

ENAMA “Certification” of the inspection workshop activity: the necessary requirements

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DOI 10.5073/jka.2015.449.0014

Summary

In European Directive 128/2009/EC it is stated that “each Member State shall establish certificate systems designed to allow the verification of sprayers inspections”, but no further indications are provided on how to make such certifications. In Italy the ENAMA (National Board for Agricultural Mechanization) working group – established to co-ordinate the sprayers inspection activities at national level – has prepared a specific document containing the guidelines on how to get, on a voluntary basis, an ENAMA certification which attests the conformity of test equipment and of test procedures adopted in the inspection workshops. In this document directions are reported on how to assess the conformity of the inspection workshops to a set of listed requirements, referred either to other ENAMA documents, or to the National Action Plan, or to ISO/IEC 17020.

The ENAMA certification of conformity therefore represents an added value for the sprayers inspection and calibrations Workshops as it ensures, through periodical inspections, that workshops apply the correct administrative (e.g. management of data and record of test reports) and technical procedures in their inspection activity and that they use appropriate test equipment and instruments.

In this paper the requirements needed to get and to maintain over time the ENAMA certification of conformity are described.

Introduction

European Directive 2009/128/EC (Art. 8) requires that “Each Member State shall establish certificate systems designed to allow the verification of inspections and recognize the certificates granted in other Member States”, but no further indications are provided on how to make such certifications.

Following the Directive 128, Italian NAP (National Action Plan) requires that “Inspection Workshops shall be equipped with suitable equipment for carrying out inspection activity and shall ensure that no environmental pollution is produced during test”.

In Italy the ENAMA (National Board for Agricultural Mechanization) Working Group has defined guidelines on how to get, on a voluntary basis, an ENAMA certification which attests the conformity of test equipment and of test procedures adopted in the inspection Workshops. Main topics examined in the Enama guidelines are:

1. Minimal characteristics of the workshops facilities;
2. Minimal characteristics of the workshops test equipment and instruments;
3. Procedures for data management data transmission and bureaucracy.

To realize this document Italian NAP and International Standard ISO/IEC 17020 was taken principally as reference. In details, the parts of the ISO/IEC 17020 Standard concerning the administrative requirements, the data and inspection results management (privacy poli-

cies), the quality of inspection activity, the equipment used, the inspection methods and the recording of inspection/calibration results (test reports and inspection certificates) related to workshops were taken into account.

This kind of voluntary certification is therefore an added value for workshop that already have the official authorization to make sprayers inspection/calibration.

Workshops officially authorized to make sprayers inspection/calibration that ask for the ENAMA certification must provide ENAMA with a set of documents concerning their activity, structures, technical personnel and equipment used to inspect sprayers. The following documents have to be attached to the request form for the ENAMA certification:

- names and licenses of the technicians who make sprayers inspection in the workshop;
- declaration in which the workshop agrees to transfer the results of sprayers inspection/calibrations to the reference board (e.g. Regional office of agriculture) at regular intervals, by internet and ad hoc software;
- declaration in which the workshop agrees to allow his licensed technicians to attend the periodical refreshment courses organized by the local/national Administration;
- declaration in which the workshop confirms that the inspection/calibration activity carried out is complying with the impartiality principles and privacy policies.

Minimal characteristics of the Workshops facilities

Workshops (fixed or mobile) officially authorized by local administration to make sprayers inspection and calibrations must be equipped with adequate protection from the influences of weather (wind and rain) of the place in which are carried out sprayer inspection/calibration activities. In particular, “fixed” workshops shall be equipped with a shed or a specific “test area”



Fig. 1. Examples of fixed and mobile Workshops.

“Mobile” Workshops shall also be equipped with protective structures (protective cover or mobile hangar) against the influences of environmental factors or, alternatively, shall be able to record, with adequate instruments, atmospheric data that may affect the proper performance of inspection.



Fig. 2. Example of test area of fixed workshop.



Fig. 3. Mobile hangar.

Workshops that inspect field crop sprayers shall be able to ensure that the place where the inspection/calibration is carried out is large enough to accommodate a proper verification of distribution uniformity of the boom throughout its full length.

All Workshops shall have a flat area equipped with a suitable system for collection and disposal of liquid sprayed during inspection/calibration and with structures able to ensure that there are no leaks of polluting residues generated by sprayer inspected/calibrated.



Fig. 4. Place where the inspection/calibration is carried out shall be large enough to accommodate a proper verification of distribution uniformity of the boom throughout its full length.



Fig. 5. Examples of systems for collection and disposal of liquid sprayed and for ensuring that there are no leaks of polluting residues generated by the sprayer.

During and after inspection/calibration, it shall be possible to clean the equipment and test benches used and it shall be possible to collect and properly dispose of all wastes produced.

If inspection/ calibration is made indoors, a system to properly recover tractor or self propelled sprayers exhaust gases shall be available.



Fig. 6. Example of system for collection and properly disposal of all wastes produced during sprayer inspection/ calibration.

Minimal characteristics of the workshops test equipment and instruments

All equipment used for sprayers inspection/calibration must follow ISO FDIS 16122 2-3 requirements and be provided (or better “certified”) with an official documentation issued by an official Board. For example, **Analogue pressure indicators** used for verification shall have a minimum diameter of 100 mm. Other minimum requirements on pressure indicators used for verification are given in Table 1.

