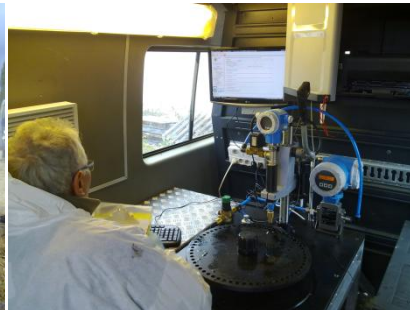
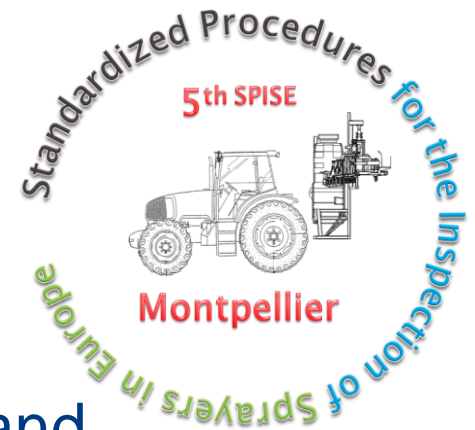


SPISE TWG 3

Correct use of existing test methods and definition of additional test methods for PAE not covered by current harmonized standards



www.irstea.fr

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Structure of the questionnaire

Internet survey



32 contact persons

<https://fr.surveymonkey.com/s/XX3B7T9>

16 positive reply

1 negative reply (no inspection in HU)

8 questions

Anonymous answers

Remarks and notes were possible



implementation of EN 13790 1 (Field crop) & 2 (bush and tree crops)

EN 13790-1&2 are the current standards in use to achieve sprayer inspection in Europe. Questions and § numbers cited in this questionnaire will refer to those two standards.

A certain number of mandatory requirements are related to the control of key components or functions of a sprayer, such as:

- 4.2. Pump capacity
- 4.3. Agitation
- 4.4. Spray tank
- 4.8. Measurements on Boom and Nozzles... (if relevant)

+ Ajouter une question ▼

Q1 Modifier la question ▼ Déplacer Copier Supprimer

1. The pump capacity is generally not easy to assess directly. How do you proceed in your country/province ?

Field crop sprayers

Sprayers for bush and tree crops

A. The pump capacity is evaluated with a flowmeter as described in part 5.2.1a

B. The pump capacity is indirectly evaluated with the method introduced in part 5.2.1b

C. No evaluation is required

Other : please explain

Q1

The pump capacity is generally not easy to assess directly.
How do you proceed in your country/province ?

	FCS		SBTC	
A. Flowmeter (5.2.1a)	9	56%	8	50%
B. Undirect measurement (5.2.1b)	9	56%	9	56%
C. No evaluation is required	1	6%	1	6%

Total : 16





Comments – question 1

1. Better to evaluate the agitation capacity, problem is that values for new sprayers are not known
2. If the pump capacity is not known 5.2.1 b is used
3. If no information on pump is available, 5.2.1b may be used. Pumpdata is provided during training of inspectors
4. It depends from region to region. For example in Piemonte Region the pump capacity is indirectly evaluated (B) but in Lombardia Region is evaluated with a flowmeter (A). In any case, each workshop has to own a specific flowmeter for this control.
5. it depends from region to region

2. Do you have a prescription about the minimum or the maximum nozzle size that has to be present on the sprayer during the inspection ?

Field crop sprayers

Sprayers for bush and tree crops

A. No prescription, the nozzles sizes correspond to those provided on the sprayer

B. Yes, there is a prescription on the minimum size of nozzles

C. Yes, there is a prescription on the maximum size of nozzles

D. Yes there is a prescription but the inspection workshop/unit has a provision of its own set of high flowrate nozzles to conduct the test

Other : please explain



2. Do you have a prescription about the minimum or the maximum nozzle size that has to be present on the sprayer during the inspection ?

