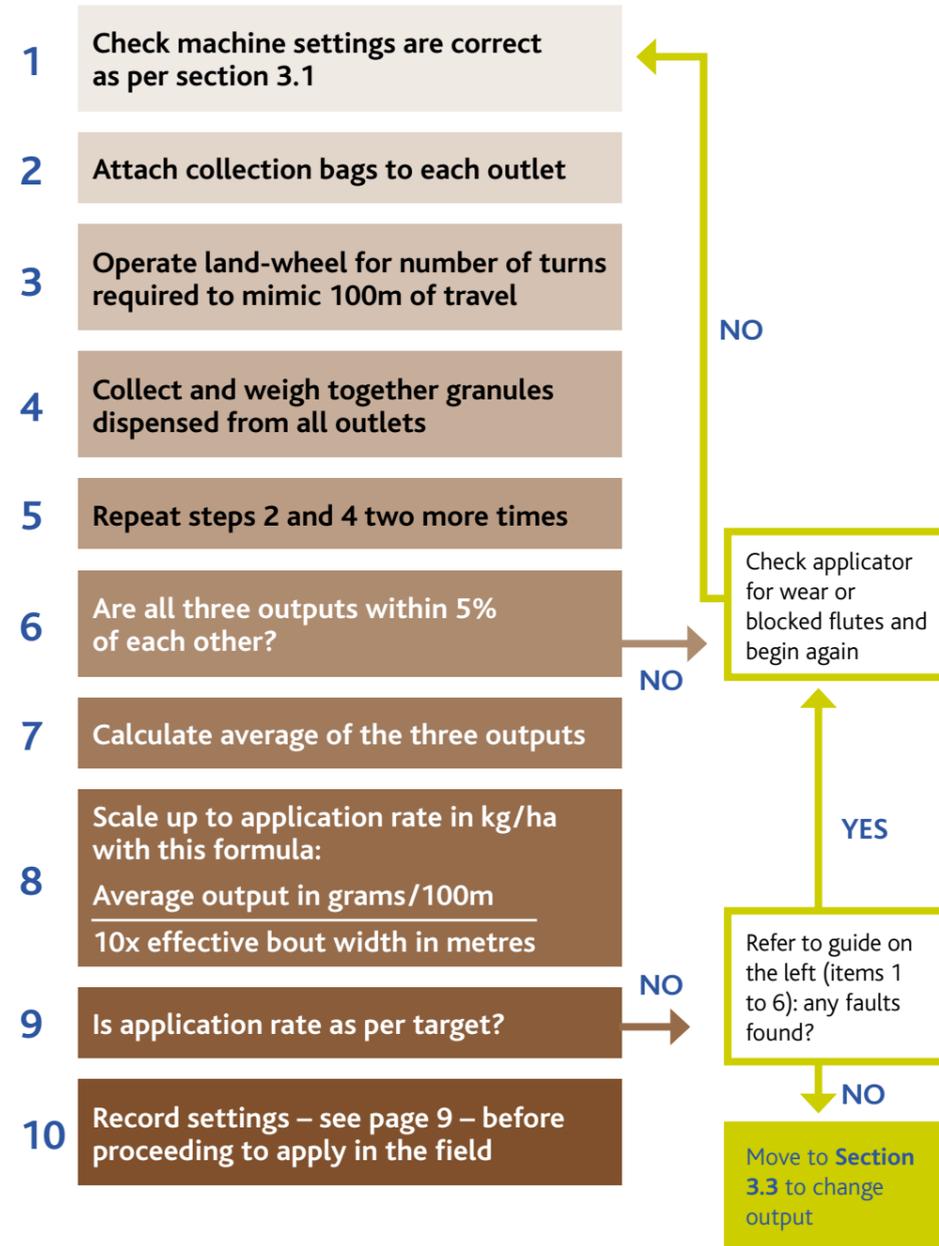
Output checking can be carried out in the workshop providing you know the number of turns of the land-wheel per 100m. A standard Horstine Farmery spider wheel should turn 42.25 times per 100m. This can be checked by marking out 100m in a field with similar characteristics and counting the number of turns.