Pressure to measure	Scale unit max.	Accuracy	Class required	Scale end value
Δp bar	bar	bar		bar
$0 < \Delta p \leq 6$	0,1	0,1	1,6	6
			1,0	10
			0,6	16
$6 < \Delta p \leq 16$	0,2	0,25	1,6	16
			1,0	25
			1,0	40
			1,6	60
			1,0	100

1 bar = 0,1 MPa = 0,1 N/mm² = 10⁵ N/m²

Tab. 1. Characteristics of pressure indicators used for verification (values in accordance with EN 837-1).

Concerning **test equipment for pump capacity test**, the error of the flow meter shall not exceed $\pm 2\%$ of the measured value when the capacity of the pump is > 100 l/min and 2 l/min when the capacity of the pump is < 100 l/min. The flow measuring device shall have a transparent part to identify air leakages on the pump's suction side and the test equipment shall have a provision that the pressure can be increased up to 10 bar.

Horizontal patternator shall have grooves 100 mm wide and at least 80 mm deep, measured as a distance between the top and the bottom of the groove, shall be used to measure the uniformity of the transverse volume distribution of the spray. The groove patternator shall be at least 1,5 m long. The groove width shall be $100 \text{ mm} \pm 2,5 \text{ mm}$. The groove width of a patternator working in steps with electronic data sampling (e.g. scanners) shall be $100 \text{ mm} \pm 1 \text{ mm}$. The graduated spray liquid measuring cylinders shall be of the same type and size and have a capacity of at least 500 ml. Scale graduation shall be a maximum of 10 ml. The error of measurement shall not be more than 10 ml or $\pm 2\%$ of the measured value whichever is greater. When passing the measuring track, positioning in single steps shall be completed with an accuracy of ± 20 mm. The measuring error of the volume of the single grooves at a flow volume of 300 ml/min shall be less than $\pm 4\%$.

In this respect, it is recalled that in Italy during 2013 was issued the first certificate ENAMA/ENTAM of an horizontal patternator (www.enama.it/certificati/enama_cer_90-001_en.pdf).

Equipment used to carry out inspection/calibration shall be periodically (e.g. every two years) subjected to controls to provide their functionality. Reference instruments (pressure gauge, flowmeter, balances...) shall be calibrated by competent national bodies (e.g. for Italy - [https:// www.accredia.it/context.jsp?ID_LINK=750&area=7](https://www.accredia.it/context.jsp?ID_LINK=750&area=7)).



Fig. 7. ENTAM test report of a horizontal patternator.

Concerning **vertical patternator**, no indications are available in ISO Standard. In Italy, ENAMA technical workgroup has defined following minimal technical characteristics:

1. Size of each single collector (in case of test benches having discrete elements) $\geq 180 \times 220$ mm;
2. It shall be possible to collect the sprayed liquid along the whole height of the spray plume without any interruption. Vertical distance between two adjacent collectors shall be ≤ 300 mm;
3. Reproducibility of measurements: $CV \leq 10\%$, determined after 4 test replicates and referred to the complete vertical spray pattern obtained through the amount of liquid collected in the graduated cylinders which shall have a capacity ≥ 50 ml and content scale $\leq 1\%$ of their capacity.

Procedures for data management, data transmission and bureaucracy

All work carried out by certified Workshop shall be documented. These documents shall be contain both inspection/calibration results, both information required to understand and interpret them.

Results of functional inspection/calibration shall be sent to ENAMA (or other board indicated by ENAMA) at the end of each control or within 15 days. In case of delay or non-delivery, Workshop shall provide written reasons to ENAMA.

Workshops that have the ENAMA certification are subjected to checks that are carried out systematically every two years by an organization nominated by ENAMA:

- control of the validity of the official license for sprayers inspections and its registration in the national database
- correct application of the test methods for sprayers inspections reported in the ENAMA documents

- management of data collected during the sprayers inspection using the appropriate official forms
- correct storage of the documents on informatics support
- efficiency of the equipment used to make the sprayers inspections.

Both workshops and licensed technicians are checked either during the inspections or afterwards on the already inspected sprayers; in this latter case it is checked the exactness of the inspection results reported in the official documentation.

More attention however will be focused on equipment and instruments used for the inspections, examining the documents related to their calibration and functionality.

ENAMA workshop certification has a four-year validity. Within three months after the end of the four years period, the workshop may request a renewal. When the workshop is not more suited, ENAMA can withdraw the certification or can reject the request for renewal. The withdrawal of the ENAMA certification is automatic if the workshop official authorization (at Regional level) to make sprayers inspections is suspended or withdrawn for any reason.

Workshop shall have a documented procedure concerning modes of behavior in case of complaints received in relation to functional control activity or its results.

Workshop and its staff shall ensure their independence of judgment and integrity in relation to their activities and ensure the confidentiality of information obtained during inspection/calibration activity.

Final considerations

Workshop certification of conformity means certainly an added value for the sprayers inspection Workshops because it ensures that Workshops apply the correct administrative (e.g. management of data and record of test reports) and technical procedures in their inspection activities and that they use appropriate test equipment.

Workshop Certification of conformity is believed to be essential for Workshop activities mutual recognition and ENAMA guidelines could be a first reference document to define SPISE advices on how to make Workshop Certification of conformity.

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Acknowledgments

Authors wish to acknowledge all the components of the ENAMA Working Group dealing with inspection of sprayers in use for their valuable contribution in developing ENAMA guidelines for certification of workshops.