	FCS		SBTC	
A. No prescription, the nozzles sizes correspond to those provided on the	15	94%	15	94%
B. Yes, there is a prescription on the minimum size of nozzles				
C. Yes, there is a prescription on the maximum size of nozzles	1	6%	1	6%
D. Yes there is a prescription but the inspection workshop/unit has a provision of its own set of high flowrate nozzles to conduct the test				
			TOTAL	16



Comments – question 2

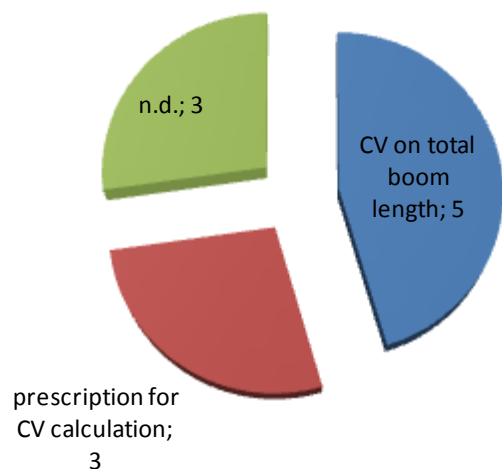
1. If using different nozzles sizes (multi body) all nozzles sizes / - types shall be inspected
2. All nozzle present on the sprayer must be tested and in good condition, else removed or replaced

3. The use of horizontal or vertical spray patternators

- A. Horizontal patternator is used with field crop sprayers
- if A selected : A1. The calculation of the CV is based on the total boom length measurement
- if A selected : A2. The inspection workshop has a prescription on how to conduct the CV calculation
- B. Vertical patternator is used for bush and tree crops sprayers

If B is selected : please indicate a) the model used and b) what are the prescriptions of the inspection center in order to improve the quality of the spray distribution

Horizontal patternator : 11/15



Vertical patternator : 3/15



Comments – Question 3

1. Most of workshops use the program provided by the test equipment manufacturer mainly AAMS
2. Scanners from AAMS and Herbst are used, they calculate automatically.
3. Neither horizontal nor vertical patternators are used during the inspection. Only nozzle flow rate is measured in both cases
4. A) Horizontal patternator is used only to evaluate optimum boom height. CV calculation is not requested because distribution uniformity is evaluated through nozzles flow rate measurement. B) a) The most widely used is vertical test patternator; in some regions is also used vertical lamellae patternator b) to reach a symmetry index between the sprayer pattern of the two sprayer sides <10
5. NL used to use vertical patternator, but next year it will be optional



Comments – Question 3

6. Horizontal patternator is mandatory for all field sprayers in Switzerland. Experiences are very good and especially the sensibilisation of the staff of testing stations and farmers is perhaps the most beneficial point of using horizontal patternators. --> Our problems is not the technical equipment but the sensibilisation and training of the users. Vertical patternator for bush and tree crops sprayers is not mandatory but used by some testing stations. The CV is in practice not of interest. They use the max. deviation per nozzle of +/- 20 % from the mean. Most of the testing station state that 20 % is too high. Most of them change nozzles even if the deviation is lower than 20 %...
7. NSTS has patteration as an optional requirement
8. The distribution have to be kept within two lines max/min +/- 15% of average (0). Additionally also the nozzle out put for every nozzle is measured (uniformity)
9. We do not use horizontal or vertical patternators.

4- Flowrate and pressure drop measurement

Total

16

FIELD CROP SPRAYERS

Tested nozzles are mounted on the boom (ref 5.2.5.1) 13

Nozzles are tested with the help of a test bench (ref 5.2.5.2) 2

Pressure drop is measured at a standard pressure (i.e. 3 bar) 11

Pressure drop is measured at the highest pressure permitted by the circuit 1

Pressure drop when closing sections is measured a standard pressure (i.e. 3 bar) 12

Pressure drop when closing sections is measured at the highest pressure permitted by the circuit 1

BUSH AND TREE CROP SPRAYERS

Tested nozzles are mounted on the boom (ref 5.2.5.1) 15

Nozzles are tested with the help of a test bench (ref 5.2.5.2) 1

Pressure drop is measured at a standard pressure (i.e. 3 bar) 9

Pressure drop is measured at the highest pressure permitted by the circuit 1

Pressure drop when closing sections is measured a standard pressure (i.e. 3 bar) 9