Before starting the output check, you must be confident that all of the applicator outlets are dispensing within +/- 5% of their average. If the variation between outlets exceeds this range, application will be uneven across the overall bout width and may reduce efficacy.

Horstine Farmery applicators are designed to achieve the required consistency of delivery of Mocap 15G between outlets but regular servicing and maintenance is essential to maintain their accuracy. The potato crop protocols of some marketing organisations require applicators to have an annual NSTS test, which includes checking the consistency of delivery. The Sustainable Use Directive states that working application equipment must have an NSTS (National Sprayer Testing Scheme) certificate by 26 November 2016.

1. Check correct rotors are fitted
2. Check correct drive combination is fitted
3. Check sprockets are fitted in their correct positions
4. Check rotor side clearance
5. Check land-wheel and drive shaft turn freely
6. Check that each outlet across the bed is delivering equal amounts of product

(With electronic rate control systems check with the individual manufacturer – do not assume running correctly).



### Record of applicator settings

Having completed the output checking procedure, record the settings.

Operator: Date: Crop: Granule type: Application rate: Land-wheel 'driver': Topshaft 'driven'.

Check the calibration regularly during the application process. Ideally this should be on a daily basis; with records kept of results.

### Ensure that the area treated and volume of product used match

By 2017 all applicators must be fitted with a device in-cab that allows the operator to shut off nematicide granule flow at least three metres from the end of each row. For those applicators fitted with a hydraulic or an electric motor this should already be possible. For those applicators driven by a land or spider wheel, an electronic clutch can be fitted to the applicator drive shaft to enable remote shut off [www.horstine.com].

### 3.3 Changing output

Application rate is determined by the gearing ratio between the 'driver' and 'driven' sprockets (or pulleys on older machines), so it can be changed by re-selecting the drive combination. To work out the correct combination, calculate the new ratio required from this formula:

$$\text{New sprocket ratio} = \left( \frac{\text{Target rate per hectare}}{\text{Current rate per hectare}} \right) \times \text{current ratio}$$

Then from the table on the right read off the new drive combination required.

#### Example:

Applicator: Microband Rotor: 13.5mm cassette type drive setting: 25T driving 34T (ratio 0.73) target rate: 40kg/ha current rate: 45kg/ha [h1] [h1]

New sprocket ratio required = (40/45) x 0.73 = 0.650

**New driver combination required is 22T driving 34T**

Having re-set the drive combination repeat the output check as per section 3.2. Only proceed to apply granules in the field when the result matches the target application rate.

Conversion chart: Pulley to sprocket combination

Pulley combination		Pulley ratio	Sprocket driver		Sprocket ratio
Driver	Driven		Driver	Driven	
4"	7"	0.570	19T	34T	0.560
			19T	31T	0.610
4.50"	7"	0.642	22T	34T	0.650
			19T	28T	0.680
5"	7"	0.710	22T	31T	0.710
			25T	34T	0.730
			23T	31T	0.740
			19T	25T	0.760
			22T	28T	0.790
4"	5"	0.800	25T	31T	0.800
			28T	34T	0.820
			19T	22T	0.860
			22T	25T	0.880
4.50"	5"	0.900	25T	28T	0.890
			28T	31T	0.900
			22T	23T	0.956
4"	4"	1.000	22T	22T	1.000
			23T	22T	1.045
			31T	28T	1.100
5"	4.50"	1.111	28T	25T	1.120
			25T	22T	1.140
			22T	19T	1.160
			34T	28T	1.210
5"	4"	1.250	31T	25T	1.240
			28T	22T	1.270
			25T	19T	1.310
			34T	25T	1.360
7"	5"	1.400	31T	22T	1.410
			28T	19T	1.470
7"	4.5"	1.556	34T	22T	1.550
			31T	19T	1.630
7"	4"	1.750	34T	19T	1.800

Decrease rate

One to one drive

Increase rate

## 4. Cassettes and cartridges

The following information is provided as a guide to available application options only and no recommendation of any one option is being made or inferred by Certis.

