“Expert Group Meeting (EGM): Development of an economically, environmentally and socially sustainable agricultural machinery and farm implements testing network for farmers in the Asia – Pacific Region”

Laying a foundation for testing agricultural machinery and farm implements: The European Network for Testing Agricultural Machinery

Sandro Liberatori
Bangkok, July 2011
This presentation gives a quick view on the following items:

1 - importance of tested and certified machines;

2 - status of the art in the European Union;

3 - Italian experience of Enama as a way to promote synergies for the industry, the trade and the use of agricultural machines;

4 – The ENTAM Network;

5 - policies and strategies for the future (development of safety of the operators, the environment and the agricultural production – food - and the establishment of good practices for the co-operation among countries according to international regulations for trade).
1 - *Importance of tested and certified machines.*

In first-party certification, an individual or organization providing the good or service offers assurance that it meets certain claims.

In second-party certification, an association to which the individual or organization belongs provides the assurance.

Third-party certification involves an independent assessment declaring that specified requirements pertaining to a product, person, process or management system have been met.
2 - Status of the art in the European Union.

Road Homologation: machines need an official homologation to drive on public roads;

Machine Directive: contains the requirements for a machine to be sold in the EU market;

OECD: provides for an international scheme for certification with technical requirements and testing methodologies of tractors;

Standard Organisations: public (EN) or private (ISO) organisations providing for technical requirements and specification.
3 - Italian experience of Enama as a way to promote synergies for the industry, the trade and the use of agricultural machines.

Added value on the product

NOT TESTED

TESTED
3 - Italian experience of Enama as a way to promote synergies for the industry, the trade and the use of agricultural machines.

ENAMA has developed 2 types of “voluntary certification” of new machines:

- Certification of performances + safety
- Certification of safety

And a service of fulfilment of safety requirements of used machines will start at the end of 2006.
At the end of 2010 approx. 1100 machines received the Enama certification.

3 - Italian experience of Enama as a way to promote synergies for the industry, the trade and the use of agricultural machines.
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European Network for Testing Agricultural Machines

www.entam.net
ENTAM acts through TWG where all Members have an expert providing for technical methodologies that are approved at international level. Methodologies are based on international standards.
Applying for and obtaining the ENTAM mark on the reports means that the manufacturer operates in an international market and it is ensured that all appropriate standards have been used giving the farmer an effective tool for the best choice when buying machines.
4 – The ENTAM Network.

ENTAM - Test Report

Assessment table

<table>
<thead>
<tr>
<th>No.</th>
<th>Contents</th>
<th>600 l</th>
<th>800 l</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spray tank surface roughness</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>2</td>
<td>Spray tank over volume</td>
<td>XXX</td>
<td>XX</td>
</tr>
<tr>
<td>3</td>
<td>Volume of total residual</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>4</td>
<td>Spray tank contents gauge up to 20% filling</td>
<td>X</td>
<td>XX</td>
</tr>
<tr>
<td>5</td>
<td>Spray tank contents gauge from 20% filling</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>6</td>
<td>Agitation system (deviation of even solution)</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>7</td>
<td>Pressure drop between manometer and nozzle</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>8</td>
<td>Deviation of single nozzle output from table</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>9</td>
<td>Accuracy of pressure gauge</td>
<td>XXX</td>
<td>XXX</td>
</tr>
<tr>
<td>10</td>
<td>Liquid flow rate left/right</td>
<td>XXX</td>
<td>X</td>
</tr>
<tr>
<td>11</td>
<td>Rinsing water tank</td>
<td>XX</td>
<td>X</td>
</tr>
</tbody>
</table>

Note: The assessment keys are listed below. All detailed results are in the following test report.

Free download of the complete test report: www.ENTAM.net or www.ENAMA.it
Description of sprayer

The machine is a trailed air-assisted sprayer for use on vineyard crops. Liquid is sprayed under pressure, while drops are conveyed via an airflow generated by an axial fan. The distribution system consists of an axial fan with the nozzles radiating out from inside the air outlet section. The speed of rotation of the fan may be modified via a 2-speed gear (+ disengagement).

The machine frame is made out of galvanised steel, the main and auxiliary tanks are made out of polyethylene. The main tank is equipped with two content indicators, one on the front right and the other on the left side. The liquid level is indicated by a transparent external tube. On top of the machine there is the auxiliary tank for cleaning the distribution circuit, while the auxiliary tank for the operator is in the centre front.

The diaphragm pump is located at the front of the machine and is operated by the PTO unit via the cardan shaft.

The hydraulic circuit is of the constant pressure type. The machine can be endowed with manual controls positioned on a mobile unit that can be placed near the driver’s seat, or with electrical controls.

The machine’s pressure gauge has a diameter of 100 mm and is in the precision class K1 1.6 in the 0–15 bar interval; in the same interval, covering an angle of the face of 225°, there are 0.2 bar intervals. The remainder of the gauge (15–60 bar) covers an arc of 90° and is in 5.0 bar intervals.

Each nozzle can be closed singly, and is endowed with a membrane antidrip device.

The filtering system consists of a filter fitted to the pump suction unit (that can be inspected even when the tank is full) and one filter located on the nozzle delivery pipes; there is also a strainer filter in the filling hole.

