

SPISE Advice of the Periodical inspection of fixed and mobile Rotary atomizers pesticide application equipment for band application.

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Summary

All types of machines used for the application of Plant Protection Products must be inspected because of the EU SUD directive. This includes machines for band application equipped with rotary atomizers. Machines with this kind of atomizers are not covered by EN-ISO 16122:2 (2015), therefore SPISE has produced a SPISE Advice about the inspection of this kind of machines, both mobile machines as stationary machines. This SPISE Advice covers all relevant inspection point for this type of machines.

Introduction.

Machines with rotary atomizers are used for purposes where low application volumes have to be dosed with uniform droplets. Rotary atomizers are used both on stationary machines and mobile machines. The stationary machines are mainly used to apply PPP on a product (like potatoes) moving on a conveyor belt. The machine is then built onto a conveyor belt or hoppers. Mobile band sprayers using rotary atomizers can be used for applying herbicides for weed-control or killing potato halms.

The working principle of a rotary atomizer is that spray liquid fed on to a spinning disc will be thrown of the periphery in droplets of uniform - depending on even liquid feed to the edge of the atomiser disc and an undamaged disc, hence it is very important that the disc is kept both clean and undamaged. Droplet size is determined by diameter of the disc and its rpm. Most rotary atomizers are driven by a small electric motor but hydraulic or other power sources have been used. The spray solution is generally driven by a pump to the spinning disc. This can be a positive displacement pump or a peristaltic pump.



Pre-inspection of the machine

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 it 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 especially with stationary equipment attention shall be given to electrical safety.

Requirements of the inspected machine

Leakage

- With a switched off machine, with the spray tanks half-filled and the pump switched off, there shall be no leakage of liquid at any part of the machine. Beside this, the spray tank has no holes, cracks or other openings through which fluid could possibly leak any liquid.
- Working at normal conditions there shall be no leakage at any part of the machine.

Condition of the pump

- a. Peristaltic pump
 - The drive of the pump is in good condition
 - No unusual play on pressure mechanism
 - Pump hose(s) is/are in good condition
- b. Positive Displacement pump
 - The drive of the pump is in good condition
 - Membranes are in good condition
 - Pump springs and pump wheels are in good condition.



Functioning agitation (if present)

- There is a clearly visible agitation in the spray liquid tank under the following condition:
 - With the spray liquid tank half filled
 - With the agitation system switched on according to the instructions of the manufacturer.

Spray liquid tank(s) (applies only if a separate spray liquid tank is present and not if the pure product is directly sucked out of the product container)

- The spray liquid tank has a lid what is in good condition, well-fitting and not damaged
- In the opening of the tank is a strainer present. This strainer is well fitting in the hole and is in good condition (no cracks or holes in the material of the strainer)
- If there is a filling installation for plant protection products present on the machine, then:
 - Has a provision to prevent objects with a diameter of more than 20 mm to enter the spray tank
 - Function well and does not leak
- There is a well-functioning pressure compensation of the spray liquid tank to prevent over- or under pressure - not required if a gravity i.e. unpressurised, feed system is used.
- The marking of the level of the liquid in the spray tank or assembly of tanks is clearly visible and readable.
- It is possible to empty the tank(s) completely without the use of special tools or removing part of the machine without the risk of contamination to the operator or the environment
- If a filling connection on the machine is present to fill the tank with water, there must be a well-functioning provision present to prevent the back flow of any water out of the tank to the water source.
- If a cleaning device for cleaning empty containers is present on the machine, this installation shall function properly.

- All equipment/provisions on the machine to clean the machine and the inside of the spray tank, cleaning installation for empty containers and the complete machine are in good condition and shall function properly.

Condition and functioning of Measuring- , control- and operation systems

- All instruments and controls needed for measuring, control and operation of the machine are functioning well.
- The switching on or off of the atomizers function properly, it is possible to switch on or off or atomizers at the same time.
- All controls needed to operate during the application or reachable and visible from the operator's position.
- Measuring systems like flow- or speed meters needed for the regulation of the liquid flow present on the machine have an accuracy of +/- 10% in relation to a reference instrument/method.

Condition hoses and line

- All hoses and lines are in good condition. There is no extreme bending or wear on the outside. They are free from defect like exceptional wear, cuts, cracks and corrosion. The reinforcement of the hose is not damaged, appearing in swollen hoses.
- Couplings are in good condition

Filtering (if present)

- The filter elements are in good condition, have no holes or cracks in the filter material and the inserts are clean.
- The mesh size of the filter inserts is as prescript by the manufacturer
- Filters can be checked without draining the fluid tank.
- Filter inserts are changeable.

Atomizer mounting/connection

- The mounting of the atomizers is in good condition and there is no excessive play on all turning or hing points caused by wear or damage.
- There is no excessive play on all turning or hing points caused by wear or damage
- Measured with the machine in horizontal position, placed on a flat surface, the difference in distance between the underside of each atomizer and the floor is not more as 10 cm of +/- 5% of the machine width, what is the highest.

General / atomizers

- All atomizers on the machines are of the same type, size and brand, except when the atomizers are meant for a special function.
- 5 seconds after the supply to the atomizer is closed, there is no continuous dripping
- The machine should not be designed so that spray contaminates it directly, except if necessary to function. If needed for the protection and/or the well-functioning of the machine this shall be minimized.
- All atomisers shall produce a regular and reproducible spray pattern.
- If present and needed for a proper functioning, all parts needed to adjust the height of the atomizers are functioning safe and properly.

Flow rate of the metering system or - pump

- The flow rate is adjustable in a for the user relevant range. .
- The flow rate of the individual atomizer is within the range of +/- 10% or the average flow rate of all atomizers of the same.

Distribution atomizers

Mobile machines:

The adjustment of the working width by the atomiser, and/or spray shield/hood if present, shall comply with the intended function.

Stationary machines:

The mounting and adjustment, if any, of the atomiser and machine shall allow the intended spray width for the intended use e.g. matching the width of the conveyor belt to ensure correct treatment and minimum waste

- The adjustment of the shielding is such that the liquid (as less as possible) hits any parts of the machine or other parts (shielding). Advice for stationary machine: leaking gutter in the length direction of the conveyor belt to collect the dripped liquid
- To ensure good performance it is critical that the disc is in good condition so it should be clean and undamaged e.g. no damage to the surface or any serrations/teeth on the disc edge.
- To ensure protection for foliage from spray drift it is critical that all spray shields/hoods are in good condition i.e. undamaged (with no broken bits that could result in spray being emitted).
- It is essential that the atomiser/disc rotates at the correct/recommended speed to produce the correct/desired droplet size range. Discs should spin smoothly at a constant speed with no exceptional play on the motor. The discs should rotate at the correct/recommended rotational speed +/- 10%