Pressure drop when closing sections is measured at the highest pressure permitted by the circuit 1



4- Flowrate and pressure drop measurement

1. Pressure drop and pressure drop when closing sections are measured at 8 bar
2. Pressure drop: result of this test is not binding. Generally test pressure is done at the working pressure indicated by the farmer
3. Pressure used is as appropriate to the equipment, not specified as 3 bar in ether cases
4. Pressure drop is measured at the pressure for practical use.
5. Pressure drop measurement: generally not mandatory. Generally reference pressure is the usual working pressure indicated by the farmer





5- Additional items from EN 13790 1-2 that are not mandatory or not tested

1. No. We test according to EN 13790. This means that the inspector may choose between patternator or nozzle flow for boom sprayers.
2. No
3. valvola di sovrappressione
4. In practice most manometers are only tested if they don't work correctly
5. no one
6. no



5- Additional items from EN 13790 1-2 that are not mandatory or not tested

7. Belgium focused on the European Directive 2009-128 EC Annex II to make the necessary adaptations of its inspection protocols. So Belgium fulfills normally 100% to Annex II but some points of EN13790 are not checked :
 - 4.2.3. Pressure safety valve not tested : Reason difficult to perform and danger to damage sprayer during inspection.
 - 4.4.3. Chemical introduction container grating: Not checked no environmental danger or danger for user.
 - 4.4.4. Pressure compensation in the tank: Not checked no specific reason
 - 4.4.6 Collect the emptied spray liquid: Not checked no specific reason danger or danger for user.
 - 4.4.9 Cleaning device for crop protection product containers : Not checked no specific reason points not checked for EN13790-2
 - 4.4.7 Non return device for water filling: Not checked no specific reason
 - 4.7.2. Isolating device present to clean filters without emptying sprayers: Not checked no specific reason Comparable
 - 4.4.8 Chemical introduction container: Not checked no environmental



Partial conclusion on the implementation of the existing EN 13790

Some discrepancies in the interpretation of existing standards/regulations

-What has to be controlled/tested ?

- The maximum capacity of the equipment ?
- The running of the equipment as used by the farmer
- The minimum requirements


- Coherence between EN 13790 and 2009/EC/128 directive requirements

- Principle of « reality » : what is reasonably testable on a sprayer, in a workshop or in a farm courtyard

6. New standards for the inspection of sprayers (EN ISO 16122 series) may be published in a near future.

- | | |
|--|----|
| <input type="checkbox"/> I had the opportunity to read at least one of prEN ISO 16122 document : | 13 |
| <input type="checkbox"/> I foresee problems in the implementation of these standards | 3 |

1. I had not the opportunity to read any of EN ISO 16122 projects.
2. "Problems" all inspectors need to be trained. New demands like travel speed, sensors etc.. will come. The pretest in part 1 will make the test take longer time, but is very valuable.
3. On the 16122 part 4 Belgium voted negative because of the implementation of a pump test on sprayers built according 16119-4.
4. It is necessary to have soon new standards for the inspection of other type of sprayers as knapsack mist blowers, train sprayers, foggers .



6. New standards for the inspection of sprayers (EN ISO 16122 series) may be published in a near future.

5. The problem with these standards is that they shall be taken in use by inspectors and not as normally industrial companies. Thus the price per standard is one thing, the other is the need of very many standard to be bought by the inspector (references to other standards in one standard and several standards for one type of sprayers).

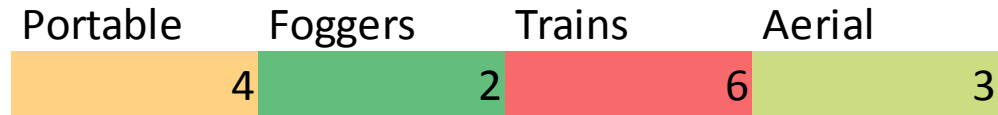
Thus SPISE should find a practical solutions of a more user friendly set (like made e.g. in Sweden) and a solution to an acceptable price.

It also have to be find a practical solution of the accreditation for the inspection units.

