

SPISE

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Advice for the functional inspection of granulate application equipment



Advice for the functional inspection of granulate application equipment

This document has been compiled by the SPISE Technical Working Group 9

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1 Foreword

All types of machines used for the application of pesticides must be inspected because of the EU SUD directive. Also machines used for applying solid shaped pesticides. This can be machines what apply the product in bands or machines designed to distribute the product in a broadcast way. These machines are yet not covered by the present EN or ISO standards; therefore SPISE has produced a SPISE Advice about the inspection of this type of machines. This SPISE Advice covers all relevant inspection for this type of machines.

2 Introduction

A granule applicator is a device to apply pesticides in a solid form, as a dry granule, pellets or micro granules. It typically consists of a hopper, a metering device and a distribution system to distribute the granules in a broadcast way or as a band application.

Type A: Band applicators, used to applying micro-granulates (Fig. 1)

Type B: Full-width applicators, used to apply slug pellets (Fig. 2)

A granulate spreader can be configured in many different ways depending on the distribution system, on the size and quantity of hoppers, the number of outlets and the drive type. Hopper size is generally between 30 and 150 L. Working width for rotary spreaders can go up to 24 m. Granule spreaders can be fitted in the front or rear section of a vehicle (tractor, ATV, Jeep, ...) or one or more devices can be mounted on an implement.



Fig. 1 Type A: Band applicators



Fig. 2 Type B: Full-width applicators

3 Pre-Inspection

For the safety of the test-operator and to protect the environment and the testing-equipment to get contaminated, the inspection of the machine shall only start when is made clear that the machine is safe and clean. Here for the item listed in 5.3 of EN-ISO 16122:1 (2015) can be used, but special attention shall be given to the cleanness of the machine because the products used with this machines are very dangerous, are good attention shall be given to the personal protection of the test-operator.

4 Requirements of the inspected machine

4.1 Type A. Band applicators

4.1.1 Leakage

With the machine not working and parked on a level surface, there shall be no leakage from any part of the machine.

Working under normal working condition, there is no leakage of product from any part of the machine.

4.1.2 Metering unit(s)

Check if the drive of the metering unit(s) is functioning correctly.

Check if the electronic signal and GPS sensors and radar sensors (if present) are functioning

Check if the drive ids-engagement (on/off) functions correctly

The drive shaft is in correct alignment and rotated easily without binding.

All rotor is made of a material suitable and recommended for the product being applied.

The rotor is not damaged or dirty, any damaged rotor should be changed.

All rotors and cassettes are fitted according to manufacturer's guidelines.

All rotors are within manufacturers specifications.

4.1.3 Hopper(s)

The hopper(s) shall be free from any defects like holes, cracks, etc.

All hopper(s) are fitted correctly to the machine.

The hopper(s) is/are provided with a lid that is well adapted and in good condition, this lid shall avoid unintended opening.

It is possible to empty the hopper(s) without the use of special tools or removing parts from the machine, without contamination of the environment and without the risk on contamination of the operator.

All seals must function correctly.

The hopper(s) is/are accessible on a safe way.

The Closed Transfer (if present) connection cap must be fitted as per manufacturer's guidelines and correctly aligned. The seal is intact and complete.

The agitator (if present) shall be free from wear and damage. The drive is operating correctly.

4.1.4 Measuring systems, controls and regulation systems

All on the machine present instruments and controls needed for the correct functioning, measuring and regulating the machine are functioning properly.

The provision for the switching on or off of the applicator are functioning properly, it is possible to switch all distributors simultaneously on or off.

All controls and instruments needed to operate the applicator during operation are reachable and visible placed he place of the operator.

4.1.5 Lines (pipes and hoses)

Hoses and pipes shall not show excessive bending, corrosion and abrasion through contact with surrounding surfaces. Lines shall be free from defects such as excessive surface wear, cuts, cracks, etc. Tubes are not pinched or kinked.

All tubes between the meter outlet and the fish-tail/deflector plate is clear of internal obstructions. Any repairs should not affect air-flow or allow chemical spillage.

On air machines, pipe work must be of the same type as per manufacturer's guidelines.

The tubes are mounted in such a way so that accumulation of product in tubes will be prevented.

4.1.6 Delivery system

The distance between fish-tails and the ground/target is as per manufacturers guidelines.

All non-flexible pipe lengths and angled bends are within manufacturers guidelines.

Spreader plates and heights of delivery tubes should be set according to machine manufacturers guidelines.

All fish tails or spreader plates are in good condition.

Fish-tails are clear of any obstruction and that internal vanes are correctly set to manufacturer's guidelines.

4.1.7 Output/Distribution

4.1.7.1 Output (for line applicators)

The measured output per output shall be within +/- 10% of the average output.

4.1.7.2 Test method

The output measurements should be carried out using blank/dummy materil.

Collect the output of each outlet and compare with the average output.

The output test must be carried out over the equivalent of 100 meters or a minimum of 100 grams per outlet, relevant to the product being used.

Read manufacturers manual and product label for calibration advice.

For air-assisted machines, collect granules using a bucket or suitable container, which allows air to escape while retaining granules (Fig. 3).