Applicator manufacturers now offer one-piece units that replace the metering unit's bearings, spacers and rotors. Horstine Farmery refers to their one-piece units as 'cassettes' and Techneat refers to theirs as 'cartridges'. Advantages gained from switching to these one-piece units are:

- Elimination of wear to the metering unit casting;
- Easier fitting and maintenance;
- Improved accuracy of application rate.



### Horstine Farmery cassettes

For application of Mocap at 40kg/ha you will need cassettes with 13.5mm wide 9 deep flute rotors. To cater for their full range of applicators there are variants with one, two and three rotors per cassette. The tables in section 3.1 should be used to select the right variant.

### Techneat cartridges

These one-piece units have liners that are colour coded to show which type of granule they should be used to apply. Mocap 15G cartridges have BLACK liners. To calibrate machines fitted with these cartridges, refer to the manufacturer's instructions.



### Machine setup and application rate guide

For use with Techneat's black cartridge with 6 outlets on 72" bed.

Chain drive Microband			
Land driver	Hopper driven	Overall kg/ha	Band g/100m
19	34	20.51	62.56
19	31	22.50	68.62
22	34	23.75	72.44
23	34	24.83	75.73
19	28	24.91	75.97
22	31	26.05	79.45
25	34	26.99	82.32
23	31	27.23	83.06
19	25	27.90	85.09

Chain drive Microband			
Land driver	Hopper driven	Overall kg/ha	Band g/100m
23	22	38.38	117.04
25	23	39.90	121.69
34	31	40.26	122.79
31	28	40.64	123.95
28	25	41.11	125.39
25	22	41.71	127.22
22	19	42.50	129.63
23	19	44.43	135.53
34	28	44.57	135.95

Chain drive Microband			
Land driver	Hopper driven	Overall kg/ha	Band g/100m
22	28	28.84	87.97
25	31	29.60	90.29
23	28	30.15	91.96
28	34	30.23	92.20
19	23	30.32	92.49
19	22	31.70	96.69
22	25	32.30	98.52
25	28	32.77	99.96
28	31	33.15	101.12
31	34	33.47	102.08
23	25	33.77	103.00
22	23	35.11	107.09
22	22	36.71	111.96

Chain drive Microband			
Land driver	Hopper driven	Overall kg/ha	Band g/100m
28	23	44.69	136.29
31	25	45.52	138.83
28	22	46.72	142.49
25	19	48.30	147.31
31	23	49.47	150.90
34	25	49.92	152.26
31	22	51.72	157.76
28	19	54.09	164.99
34	23	54.26	165.50
34	22	56.73	173.02
31	19	59.89	182.67
34	19	65.69	200.34

## 5. Environmental safety

To safeguard the public, wildlife and pets, it is essential that all nematicide granules are well incorporated within the soil and none are left lying on the surface. Particular areas of risk are at the ends of rows when machinery is lifted, and at the point of hopper filling.

It is good practice to rotavate all headlands following planting to ensure that any granules that may be left on the surface are fully incorporated, however any spillages must be dealt with immediately.

All nematicides should be stored and transported in line with current codes of practice. Empty containers must be collected and returned to safe storage on a daily basis.

Always fill hoppers with the nematicide in fields where they are being used. Transport of product in hoppers from field to field where the journey involves using the public highway is to be avoided, where possible. Plan to fill the hoppers with the appropriate volume of product to treat the field.

Ensure that all hoppers and hopper lids are secure.

It's good practice to use a single site for filling hoppers in each field, one which can easily be checked for spillages. Small spillages should be buried so that no granules are left on the surface.

## 6. Mocap Stewardship Guide 2017

Refer to the current Nematicide Stewardship Programme (NSP) guidelines available at <http://nspstewardship.co.uk/best-practice>

### Read the label first

Even if you have used Mocap 15G before, always read the label before using the product as requirements may have changed since you last used the product.

### Application equipment

Full mechanical application is required for the use of Mocap 15G.

**AIM** to have applicators set up so that there is minimal distance between the applicator outlet and soil surface. Avoid granules being deflected by linkage arms or any other part of the equipment.