It has to be taken into account that some countries have several units with a low number of inspections due to the infrastructure and size of country and more mobile units in order to visit the operators and ensure that the operator join the inspection, when other countries have workshops were several hundreds of sprayers are inspected at the same location and rarely have the possibility to have the operator present. If to complex the costs per inspection will increase and the motivation of the operator will decrease.

7. Sprayers not covered by EN ISO 16122 inspection done

(9 MS answers) Inspection is done



Parameter	Portable	Foggers	Trains	Aerial
Pump capacity	3	1	7	1
Pressure	5	3	6	2
Flowmeter	3	2	5	1
Forward speed	2	1	3	
Spray distribution	2	2	3	
Nozzle flowrate	6	4	7	3
Pressure drop	5	1	6	2
pressure drop when spray off	2	1	4	1
Pressure distribution	3	1	4	1
backflow for agitation	3	2	4	1
direct injection	3	2	4	1
application volume	4	2	6	3
spray range	2	1	4	1
agitation	4	2	6	1



7. Sprayers not covered by EN ISO 16122

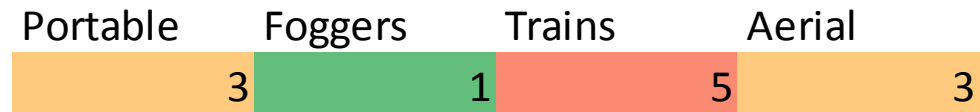
Inspection is done (9 MS)

Portable	Foggers	Trains	Aerial
3	1	5	3

1. none of this equipments are inspected yet
2. Today, only train sprayers are tested in an own, voluntary system in SE. This will be adjusted to EN ISO 16122...
3. Portable sprayers: actually inspected only in some regions
4. We have regulations on how to inspect the train and the aerial sprayers and some workshop interested in to do the inspections, but the inspections are not performed yet.
5. For the aerial sprayers only functional tests are to be performed. We wait for new standards to follow up.

7. Sprayers not covered by EN ISO 16122

Inspection is done (9 MS)



6. At this moment Belgium is inspecting: - Field crop sprayers - Orchard and Vineyard sprayers - Greenhouse and similar sprayers (Fixed and semi mobile sprayers) - Soil disinfection machines

Portable sprayers: Approximately 10 portable plot-sprayers are inspected at this moment with the Belgian “greenhouse sprayer” protocol.

This works but do not fit 100% on those type of sprayers. At this moment we perform no other inspections on other types of portable sprayers.

Foggers: No inspections at this moment. Belgium is waiting for a Standard.

Train sprayers: Only one train sprayer has been inspected at this moment in Belgium, but no specific protocol was developed for this purpose. A tailor made inspection was performed, mainly based on existing field - crop protocol in Belgium and EN13790-1 standard. Furthermore, a number of railway sprayers mainly based on unimog's are inspected by using the Belgian field crop spray protocol.

Aerial sprayers: No aerial spraying in Belgium.

7. Sprayers not covered by EN ISO 16122

Inspection is done (9 MS)

Portable	Foggers	Trains	Aerial
3	1	5	3

7. Only one helicopter in use. Nozzle type, drop size and distribution for train and helicopter are set due to the high speed in use in order to avoid drift.

For trains we normally also do deposit tests by the use of WSP with a speed about 20 km/h.

For helicopter we have made deposit tests due to 60-70 km/h and 4-5 m height with nigrosine and paper rolled out perpendicular to the driving direction. A stationary distribution test for such equipment may be incorrect if not taken into account the high speed in use. Because the nozzle used do minimize the risk of drift (proved by experiments) we only make stationary test with these nozzles normally for the annual inspection.

I also like to add that inspection of foggers may be very difficult because of the high concentration of pesticide in practical use. Thus here the inspection should have been carried out by a test fluid (with properties of pesticides but not toxic) or by the use of the pesticide itself. Parameters like house construction, fogger position, RH and temperature and the mass of plants may influences and require different set up & ventilation etc and have to be taken into account (some how..)

7. Sprayers not covered by EN ISO 16122

Inspection is done (9 MS)

Portable	Foggers	Trains	Aerial
3	1	5	3

(7) Ctd....

