

CHEMICAL HANDLING

The benefits of getting it right, by RICHARD GARNETT

Why should owners and operators of sprayers be concerned about the way chemical products find their way from the container or packet in which it is sold and into the sprayer? In the current atmosphere it may seem to many greenkeepers that this is a question of minor importance, but a combination of increasing public interest and the following considerations may cause many users to re-appraise their methods.

From the beginning, the selection of agrochemical products of low toxicity along with packaging type and size is very important. Select the products you want, but request that the package has the latest features to improve handling. With liquid products, the new wide neck containers (63mm) with separate handles give much better results for emptying and rinsing times. If possible, order chemical in pack sizes to suit your requirements as the bigger the pack, the faster it loads the chemical and also facilitates easier rinsing and disposal of the empties.

Clean opening of the container may be further improved by using the new spanners for undoing the caps, which are often tighter than most people's grip and turn abilities. The spanner from Inpack Systems is double sided. On one side there is a grip to match all 63mm caps and a short handle. When the cap is removed the spanner is turned over and pushed into the foil seal to penetrate it. A further twist cuts the seal out and no longer requires the use of a penknife, screwdriver or thumb-nail!

Pouring chemical into the sprayer is the highest risk portion of the whole activity and to stand and pour then rinse takes a considerable time. Risk when using any type of chemical, be it pesticide or household bleach, can be simply viewed as the result of handling a potentially toxic substance and the number of times exposure occurs. In other words $RISK = TOXICITY \times EXPOSURE$. If we assume that all types of chemical have some toxicity, then the simple approach to reduce risk is to minimise exposure. Good planning and a well thought out approach to emptying and rinsing will dramatically reduce risk to both the operator and the environment.

One of the new advances to look out for will be sealed containers that may be connected to your filling system or sprayer and which provide direct transfer of the chemical. If current trials with these systems by leading Agrochemical companies prove successful, then your dealer may have them available in 18-24 months.

The added bonus to this type of container is that once empty, the operator disconnects and, because the container remains sealed, no rinsing is required and it is then returned for refilling with the same product.

In most operations measuring of chemical is required. Use a clean, accurate and easily readable measuring jug with a stable base. The most effective method of measurement is to use a fully closed measurement and transfer system which allows full control of the process.

When dry products are used, select if possible the new formulations which are Dry Flowable or Water Dispersible granules. These are much easier to handle and produce much less dust – so reducing risk by inhalation. Many of these new formulations will be available in water soluble packaging, making disposal of the outer pack even easier and handling safer.

Whatever formulation and packaging is used, increases in efficiency and decreases in risk can be achieved by using low level induction bowls, and particularly the new closed transfer systems. Using this type of equipment removes the need to clamber on to the tank and risk slipping off, rubbing against dried-on spray materials and removing the risk of spilling when climbing.

As recently publicised, the Health and Safety Executive, the Agricultural Engineers Association and the British Standards Institute are working closely together to define improved methods of chemical handling and loading. Safety inspectors are expecting to see such systems employed as soon as possible. The Environmental Protection Agency in the USA have assessed that a full system will reduce operator and environmental contamination dramatically. In tests, the use of fully closed systems reduced operator dermal contamination by 90% and inhalation risk by 85%.

General

- 1 Transfer of pesticide from its original container to the spraying machine without contaminating the operator or the environment.
- 2 Accurate measurement of the quantity of pesticide to be mixed where necessary.
- 3) Rinsing of both the container and the transfer device with the washings returned to the application equipment and ultimately the target
- 4 The device should be acceptable to management and operators, both in terms of technology and cost measured on a comparative basis to chemical usage and application equipment value.
- 5 To be effective, the device should offer a progressive approach beginning at an easily affordable and useful system for bulk dilution but leading to common container access methods



and simplicity of approach to environmentally sounder packaging. The ultimate aim should be inexpensive direct metering of chemical to the target with the minimum of contamination to the equipment. This must be achieved with a system simple enough to fit any application, handling and measuring equipment using basic tools and skills.

- 6 Container rinsing prior to disposal.
- 7 Facilitate recycling and re-use where possible for refilling.

Specific

- 8 Adapt to ANY chemical/pesticide container shape, size and closure dimensions.
- 9 Operation of the system should take no more time than traditional methods.
- 10 Use of the system should significantly reduce the safety clothing requirements ideally down to gloves only.
- 11 The system must be acceptable to the health and safety legislators and should be acceptable in general terms to: (a) chemical/pesticide manufacturers (b) application, handling and measuring equipment manufacturers (c) the environmental lobby (d) the users.
- 12 The system should not be dependent on the container or chemical manufacturers for its success.
- 13 The system should allow for special packaging at a future date for added safety.
- 14 The occasional use of powders and granules and soluble packaging must be catered for.
- 15 Filling, operating, cleaning and maintenance should be inexpensive, quick and simple, i.e. be reasonably practicable.
- 16 The system should offer scope for advancement in technology and practices.
- 17 The system should allow for containers being removed partially empty.
- 18 Connection between containers and the device should be made using a 'dry break coupling' that allows less than 1ml of concentrated active residue per break.
- 19 If containers are to be rinsed then this should take place prior to removal, and all rinsate should be directed to the tank. The system should remain 'closed' throughout the process and perform under a range of conditions up to a level that ensures a residue of less than 0.01% of the container's original volume.

■ The author, former college machinery lecturer, Richard Garnett, is designer of the award winning Wisdom closed transfer system for chemical handling.

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