Assuring the measurement precision of testing devices for the control of plant protection devices in different states of Germany

Summary

In Germany, as well as in other countries, the variation of different sprayer types is really high. There are field sprayers, orchard sprayers and numerous special sprayer devices for crops like asparagus, christmas trees, cherry standard trees and under-leaf and band sprayer devices for corn and sugar beets as well. In Bavaria for example, 5000 air-assisted sprayers are working in different ambient cultures (hop-growing, viticulture and fruit growing).

1. Introduction

In Germany nearly all sprayer types have to be examined by “officially authorized inspection workshops” in a two-years rotation. Plenty of inspection devices are at different controlling-sites throughout country. The control comprises the test of pressure gauges, pump performance and flow-meters as well as the measurement of the cross distribution (CV) for field sprayers and for measurement of single nozzle output for atomizers and special sprayer devices.

2. Different organisation in the states of Germany

The operators of the mentioned measuring equipments are obliged by federal state ordinance to have the measuring precision being tested by an expert before the first use (for new acquisitions) or after repairs and every second year as well. The way of testing the equipment is different in every single state. For instance in Bavaria the personnel of DEULA test engineering carries exclusively out the inspection of test units. DEULA is also capable of carrying-out re-adjustments of the test units on-site in the controlling enterprises.

Fig 1: Testing of BayWa test units by DEULA on site
In North-Rhine Westphalia (NRW) and Lower Saxony the chamber of agriculture is the control authority which is responsible for the perfect function of the test equipment. In NRW the control workshops has to bring their test facilities to a central place, the head office of the chamber of agriculture, for inspection and quality control. In the Lower Saxony a test team is carrying out the testing on-site in the controlling workshops.

![Stationary testing of workshop equipment at the head quarter of the chamber of agriculture in North Rhine Westphalia](image1)

Fig 2: Stationary testing of workshop equipment at the head quarter of the chamber of agriculture in North Rhine Westphalia

If the measurement precision is suitable, the inspection technique receives a badge with the duration of inspection validity.

![badge “Kalibriert” that shows the duration of inspection validity. In this case next inspection in April 2006](image2)

Fig 3: badge “Kalibriert” that shows the duration of inspection validity. In this case next inspection in April 2006

The inspection of the testing units comprises in detail the following parts:

- the pressure gauge with a hydraulic/electric testing-unit
- the flow-meter by means of a vane wheel impeller
- the cross distribution test stands for the strict keeping to the driving-distance covered
- the measured water quantity
the single nozzle measuring devices for measurement precision of a water quantity
exactly allocated with a laboratory measuring cylinder

The all out testing of the equipment of the testing companies is necessary, so that it is assured that plant protection devices are examined with exactly measuring devices. The testing personal of the testing companies as well is trained by the responsible agricultural department. So that the owners of sprayers can assume, that costs of repair at their sprayer do not arise by false measurement results. This creates a relationship of confidence between testing enterprise and implement owner.
Assuring the measurement precision of testing facilities for the inspection of plant protection equipment in different states of Germany (as Bavaria, Lower Saxony and North Rhine Westphalia)

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Plant Protection Service
presented states

Bavaria
North Rhine Westphalia
Lower Saxony
Inspection of test facilities

- in Bavaria a company (DEULA) carries out the inspection on site
- in Lower Saxony the chamber of agriculture carries out the inspection on site
- in North Rhine Westphalia the workshops has to bring their test facilities to the headquarter of the chamber of agriculture for inspection

⇒ In all three cases the precision of the test facilities is shown by a badge and a equipment pass
examples of testing facilities

testing of pump performance, pressure gauges and flow meters in all cases of testing plant protection equipment
sprayer types - field sprayer

plant protection service

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fixed patternator – cross distribution
mobile patternator – cross distribution
sprayer types - orchard sprayer
sprayer types - vineyard sprayer
sprayer types - hop sprayer
sprayer types - asparagus sprayer
sprayer types - application unit for strawberries
single nozzle test stand (commercial)
single nozzle test stand (commercial)
single nozzle test stand (commercial)
single nozzle test stand ("self made")
single nozzle test stand ("self made")
demands on the testing facilities

• to assure the measurement precision, the inspection workshops have to present their testing facilities every second year for inspection to an authorized organization/expert

• the precision of measurements of the inspection equipment is higher than the workshop equipment

• the result of the testing is documented in a equipment pass and by a badge
acceptation conditions

- the corresponding agricultural department is responsible for the inspection workshops
- only agricultural machinery workshops can make an application to become an inspection workshop
- only especially trained staff (trained from the agricultural department) can carry out sprayer inspection
- the testing facilities has to be accepted by the BBA and has to be tested every second year (badge)
- for measuring the cross distribution there is a need of a adequate hall or roofed place with protection against wind
Bavaria

plant protection service

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pump performance (flow rate & flow meter)
twin pump – flow meter
pump performance (flow rate)

- electronic data recording
- measuring turbine
- water meter
Digital pressure gauge

Deula measuring technique

testing pressure gauge

plant protection service
pressure gauge
mobile patternator

- Water supply reservoir
- Battery
- Tube with one boring per groove
- Pump

plant protection service
mobile patternator

one nozzle per groove

water supply
mobile patternator
testing facility from BayWa workshop
plant protection service

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mobile patternator

water supply
mobile patternator

one nozzle per groove
mobile patternator – covered distance
North Rhine Westphalia
Pressure gauge – flow rate & meter

- Magnetic inductive flow meter
- Electronic pressure measurement
- Testing facility
water supply

Tube with one nozzle for each groove

pressure tank
define exact flow rate

Tube with one nozzle for each groove
mobile patternator – LH AGRO
single nozzle test stand
Badge NRW

plant protection service
Prüfungsnachweis
der Kontrollstelle

DEULA – Bayern GmbH
Prüftechnik

Nächste Geräteprüfung
training of workshop staff

plant protection service
label for an authorized inspection workshop

Anerkannte Kontrollstelle für Pflanzenschutzgeräte

plant protection service
Thank you for your attention
field sprayer
field sprayer
field sprayer

plant protection service
field sprayer
magnetic inductive flow meter
field sprayer
field sprayer
Gebühren
Anerkennung der Kontrollwerkstätten (Bescheid) einschließlich Erstabnahme des Kontrollortes und Aushändigung des Anerkennungsbescheides 200 Euro

Erstellung eines Änderungsbescheides, z.B. Bescheid geänderter Kontrollort (LwA vor Ort) 150 Euro

Erstellung eines Änderungsbescheides, der keine Maßnahmen vor Ort erfordert (vom Büro aus) 40 Euro

Rücknahme eines Bescheides einschl. Anerkennungsschild und des Deula-Prüfungsnachweises 50 Euro

Abnahme der Prüftechnik durch die Deula, alle 2 Jahre (erstmals vor Inbetriebnahme) ca. 500 Euro

Eintägige Grundschulung ca. 60 Euro