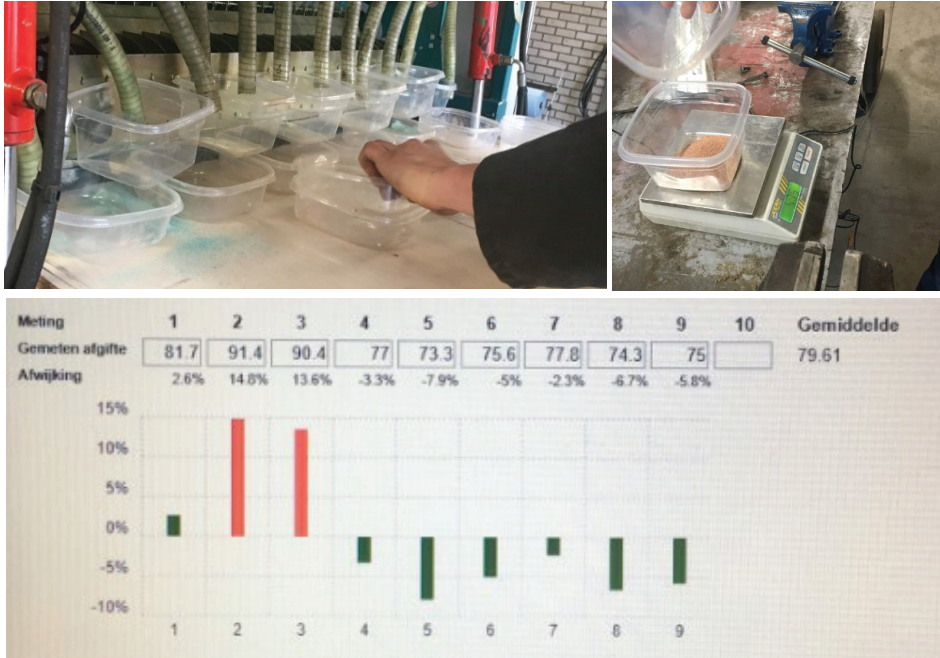


Fig. 3 Output distribution

4.1.8 Pneumatic systems

Check the bearing and fouling of the fan.

Check the fan is running in the correct direction, the wrong direction will affect air pressure.

The blades of the fan shall not be damaged and in good condition.

The fan speed/pressure shall be within manufacturer's guidelines.

All pipes, hoses and joints are free from wear or leaks.

The venture-system is clear and within manufacturer's guidelines.

The alignment and deflection angle is according to manufacturer's guidelines.

The nozzle insert length is as stipulated by the manufacturer.

The nozzle spacing is to manufacturers guidelines

The nozzle height above the intended application surface is correct to manufacturer's guidelines.

4.2 Type B. Full-width applicators

4.2.1 Leakage

With the machine not working and parked on a level surface, there shall be no leakage from any part of the machine.

Working under normal working condition, there is no leakage of product from any part of the machine.

4.2.2 Metering unit(s)

Check if the drive of the metering unit(s) is functioning correctly.

Check if the electronic signal and GPS sensors and radar sensors (if present) are functioning correctly.

Check if the drive ids-engagement (on/off) functions correctly (if fitted).

Metering shaft alignment.

The drive shaft is in correct alignment and rotated easily without binding.

All rotors are made of a material suitable and recommended for the product being applied.

The rotors are not damaged or dirty, any damaged rotor should be changed.

All rotors and cassettes are fitted according to manufacturer's guidelines.

All rotors are within manufacturers specifications.

4.2.3 Hopper(s)

The hoppers shall be free from any defects like holes, cracks, etc.

All hoppers are fitted correctly to the machine.

The hopper(s) is/are provided with a lid that is well adapted and in good condition, this lid shall avoid unintended opening.

It is possible to empty the hopper(s) without the use of special tools or removing parts from the machine, without contamination of the environment and without the risk on contamination of the operator.

All seals must function correctly.

The hopper(s) are accessible on a safe way.

The Closed Transfer connection cap (if present) must be fitted as per manufacturer's guidelines and correctly aligned. The seal is intact and complete.

The agitators shall be free from wear and damage. The drive is operating correctly.

4.2.4 Measuring systems, controls and regulation systems

All on the machine present instruments and controls needed for the correct functioning, measuring and regulating the machine are functioning properly.

The provision for the switching on or off of the applicator are functioning properly, it is possible to switch all distributors simultaneously on or off.

All controls and instruments needed to operate the applicator during operation are reachable and visible placed he place of the operator.

4.2.5 Lines (pipes and hoses)

Hoses and pipes shall not show excessive bending, corrosion and abrasion through contact with surrounding surfaces. Lines shall be free from defects such as excessive surface wear, cuts, cracks, etc. Tubes are not pinched or kinked.

All tubes between the meter outlet and the fish-tail/deflector plate is clear of internal obstructions.

Any repairs should not affect air-flow or allow chemical spillage.

On air machines, pipe work must be of the same type as per manufacturer's guidelines.

The tubes are mounted in such a way so that accumulation of product in tubes will be prevented.

