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Agricultural and forestry machines — Inspection of sprayers in use —

Part 4: Fixed and semi-mobile sprayers

Matériel agricole et forestier — Contrôle des pulvérisateurs en service —

Partie 4: Pulvérisateurs fixes et semi-mobiles

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO 16122-4 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 144, *Tractors and machinery for agriculture and forestry*, in collaboration with ISO Technical Committee TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 6, *Equipment for crop protection*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 16122 consists of the following parts, under the general title *Agricultural and forestry machinery — Inspection of sprayers in use*:

— *Part 1: General*

— *Part 2: Horizontal boom sprayers*

— *Part 3: Sprayers for bush and tree crops*

— *Part 4: Fixed and semi-mobile sprayers*

Introduction

There are two main reasons for the inspection:

— less potential risk of environmental contamination by plant protection products;

— good control of the pest with the minimum possible input of plant protection product.

In order to use plant protection products in agricultural production safely, it is necessary to define the requirements and test methods for sprayers in use. This is a relevant step after having standardized minimum requirements for new sprayers, in respect of safety hazards (see ISO 4254-6) and potential risks of environmental contamination (see ISO 16119 series).

Standardising the requirements and methods for inspection of sprayers in use, takes into consideration not only the original performance of the sprayer, but also its use, care and maintenance. This is a logical link to ensure the continued benefit arising from the supply of new sprayers of good quality.

The inspection of sprayers in use can be a mandatory requirement or adopted on a voluntary basis. In both cases further requirements, outside the scope of this standard, are necessary for the management of inspections. These include, for example, requirements for the competence of persons carrying out inspections and the frequency of inspections.

NOTE National or local regulations may also apply concerning the qualifications and competence of inspectors.

Agricultural and forestry machines — Inspection of sprayers in use —

Part 4: Fixed and semi-mobile sprayers

1 Scope

This part of ISO 16122, when used together with ISO 16122-1, specifies the requirements and test methods for the inspection of fixed and semi-mobile sprayers, when in use.

The requirements relate mainly to the condition of the sprayer with respect to its potential risk for the environment and its performance to achieve good application.

It does not apply to application equipment for spatial treatment (e.g. foggers).

NOTE Requirements for the protection of inspectors during an inspection are given in ISO 16122-1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5682-2:1997, *Equipment for crop protection — Spraying equipment — Part 2: Test methods for hydraulic sprayers*

ISO 16122-1:2015, *Agricultural and forestry machinery — Inspection of sprayers in use — Part 1: General*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16122-1 and the following apply.

3.1
fixed sprayer
machine primarily for spraying plant protection products in covered structures, and where the *pump/tank unit* (3.3) and/or *application unit* (3.4) do not move

[SOURCE: ISO 16119-4:2014, 3.1]

3.2
semi-mobile sprayer
machine primarily for spraying plant protection products on crops grown in covered structures, and where the *pump/tank unit* (3.3) and *application unit* (3.4) are moveable

[SOURCE: ISO 16119-4:2014, 3.2]

3.3
pump/tank unit
device made at least by the pump and the spray liquid tank

Note 1 to entry: They can be built together as one unit or separate units.

3.4
application unit
device consisting of one or more nozzles/spray generators with or without air-assistance, and used with a separate pump/tank unit to which it is connected by a pipeline

[SOURCE: ISO 16119-4:2014, 3.4]

4 Requirements and method of verification

4.1 Leaks and dripping

4.1.1 Static leaks

The sprayer shall be filled with water to its nominal capacity.

With the pump not running and the sprayer parked on a level horizontal surface (in case of semi-mobile sprayer), a visual inspection for any leakage from the tank, pump and associated pipes shall be carried out.

For high capacity tanks, water filling can be reduced to no less than half of the nominal tank volume, provided an additional inspection of the tank is carried out in order to identify any cracks, holes or other damage that can cause leakage.

Compliance shall be checked by inspection.

4.1.2 Dynamic leaks

4.1.2.1 Leak-test when not spraying

With the sprayer running at a pressure which is equal to the maximum obtainable pressure for the system, with the section valves closed, there shall be no leakage from any part of the sprayer.

Compliance shall be checked by inspection.

4.1.2.2 Leak-test while spraying

While spraying at a pressure that is equal to the maximum working pressure recommended by the sprayer manufacturer, or the nozzle manufacturer for the nozzles mounted on the sprayer if lower, there shall be no leakage from any part of the sprayer.

Compliance shall be checked by inspection.

4.1.3 Spraying and dripping on parts

Regardless of the distance between the spray boom to the target to be sprayed, in the range between the nozzles and the target surface, no liquid shall be sprayed directly on to the sprayer itself (e.g. parts of the sprayer, hoses). This does not apply if needed by function (e.g. sensors) and if dripping is minimised.

Compliance shall be checked by inspection and function test.

4.2 Pump(s)

4.2.1 Capacity

4.2.1.1 General

The pump capacity shall be suited to the needs of the sprayer.

4.2.1.2 Sprayers built according to ISO 16119-4

The agitation capacity (liquid backflow in the tank) of the pump shall be at least equal to the value given in the instruction handbook.

