A greener approach to crop protection

by Jean-Christophe Rousseau, Chair, ISO/TC 23/SC 6, Equipment for crop protection

Growing awareness of environmental and health issues has brought into question the use of pesticides in agriculture – an increasingly controversial issue. Yet, there is also a pressing need to find viable solutions to feed the world's populations. The use of pesticides is essential here to ensure efficient food production on a quantitative, as well as qualitative and economic level.

In recent years, emphasis has been placed on a reasonable use of pesticides that is compatible with sustainable development. Some countries have tended towards a reduction in the quantities used. More generally, policies have given priority to the development of good practices in the use of phytosanitary products.

The middle link

To date, the focus of regulations has been at the two ends of the chain. At one end, to authorize the marketing of phytosanitary products through very strict approval procedures and, at the other end, to set maximum residue limits for plant foodstuffs.

In the future, and particularly in Europe when the European Commission's *Thematic Strategy on the sustainable use of pesticides* comes into force, emphasis will be increasingly placed on the intermediate link of the chain. This will become notable with the introduction of measures related to:

- practices – recycling of empty packaging, management of phytosanitary effluents;
- users – compulsory training and certification of users;
- application equipment – mandatory inspection of sprayers in use, environmental certification of new equipment.

Technical committee ISO/TC 23/SC 6, *Equipment for crop protection*, has long anticipated such regulatory developments. During the course of the 1970s and1980s, its work mainly addressed the functional parts of sprayers, but since the 1990s the committee's attention has inclined towards aspects related to user safety and environmental protection. This approach can be seen in several examples of recent or ongoing work.

Hoppers to reduce risk

In the application process, one of the most risky steps for both the operator and the environment is the preparation phase of the spray mixture, and in particular the introduction of phytosanitary products into the sprayer tank. This is because it involves the handling of pure, and therefore concentrated, products.

On earlier equipment, the product had to be poured directly into the tank. Today, all equipment with a filling aperture located at a height of more than 1500 mm from the ground or from a platform

must be fitted with an induction hopper. This type of hopper is able to transfer the chemical product into the sprayer, partially mix the chemical product, and even carry out self-cleaning. Free-standing hoppers which can be connected to the sprayer are also available.

In this context, a new subject of study was initiated in 2005. With a membership comprising experts from various sectors and countries – test laboratories, manufacturers, development consultants, from France, Germany, Italy, Sweden and the United Kingdom – working group WG 11, Induction hoppers, developed a two-part standard.

Just published, Part 1 of ISO 21278:2008, *Equipment for crop protection – Induction hoppers,* specifies test methods, whilst Part 2 addresses general requirements and performance limits. This standard incorporates criteria relating not only to performance but also to safety and respect for the environment, namely:

- speed of induction of various forms of products (liquid, powder, or granules);
- efficiency of the bowl-rinsing device;
- efficiency of the can-rinsing device incorporated in the hopper.

Comparative tests carried out between various hoppers available on the market have revealed significant performance discrepancies, showing that there is scope for considerable improvements to be realized in a number of cases. This new standard will provide invaluable help to manufacturers who, from now on, will have a method to assess their equipment and advance the quality of their products, with benefit for both user safety and the environment.

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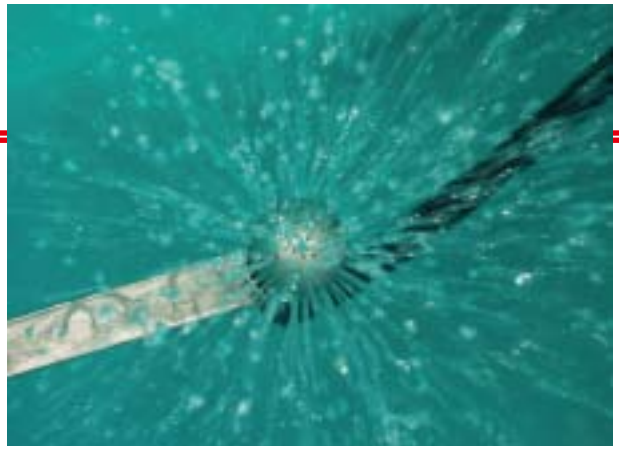
Rinsing for good practice

Another example is the rinsing of sprayers. Until now, the main aim of this operation has been to prevent problems during subsequent treatments: unwanted clogging for one, and for another, phytotoxicity risks in the event of the application of a herbicide product.

Rinsing, which is now part of good practices of application, is mainly recommended because of its potential impact on the environment. Indeed, rinsing in the field, which allows dilution or even emptying of the bottom of the tank onsite after dilution, is one of the most efficient methods of managing any residual volume at the end of the application. It also helps to limit to a minimum the risk of pollution from point sources. The European project TOPPS "Training the operators to prevent pollution from point sources" has clearly highlighted the efficiency of this practice.



"Reducing the volume of residual in sprayers is one of the best ways to limit the volumes of phytosanitary residues."

Subcommittee SC 6 has worked on this issue for many years and developed several standards related to the rinsing process:

ISO 13440:1996, *Equipment for crop protection – Agricultural sprayers – Determination of the volume of total residual*, specifies a method for measuring the volume of residual of sprayers. The volume of residual is the part of the spray mixture which, at the end of the application, cannot be sprayed by the

About the author

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device for technical reasons related to the device itself.

In practical terms, it is the volume of the spray mixture that remains in the sprayer when the pump loses pressure. The lower the volume of residual in the device, the less residues it generates at the end of the application and the easier it is to rinse. The residual volume of the sprayer depends on its design but also on the rinsing method used. Reducing the volume of residual in sprayers is one of the best ways to limit the volumes of phytosanitary residues.

More recently WG 6, *Sprayer cleaning*, developed a standard allowing the efficiency of sprayer rinsing systems to be measured. Published in 2004, ISO 22368, *Crop protection equipment – Test methods for the evaluation of cleaning systems*, is in three parts:

- **Part 1:** *Internal cleaning of complete sprayers* (tank and sprayer);
- **Part 2:** *External cleaning of sprayers*;
- **Part 3:** *Internal cleaning of tank.*

Tests on different types of sprayers are underway in order to determine performance thresholds.

Accent on respect

It would be possible to discuss many other examples of past, ongoing and planned work within SC 6, connected with issues of user safety or the environment. Subjects such as measurement of the drift on the field and in the laboratory, safety requirements of knapsack sprayers, safety requirements and performance limits of knapsack atomizers, traceability, among others.

Much of this work has inspired legislators. All of it clearly illustrates ISO/TC 23/SC 6's contribution to promoting application techniques in crop protection with an accent on respect – of user safety, of the environment, of the consumer, and ultimately of us all.