Why pump capacity is not measured on the helicopter is that it is used a easy mixable pesticide (glyphosate) and also that it is complicated to fix a flowmeter to the pump below the helicopter.

For helicopter use, we have to keep in mind that failures like variations in height (difficult terrain in forest), variations in swath width and variations in speed e.g. at the end of track give more variations than minor failures on e.g. pressure. The nozzle out put is rather large due to the high forward speed (ca 4,7 l/min). In the helicopter a flowmeter is installed. We measure nozzle output and check if this value corresponds to the flowmeter in the helicopter (and adjustments are made if necessarily)

8. Sprayers not covered by EN ISO 16122 expectations

(10 MS answers)

Parameter	Portable	Foggers	Trains	Aerial
Pump capacity	3	2	7	3
Pressure	8	3	7	6
Flowmeter	4	3	6	5
Forward speed	3	2	6	2
Sprary distribution	5	4	6	3
Nozzle flowrate	8	6	7	5
Pressure drop	6	3	5	4
pressure drop when spray off	2	3	4	2
Pressure distribution	3	2	4	3
backflow for agitation	1	3	7	3
direct injection	2	3	6	2
application volume	7	7	6	4
spray range	6	4	6	4
agitation	5	4	6	3



8. Sprayers not covered by EN ISO 16122 expectations

(10 MS answers)

1. We will probably demand that sprayers on train and aircraft are inspected (according to a standard if there is one) to be allowed to use but we will probably not have any Swedish inspections scheme
2. I'm not sure what portable sprayers are in this connection
3. In Switzerland we have the opinion, that training of users is much more important than controlling portable sprayers. Train sprayers are not in use anymore. And very few aerial application occurs. Foggers are not tested.
4. A problem with portable sprayers is that an inspection will cost more than buying a new one, and that failures may occur between the inspections. Additionally wrong dosage, bad safety and environmental problems as well as poor effect may occur more due to misuse of the sprayer. Thus information and skilling in proper calibration, check for leaks, nozzle variety, simple means for ensuring a good application without risk for operator or environment will motivate better the grower to buy a better sprayer when needed and USE the sprayer in a correct manner and also avoid huge residues of spray volume at the end.



8. Sprayers not covered by EN ISO 16122 expectations

(10 MS answers)

6. Belgium has started up a specific project (SIRA-APESTICON) in order to give an answer on Chapter III, Art 8 point 3. It exists mainly out of the following 3 steps:
- Determining which PAE is used on Belgium territory. (Kind, Numbers, Type of pesticide,...)
 - Developing a risk analysis method to research if derogation is applicable for certain PAE.
 - Developing new inspection protocols where applicable
7. The new regulations are in the final step but still in progress. It will cover: glasshouse sprayers, foggers, seed treatment, granules application, other spraying equipment with the tank volume of less than 30 l. Only for glasshouse sprayers there is a proposal to measure pressure drop and nozzle flowrate, for the rest of equipment - functional tests and visual inspection.



Conclusion

- ❑ EN 13790 implementation showed differences in terms of implementation in MB
- ❑ EN ISO 16122 Projects are more or less known by ~10 MB.
- ❑ Some sprayer types not already covered by EN ISO 16122 are already tested by some MB. A potential for existing methodologies might be beneficial to CEN developments.
- ❑ Trains are priorities followed by portable and aerial sprayers
- ❑ Few considerations and remarks on portable sprayers
- ❑ Problems of the access/cost of standards was raised several times.
- ❑ Consideration to inspection workshops size and volume of activity



Perspectives – SPISE action plan

EN 13790 series were not precise enough and their interpretation was subjected to variations among MB. Spise Guidelines were welcome in this case !

In some cases, the implementation of a regulation is facing terrain context.

EN ISO 16122 series, once published, shall be more detailed
The necessity for the development of SPISE guidelines is to be discussed

New categories of sprayers would benefit from CEN activities. A vademecum based on the existing protocols may help to inspect sprayers not already covered by EN ISO 16122.

ISO TC23 SC6 W20 is involved in the development of specific requirements regarding aerial sprayers (new and in-use) in parallel to EN ISO 16119-5.

Questions to other SPISE TWG :

- Equipments of inspection workshops
- Training of inspectors