Spanish’s experience on improving inspection of sprayers: official manual for ISO 16122 and ISO 16119

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Introduction – Why additional guidelines?

- European Directive 2009/127/EC establishes the environmental and safety requirements to be met for new sprayers.
- ISO 16119 and ISO 16122 are focused on new sprayers and sprayers in use, respectively.
- However, these standards are not always easy to understand.
- Official inspectors and spray manufacturers were sudden receivers of new EU standards, applying them without previous experience.

Directive 2009/127/CE

EN ISO 16119
Two practical publications to help stakeholders to understand ISO 16119 and ISO 16122
Difficulties to follow International Standards on a daily inspection activity

Official documents

Establishing the technical procedure for a complete inspection of sprayers in use (EN ISO 16122 series) are not a good example of clear, objective and easy to read documents.

Difficulty

These facts lead to a difficulty in the interpretation and application of technical requirements during an inspection process.

Technicians

This feeling is widely disseminated in general among technicians when talking about the official standard documents.
Difficulties to follow International Standards on a daily inspection activity - ISO 16122

Example: Pressure drop, how to measure it?
Great success of first official Manual for inspection of sprayers in use

2012 – More than 3000 units
Five editions
EN 13790

2017 – Modified according
ISO 16122 (1,2 & 3)
This tool is mainly focused and dedicated to facilitate the comprehension of the whole procedure for the official inspectors and inspection’s workshop responsible.
The new software has been adapted according the structure of the new manual of inspections.

**PRITEAF Software structure**

- **Inspections database**
- **Sprayers database**
- **Holders database**

**Modules**

- Module for generating reports and communications
- Module for data acquisition

**Databases**

- Database of sprayer models
- Database of nozzles
PRITEAF – Useful database

Spray manufacturers

Spray Nozzles

Owners / inspections

Unidad de Mecanización Agraria
http://uma.deab.upc.edu
Importance of guarantee the quality of new sprayers: Manual for manufactures

- European Directive 2009/127/EC establishes the environmental and safety requirements to be accomplished for new sprayers
- As a consequence, a new ISO 16119 series was published as a tool to help the sprayer’s manufacturers to fulfill all the mandatory requirements
  - But the standard is very complex and the tests included are expensive and time-consuming.
Difficulties to accomplish the complete requirements of ISO 16119

To accomplish the point 5.1.1 is needed to consult 9 more ISO normative. This difficulties a lot the work of the manufacturers.

Diagram:
- 5.1.1 Spray tank
  - 5.1.1.1 Surfaces
    - ISO 9357
  - 5.1.1.2 Filling
    - ISO 4288
    - ISO 21278-2
  - 5.1.1.3 Emptying
    - ISO 13440
    - ISO 4254-6
  - 5.1.1.4 Tank contents indicator
    - ISO 9357
  - 5.1.1.5 Mixing
    - ISO 5682-2
A practical guideline

- UMA-UPC has developed a practical guideline as a requirement of the Spanish Association of Agricultural Machinery Manufacturers (ANSEMAT).

- It is important to a fluent exchange between national representative on International Standardization Bodies and local manufacturers.
Technical guideline (87 pages) with detailed explanation about test methods, material, procedure and evaluation results following ISO 16119 (1,2&3)
Example: evaluation of cleaning system

1. Deposit the liquid until reaching the nominal capacity.

2. Incorporate the copper oxidizing agent until achieving a concentration of 1%.

3. Extract three samples and determine the average concentration.

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<thead>
<tr>
<th>Tipo de muestra</th>
<th>mg/l</th>
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<tbody>
<tr>
<td>Concentración del líquido de referencia (antes de la limpieza)</td>
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<tr>
<td>Muestra 1 (C_{R1})</td>
<td>11610</td>
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<td>Muestra 2 (C_{R2})</td>
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<td>Muestra 3 (C_{R3})</td>
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<td>Concentración media (C_{RM})</td>
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<td>Concentración después de la limpieza (tanque A)</td>
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<td>Muestra 1 (C_{A1})</td>
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<td>Muestra 1 (C_{A3})</td>
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<td>Concentración media (C_{AM})</td>
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<tr>
<td>Cálculo de la fracción residual tras la limpieza (%)</td>
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<tr>
<td>$F(%) = \frac{C_{AM}}{C_{RM}} \times 100$</td>
<td>6.61%</td>
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</table>

<table>
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<th>Concentración tanque A (mg/L)</th>
<th>Concentración tanque B (mg/L)</th>
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<td>Muestra 3 (C_{R3})</td>
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<tr>
<td>Media (C_{RM})</td>
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<td>Media (C_{AM})</td>
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<td>Volumen A (L)</td>
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<td>Volumen A (L)</td>
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<td>Residuo (m)</td>
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</table>
SPISE ADVICE linked to ISO 16119 & Directive 2009/127/CE
Feedback from sprayer’s manufacturers

- This guidelines helps them for a complete knowledge and awareness about the mandatory requirements.

- Demonstrate that it is really difficult a complete arrangement of requested tests, especially for SME

- Spanish manufacturers are really interested in the complete accomplishment of mandatory requirements. However, sometimes it seems really difficult and expensive
Importance of guarantee the quality of new sprayers: Manual for manufactures

Easier way to understand the ISO 16119

Coordinated with the Spanish Manufacturers (ANSEMAT)

Clear and practical information

Supported by pictures and graphical information

It is important to improve the communication and feedback in order to guarantee a clear and useful information
Conclusions

- The Spanish experience has widely demonstrated the interest for a good guideline as support for the fully accomplishment of the official international standards.

- Due to different reasons, unfortunately in some cases, ISO 16122 result unclear and tricky interpretable, resulting on a difference criterion of interpretations.

- The implementation and official publication of a manual for inspections resulted clearly well appreciated by all the official inspection’s workshops in Spain.

- Concerning the difficulties to apply the ISO 16119 it has been clearly detected deriving in an unintentional non accomplishment of the technical requirements.

- In this sense, as a requirement of the Spanish Association of Agricultural Machinery Manufacturers (ANSEMAT), UMA-UPC has developed a practical guideline with clear and practical information including real examples
Thank you very much for your attention