**APPLICATION** equipment should only be mounted to tractors with fully closed cabs equipped with air filters.

**ENSURE** lids of hoppers are properly closed.

**MONITOR** product application rate and adjust as necessary.

**CHECK** applicator rotors regularly during application to ensure product is flowing freely. Consider using new improved cartridges that may be available from your supplier.

**USE CLOSED TRANSFER SYSTEM AS INTENDED**

**DO NOT** force open Ultima or Surefill systems.



### Spillage is caused by:

- Poorly maintained machinery;
- Not checking applicator operation at the filling area on headlands;
- Leaving rotors engaged when moving between fields;
- Poor operational practice.

### To avoid spillage:

- Use the Ultima system as designed – do not break the neck seal;
- Maintain and service machinery prior to operation;
- Check operations on a part of field yet to be treated;
- Dis-engage the applicator drive between fields.

### Dealing with a spillage:

Any size of spillage is important, however small, and must be dealt with immediately.

- Small in-field spillage - if it will not cause environmental damage, bury where it is;
- Large spillage and any spill outside the field - collect up immediately and store in a sealed and labelled container, to await disposal (never leave until later);
- Do not wash into drains.

### Safe incorporation:

- Cultivate immediately after overall application;
- Cultivate all granules off the surface before leaving the field;
- Incorporate any exposed granules manually with a rake.

By 2017 all applicators must be fitted with a device in cab that allows the operator to shut off nematicide granule flow at least three metres from the end of each row. For those applicators fitted with a hydraulic or electric motor, this should already be possible. For those applicators driven by a land or spider wheel, an electronic clutch can be fitted to the applicator drive shaft to enable remote shut off, for more information visit [www.horstine.com](http://www.horstine.com).

This should be read in conjunction with up to date advice from the Nematicide Stewardship Programme (NSP).

Effective granular nematicide stewardship will help ensure Mocap 15G remains available for growers for the reduction of PCN and wireworm.

## Personal protection

**BE** aware of wind direction when filling applicator hoppers, to reduce the chance of inadvertent operator exposure.

**ALWAYS** follow the requirements for Protective Personal Equipment (PPE), which are stated on the label.

**ALWAYS** ensure tractor cab air filters are working properly, and check them regularly during planting.

**ALWAYS** wear full PPE when cleaning down, and treat any dust as a pesticide.

## Post Application wildlife monitoring

**GROWERS SHOULD CHECK** treated fields 24 hours post application for any bird or animal carcasses. Any carcasses found may indicate poor incorporation of granules. If granules are seen on the surface they should be incorporated immediately. Remove and cover the carcass, then contact the Wildlife Incident and Investigation Scheme (WIIS) using the UK free-phone number 0800 321600. Also contact Certis.

# CERTIS

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Certis product guide mobile app; **to download to your smart phone or tablet,** simply open your web browser and enter the address above.

Mocap 15G® contains ethoprophos and is a trademark of AMVAC Chemical Corporation. MAPP no.16562.  
Ultima® is a trademark of AMVAC Chemical Corporation.

USE PESTICIDES SAFELY. ALWAYS READ THE LABEL AND PRODUCT INFORMATION BEFORE USE.

For further information with regard to the warning phrases and symbols for this product please refer to the product label.

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## Cleaning and disposal

**DO NOT** attempt to clean any machinery which is contaminated by dust in farm yards, on roadways, or near open drains or ditches. Wash machinery after treatment in the field with water, so that contaminated water is collected in the field and will not contaminate surface water. Brush inside hoppers and rotor areas: avoid using water inside hopper/dispersing units.

**RETURN THE CLOSED TRANSFER SYSTEM** to your supplier without cleaning it out.

When testing equipment please refer to the latest NSTS granule test guidelines.

## Application equipment cleaning procedure

**ENSURE** that no or only a minimal quantity of product remains in the hopper after field application. Upon completion, place suitable receptacles over the delivery tubes, crank the applicator, and collect the remaining granules. Comply with operator safety measures during these manipulations. The granules collected should be disposed of as pesticide chemical waste and use an approved local authority disposal company.

