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## Session 5: Additional Workshops activities including PAE adjustment

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### What to be considered when you buy a sprayer: the SPISE advice

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#### Abstract

Since the publication of European Directive (2009/127/EC), environmental requirements for new orchard sprayers are mandatory. Only equipment which has successfully accomplish the specifications can be placed into the EU market. For this purpose, the new harmonized ISO 16119 series represents an interesting tool to fulfil the requirements. However, not all the sprayers placed in the market after the publication of the Directive are in line with it. SPISE community has developed a practical guideline in order to guarantee a clear and universal dissemination among farmers and other stakeholders about the main requirements to be accomplished by the sprayers.

#### Introduction

Mandatory inspection of sprayers in use became mandatory in Europe since the official publication of the European Directive for a Sustainable Use of Pesticides (EC, 2009). From the technical point of view, the official procedure for the inspection is very well defined after the publication of the harmonized standard EN ISO 16122 (ISO, 2015). At the same time, the European Directive 2009/127/EC amending 2006/42/EC with regard to the spraying equipment was also published, establishing the essential environmental and safety requirements to be accomplished for new sprayers. European sprayer's manufacturers shall take all appropriate measures to be sure that their machinery may be placed on the market and put into service accomplishing the relevant provisions established in the legislation. In a similar way, the harmonized standard EN ISO 16119 (2014) was also published as a technical reference document.

However, there is still an important lack of information among the involved stakeholders (manufacturers, farmers, advisors...) concerning the mandatory requirements to be accomplished by new sprayers. It is still possible to find in the market new sprayers with defaults in some important aspects (cleaning, agitation, measuring devices...) that should be avoided. In most cases these defaults have been produced as a consequence of a lack of information by small and medium manufacturers. This fact, linked with the difficulty to arrive to farmers with clear information about the official requirements, derive in the selection of new sprayers with technical default with great influence on quality of applications, generating also difficulties during the mandatory inspection process.

For those reasons, SPISE community decided to develop a practical guideline with the main objective to inform on an easy and clear way, which are the main requirements that farmers should check before to acquire a new sprayer. This guideline cannot be considered as a law. It is just a practical document where main requirements are clearly explained in order to help farmers, and also other stakeholders, during the selection process of the most accurate sprayer for their interests.

#### Structure of the SPISE guideline for new sprayers

The guideline has been developed in a practical way, avoiding too many texts and providing farmers with clear descriptions, schemes and figures. Along the guideline, the main aspects addressed are included in table 1.

*Table 1. Main aspects considered in the SPISE advice about new sprayers*

Aspect	Requirements according ISO 16119-1
<b>Inspection of sprayers</b>	Sprayers shall be provided by adequate devices in order to facilitate the connection of special devices for the mandatory inspection of sprayers in use (ISO 16122 series)
<b>Adjustment of sprayer</b>	It shall be possible to adjust the sprayers for the intended volume application rate. The sprayer shall be delivered with adequate and reliable measuring systems.
<b>Spray distribution</b>	Characteristics of the sprayer shall allow to obtain a uniform distribution of the sprayed liquid according the intended target, while minimizing losses and drift and avoid contamination of non-target areas.
<b>Information</b>	The sprayer shall contain a specific placement where operator will write the name and specifications of PPP in use
<b>Filling, emptying and cleaning</b>	All the sprayers shall be provided with reliable and safe systems for filling and emptying the tank without environmental risk. Sprayers shall incorporate devices for cleaning the whole machine (inside and outside) after the application process.
<b>Marking</b>	Specific spare parts as nozzles and filters shall be clearly identified (manufacturer, size, type...)
<b>Instruction handbook</b>	It is mandatory to provide a clear, precise and useful instruction book with all the sprayers. Information about calibration, cleaning and maintenance shall be provided.

All the aspects described in table 1 are in accordance with the official requirements established in the European Directive 2009/127.

### Contents of the SPISE guideline

It is obvious that not all the technical requirements included in ISO 16119 can be explained briefly and easily on a practical guideline as it is. For that reason, this SPISE guideline includes the most relevant a practical aspect to be considered. The included items are:

- Required characteristics of the spray tank
- Technical requirements of the pump
- Spray boom (for field sprayers)
- Filters and nozzles
- Devices for avoiding drift
- Measuring systems
- Provisions for connecting test equipment
- Air and liquid adjustments
- Cleaning devices
- Induction hopper

All the included aspects have been selected due its possibility to be easily checked over a sprayer, without any kind of measurement or instrument. The SPISE guideline includes also a special chapter dedicated to band sprayers and its special requirements.