Compliance shall be checked by measurement according to 5.2.1.3.

4.2.1.3 Other sprayers

a) The pump capacity shall be at least 90 % of its original nominal flow given by the sprayer manufacturer or another minimum pump capacity given by the sprayer manufacturer.

   Compliance shall be checked by measurement according to 5.2.1.2.3;

   or for sprayers not fitted with a test adapter:

b) The pump(s) shall have sufficient flow rate capacity in order to be able to spray while maintaining a visible agitation as specified in 4.3.1.

   Compliance shall be checked by measurement according to 5.2.1.2.2.

4.2.2 Pulsations

The pulsations shall not exceed ± 10 % of the working pressure.

Compliance shall be checked by inspection, measurement and function test according to 5.2.2.

4.2.3 Air chamber

If an air chamber is present the membrane shall not be damaged, there shall be no appearance of liquid when operated at the maximum pressure recommended by the sprayer manufacturer. The air pressure shall be the pressure recommended by the sprayer manufacturer or between 30 % to 70 % of the working pressure for the nozzles in use.

Compliance shall be checked by function test and measurement.

4.3 Spray mix agitation

4.3.1 Hydraulic

A clearly visible agitation shall be maintained:

— when spraying at the maximum working pressure as recommended by the sprayer or nozzle manufacturer (whichever is the lower);

— with the largest nozzles mounted on the application unit;

— with pump rotation speed as recommended by the sprayer manufacturer;

— with the tank filled to half its nominal capacity.

Compliance shall be checked by inspection.

4.3.2 Mechanical

A clearly visible agitation shall be maintained when the agitation system is working as recommended by the sprayer manufacturer, with the tank filled to half its nominal capacity.

Compliance shall be checked by inspection.

4.4 Spray liquid tank(s)

4.4.1 Lid

The tank(s) shall be provided with a lid that shall be well adapted and in good condition.

This lid shall be tightly sealed to prevent leakage and shall avoid unintended opening. This requirement does not apply to fixed installations.

If a vent is fitted in the lid (according to 4.4.4), it shall prevent spillage.

Compliance shall be checked by inspection.

4.4.2 Filling hole(s)

For semi-mobile sprayers there shall be a strainer in good condition in the filling hole(s).

Compliance shall be checked by inspection.

4.4.3 Induction hopper

If there is an induction hopper, it shall:

— prevent any object greater than 20 mm diameter from entering into the sprayer tank.

Compliance shall be checked by measurement.

— function and not leak.

Compliance shall be checked by function test.

4.4.4 Pressure compensation

There shall be a pressure compensation device to avoid over-pressure and under-pressure in the tank.

Compliance shall be checked by inspection.

4.4.5 Tank content indicator(s)

The volume of liquid in the tank shall be clearly readable from where the tank is filled.

Compliance shall be checked by inspection.

4.4.6 Tank emptying

It shall be possible to:

— empty the tank e.g. using a tap, and

— collect the liquid without contamination of the environment and without potential risk of exposure of the operator.

Compliance shall be checked by inspection.

4.4.7 Tank filling

If there is a water filling device on the sprayer, water from the sprayer shall be prevented from returning to the water source, e.g. by means of a non-return valve.

Compliance shall be checked by inspection and function test.

4.4.8 Cleaning device for plant protection product containers

If provided, the cleaning device for plant protection product containers shall function.

Compliance shall be checked by inspection and function test.

4.4.9 Cleaning equipment

If provided, tank cleaning devices, devices for external cleaning, devices for cleaning of induction hoppers, and devices for the internal cleaning of the complete sprayer, shall function.

Compliance shall be checked by inspection and function test.

4.5 Measuring systems, controls and regulation systems

4.5.1 General

All devices for measuring, indicating and/or adjusting the pressure and/or flow rate shall function.

The valves for switching on or off the spray shall function.

Switching on and off of all nozzles shall be possible simultaneously.

The controls to be operated during spraying shall be operable from the operator`s position and the instrument displays shall be readable from this position.

If using a spray boom, switching on and off individual boom sections shall be possible.

Compliance shall be checked by inspection and function test.

4.5.2 Pressure indicator

4.5.2.1 General

A pressure indicator shall be present on the tank/pump unit.

An additional pressure indicator shall be present on the application unit, except for spray guns and lances manufactured before publication of ISO 16119-4.

The pressure indicators shall be fitted at a position where they are clearly readable. Pressure indicators shall be suitable for the working pressure range used.

Compliance shall be checked by inspection.

4.5.2.2 Diameter of analogue pressure indicator

For analogue pressure indicators the minimum diameter shall be 63 mm, except for those mounted on spray guns and lances which shall have a minimum diameter of 40 mm.

Compliance shall be checked by measurement.

4.5.2.3 Scale of analogue pressure indicator

The scale of analogue pressure indicators shall provide graduations:

— at least every 0,2 bar[1)] for working pressures less than 5 bar;

— at least every 1,0 bar for working pressures between 5 bar and 20 bar;

1) 1 bar = 0,1 MPa = 0,1 N/mm^2 = 10^{5}N/m^2.