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Dimensions and weights

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length</td>
<td>3000 mm</td>
</tr>
<tr>
<td>Height</td>
<td>1300 mm</td>
</tr>
<tr>
<td>Transportation width</td>
<td>1140 mm</td>
</tr>
<tr>
<td>Unloaded weight</td>
<td>335 kg</td>
</tr>
</tbody>
</table>
4 – The ENTAM Network.

Main results of functional tests

<table>
<thead>
<tr>
<th>In the tank</th>
<th>Residual (l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>horizontal</td>
<td>--</td>
</tr>
<tr>
<td>with back flow - with agitation</td>
<td>--</td>
</tr>
<tr>
<td>without back flow - without agitation</td>
<td>1.10</td>
</tr>
<tr>
<td>inclined to right</td>
<td>2.20</td>
</tr>
<tr>
<td>inclined to left</td>
<td>2.00</td>
</tr>
<tr>
<td>inclined to rear</td>
<td>4.70</td>
</tr>
<tr>
<td>inclined to front</td>
<td>4.30</td>
</tr>
<tr>
<td>in the hoses, dilutable</td>
<td>5.20</td>
</tr>
<tr>
<td>dilutable residual</td>
<td>9.80</td>
</tr>
<tr>
<td>in the hoses, non-dilutable</td>
<td>0.80</td>
</tr>
<tr>
<td>total residual</td>
<td>16.70</td>
</tr>
</tbody>
</table>

* Liquid that can flow back into the main tank and can be diluted by the mixing tank contents
* Liquid that can flow back into the main tank

Agitator performance

- 800
- 500

Pressure gauge

- Diameter: 150 mm
- Distance between marks: 0.2 bar
- Accuracy: 0.04 bar

Fan

- Flow rate: 33170 m³/h
- Power needed: 16.9 kW

Sizes and weights

<table>
<thead>
<tr>
<th>Extension</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Fan blade height (mm)</th>
<th>Fan blade length (mm)</th>
<th>Fan wheel pitch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend Plus 600/7</td>
<td>3000</td>
<td>1140</td>
<td>1300</td>
<td>335</td>
<td>1180</td>
</tr>
<tr>
<td>Trend Plus 800/8</td>
<td>3000</td>
<td>1140</td>
<td>1300</td>
<td>335</td>
<td>1300</td>
</tr>
</tbody>
</table>

Air velocity measured 0.50 m from outlet

Gear I

Gear II
Testing of Safety
The machine is endowed with CE marking, an identification plate, safety pictograms, an instruction handbook and an EC manufacturer’s declaration of conformity.
The implement meets the requirements of Enama safety regulations cat. 05.05 – Crop protection machines: Trailed boom sprayers - rev. 2.4 of 1/04/2008, containing the following harmonised standards and technical specifications: UNI EN 907: 1998, UNI EN 1553: 2001, ISO 11684: 1995. The relative documentation has been filed.

Explanation on testing
Testing takes place according to the Technical Instructions for ENTAM-Tests of Air-Assisted Sprayers (Rel. 1 and Rel. 3). This procedure was developed by the competent testing authorities of the European countries participating in ENTAM and is based on the CEN standard EN 12761 “Agricultural and forestry machinery – Plant protection equipment for the application of plant protection products and liquid fertilizers”. This test is only a technical performance test which takes place without an accompanying field test.
The test results apply only to the tested appurtenances of the sprayer. Statements on the behaviour of the sprayer with different appurtenances cannot be derived from this results.
It is the “conformity assurance” of products / processes to Technical Regulations (mandatory certification) or to Technical Standards or equivalent documents (voluntary certification).

therefore

the voluntary certification is intended to assess conformity of products to the requirements established by voluntary Technical Standards or equivalent normative documents. They are produced with the consensus of all interested parties.

and

it guarantees the manufacturer, the dealer and the farmer that they are producing, selling and using a high value and safe machine;

it helps manufacturers to improve their products.
5 – Policies and strategies for the future.

Future steps to be developed gradually:

1 – setting up of methodologies with the consensus of all involved parties (they should involve safety of the operator of the environment and agricultural production);

2 – setting up of testing facilities;

3 – setting up of regulations and policies that will favour tested machines.

Benefit for the operator’s safety, the environment and productions

= Reduction of social costs for the health and environment and better prices for agricultural products
THE PRICE OF A PRODUCT IS A POWERFUL TOOL BUT NOT ENOUGH TO BE ON A MARKET WHERE ACTORS SEEK FOR GLOBAL QUALITY

THEN

PLAN AND PRODUCE MACHINES ACCORDING TO THE NEEDS OF THE CUSTOMER, THE ENVIRONMENT, THE SAFETY, THE ETHICAL MODELS etc. TOGETHER WITH CO-OPERATION IS THE PRESCRIPTION TO GROW IN A MARKET
Ambrogio Lorenzetti – 14th century

Good Government

Bad Government
SOME TOPICS FOR THE DISCUSSION

1 ORGANISATION OF THE ANTAM NETWORK: relation with Governments, role of the existing testing stations, interest of manufacturers and farmers, costs, ...

2 HOW TO START: identification of key sectors (tractors and sprayers ?), methodologies, ...

3 ROLE OF COUNTRIES: benefits for countries producing and importing machines, ...
Thank you and special thanks to the organisers of the Meeting.