## Figures and schemes

As a practical guideline, most of the items included on it have been accompanied with explanatory figures or schemes. The main objective of this guideline is to be used as a practical document to help farmers during the process of sprayer selection. Figures 1 and 2 are some examples of graphical information included on the guideline.



Figure 1. The sprayer shall be provided with a device for an easily connection of instruments used during the mandatory inspection of sprayers in use according ISO 16122. Left: easy adaptor for pump tester; right, easy plugging adaptor for testing manometer.

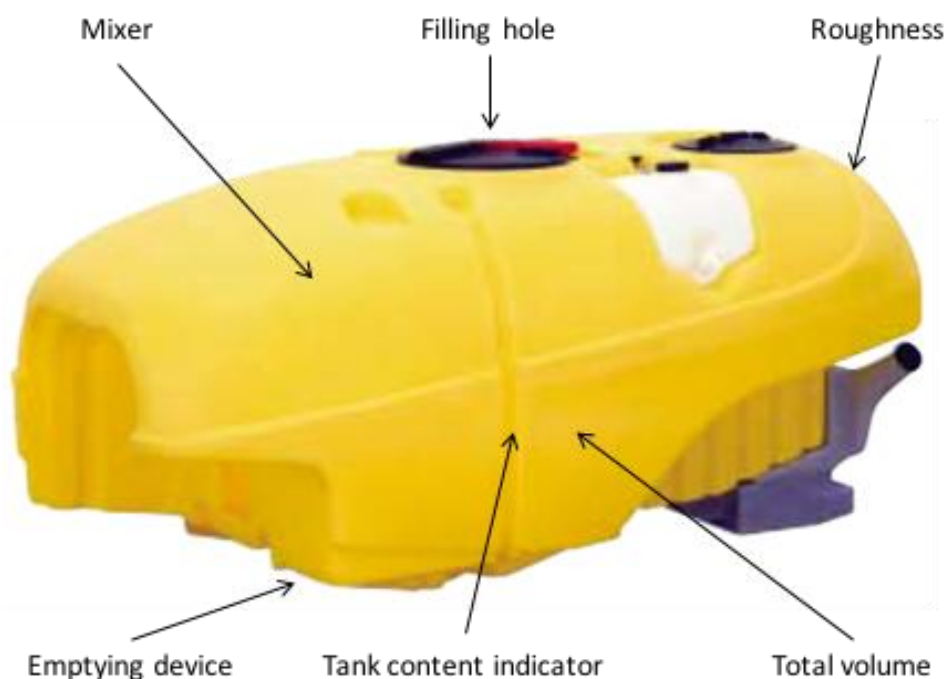


Figure 1. Main aspects to be considered on a sprayer tank

## Instruction handbook

As a mandatory requirement established in EU Directive 2009/127, all the sprayers must be provided with a instruction handbook. This document shall incorporate diverse aspects in order to help the users for a proper use of the sprayer. For this reason, a specific chapter concerning instruction handbook has been included in the SPISE guideline. Table 2 shows the mandatory information to be included.

## Conclusions

Following the aim of SPISE community, the development of the advises' guidelines collection follows to increase the knowledge and dissemination of all aspects related with inspection of sprayers in use, knowing the importance of the topic directly related with a good a safe use of pesticides. The entire collection of the guidelines can be downloaded at <https://spise.julius-kuehn.de/index.php?menuid=34&getlang=en>

Table 4. Main aspects to be included in the instruction handbook

Subject	Information to be included in the instruction handbook
Adjustment and calibration process	Detailed explanation about how to adjust the working pressure Complete calibration procedure information Folding/unfolding method of boom sprayer How to proceed in case of blocked nozzle, or other problems during the spraying process in the field.
Maintenance	Maintenance and updating process of the sprayer after the Winter break Practical information about how to prepare the sprayer for the winter break Precautions to be considered during the cleaning process, especially those concerning to environmental contamination Detailed information about maintenance procedure and safety measurements before dismounting pieces. Practical information concerning pump substitution
Safety	Practical recommendations to avoid direct contact with plant protection products, or inhalation dangerous vapours. Practical information about safe use of front spray boom (if applicable) Information about risk of a complete entry on the sprayer's tank Check the presence of other persons close to the sprayer before starting; special concerns must be indicated about blower Information about potential accident with high electrical lines. Information about maximal working pressure of the circuit

## References

EC/127. Directive 2009/127/EC of the European Parliament and of the Council of 21 October 2009 amending Directive 2006/42/EC with regard to machinery for pesticide application; 2009 [Of. J. EU, 25.11.2009, L 310/29].

EC/128. Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides; 2009 [Of. J. EU, 24.11.2009, L 309/71].