4.2.6 Delivery system

The number of fish-tails should be sufficient to cover the width of application required.

The distance between fish-tails and the ground/target is as per manufacturers guidelines.

All non-flexible pipe lengths and angled bends are within manufacturers guidelines.

Spreader plates and heights of delivery tubes should be set according to machine manufacturers guidelines.

All fish tails or spreader plates are in good condition.

Fish-tails are clear of any obstruction and that internal vanes are correctly set to manufacturer's guidelines.

The fish-tail/deflector plate spacing is according to manufacturer's guidelines and product label recommendations.

The fish-tail/deflector plate height is according to the manufacturer's guidelines.

The deflector plate gap/angle is set to the manufacturer's guidelines.

4.2.7 Disc spreading applicators

The electric motor, disc, vanes and agitators are in good condition and correctly fitted.

All shutter mechanisms must be complete and working correctly, and apertures correctly set according to manufacturer's instructions.

The vanes shall be free from wear and damage.

The agitators shall be free from wear and damage.

The agitator drive is operating correctly.

All drop-on guides are complete and guides and apertures are set according to manufacturer's instructions.

4.2.8 Output/Distribution

4.2.8.1 Output (for full-width applicators with multiple outlets – pneumatic devices)

The measured output per output shall be within +/- 10% of the average output.

4.2.8.2 Distribution - uniformity of spread (for full-width applicators)

The uniformity of pellets spread should be checked by tray testing (Fig. 4).

Shallow trays are set out in a line across the direction to travel, leaving gaps for the wheels. Trays to be spaced at 2m intervals across the width of spread, these should continue beyond the anticipated width to ascertain the maximum width to pellet spread. This maximum width shall be recorded for both Left and Right, giving the user an indication of the maximum spread width. The spreader is then driven perpendicular to the line of trays and pellets are collected. The number of pellets collected is counted and those collected from the left are compared with those collected from the right. This will confirm the distribution of pellets thrown to the left and right of center is within the tolerance of +/-15% of the mean.

The tray testing gives also information what the total width of spread is. The width of spread to left and right is not always the same and it gives the machine owner the knowledge of how wide the machine actually spreads which helps safeguard watercourses or other non-target areas.

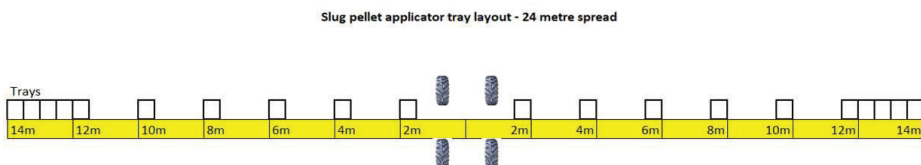


Fig. 4 Diagram and sight of test tray spacing (diagram shows layout for 24-meter spread width):

4.2.9 Pneumatic systems

Check the bearing and fouling of the fan.

Check the fan is running in the correct direction, the wrong direction will affect air pressure.

The blades of the fan shall not be damaged and in good condition.

The fan speed/pressure shall be within manufacturer's guidelines.

All pipes, hoses and joints are free from wear or leaks.

The venturi-system is clear and within manufacturer's guidelines.

The alignment and deflection angle is according to manufacturer's guidelines.

The nozzle insert length is as stipulated by the manufacturer.

The nozzle spacing is to manufacturers guidelines.

The nozzle height above the intended application surface is correct to manufacturer's guidelines.

4.3 Test-equipment needed

4.3.1 Equipment needed for testing band-applicators

- Scale to weight 100 grams with min accuracy of +/- 2%
- Collecting trays
- Dummy material of micro granulate

4.3.2 Equipment required for testing pellet applicators

- Minimum number of trays – 20 (spaced as per figure 4)
- Size of trays 0.5m X 0.5m X either 0.10m or 0.15m high (depth is not critical but all trays used MUST be the same size)
- Liter measure
- Scales – to be calibrated annually by using a calibrated weight
- Optical and contact tachometer – to be calibrated annually by comparison with a calibrated Tachometer
- Tape measure
- Dummy material of pellets

5 References

1. EN ISO 16122, 2015. Agricultural and forestry machinery - Inspection of sprayers in use. Part 1
2. Directive 128/2009/EC Article 8 and Annex II
3. Forman I., Kole J. 2018: SPISE Advice of Periodical inspection of Granulate application equipment. Proceedings of European Workshop "SPISE 7" in Berichte aus dem Julius Kühn Institut 196, pag. 111-117

SPISE – Standardized Procedure for the Inspection of Sprayers in Europe

Established in 2004 by founding members from Belgium, France, Germany, Italy and the Netherlands, the SPISE Working Group aims to further the harmonisation and mutual acceptance of equipment inspections. In regular meetings, several Technical Working Groups (TWG) prepare advice about the items taken into account by the EU Directive 128/2009/EC but still not considered in the actual ISO/CEN Standards. The present document is intended to provide technical instructions and describes a procedure which is not mandatory but can be voluntarily adopted in the course of inspection or calibration.

Further information can be found at <https://spise.julius-kuehn.de>

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