

# Closed transfer systems offer salvation for pesticide products

Tightening regulations mean it is probable some pesticides will have to be transferred into sprayers using a closed induction system. **Adam Clarke** finds out what is being done to develop an industry-wide standard to reduce the risk of operator exposure

**S**prayer operators may soon be required to use a closed system for transferring certain liquid pesticides from the can to the spray tank and, for the first time, key industry players have united to find a standardised system to minimise operator exposure.

A closed transfer system (CTS) is a device that allows neat pesticide mixture to be transferred from its container to the spray tank with negligible exposure to the operator and the environment.

Such devices have been available for many years and the pesticide industry has attempted to introduce them across Europe and the US in the past, but with limited success.

This was primarily down to the failure of the crop protection companies to work together to develop an international standard for CTS and sprayer manufacturers and agrochemical firms to adhere to.

However, ever-increasing regulatory pressure on plant protection products has caused the industry to address the issue with urgency.

## PRODUCTS UNDER THREAT

As ag-chem companies bring new active ingredients to market or re-register existing ones, increased



The EziConnect's use of suction and air helps speed up the filling process

through consultation with sprayer manufacturers and agrochemical companies.

"The need for an ISO standard is not about the design, but about ensuring any system that comes to the market is performing to set criteria," he explains.

It is hoped that the new standard, combined with innovative CTS designs that are widely accepted by all parties will result in wholesale adoption across the EU to benefit operators, the environment and minimise product losses.

## IMPROVED EFFICIENCY

In addition to these crucial benefits, Mr Garnett points out there is also much more interest in efficiency on farm and says the average sprayer takes about 40 minutes to load.

"About 10 minutes is filling the sprayer with water, so the other 30 minutes [loading chemical] is relatively inefficient and the right closed transfer system and packaging can help improve that," he adds.

Mr Robinson gauged the willingness of sprayer manufacturers to incorporate CTSs into their design or offer retrofit alternatives at Cereals 2016 and all were keen.

The same is also true of two major agrochemical manufacturers – Bayer and BASF. Bayer's application and stewardship coordinator Alice Johnson says it is important the industry follows the project

importance is being placed on reducing operator exposure, explains pesticide application expert Tom Robinson.

This means that in the future, some formulations may not be approved for use in the European Union unless a CTS is used during the filling process.

"Products are under threat and regulators may require manufacturers to demonstrate negligible exposure to humans under realistic conditions of use.

"We have already seen this impacting on the application side with drift reduction nozzles now a requirement on some product

labels and it's affecting the filling side," says Mr Robinson.

## ISO STANDARD

This imminent threat of product loss has prompted the European Crop Protection Association, farmer and agricultural engineering representatives and the International Organization for Standardization (ISO) to get together and compile a draft ISO standard for closed transfer systems.

Richard Garnett, director of chemical transfer and packaging experts Wisdom Systems, says the process is in its advanced stage after

## ISO TECHNICAL CRITERIA FOR CLOSED TRANSFER SYSTEMS

- \* CTS should be standardised on the closure of 63mm to enable use with the majority of bottles.
- \* Maximum residue in rinsed container shall not exceed 0.01% of original content
- \* Maximum leakage during transfer: <0.25ml
- \* Maximum residue on coupling after disconnection: <1.0ml
- \* Maximum residue in closed transfer system after flushing: <0.5ml
- \* Bottle nominal capacity: 1-litre to 20-litre bottles
- \* CTS must support all bottle shapes

**Richard Garnett says closed transfer systems can help reduce sprayer filling time**



through and gets behind a system that works for everyone.

“From our perspective, we see the need to get the technology on farm – it doesn’t matter who’s design it is. The key thing is that they all work together and containers also work across the board,” she explains.

BASF campaign manager Ruth Stanley agrees that a universal approach is critical and it is also important any system brought to market is user-friendly and something farmers will want to adopt.

“There is a history of failure [with CTS] and that was due to a lack of standardisation. It just makes things too complex,” she adds.

## Testing closed transfer systems

While the paperwork is processed for the ISO standard, designers, packaging experts and major agrochemical manufacturers have all been working on developing a range of CTSs.

Three candidate systems are at an advanced stage of development and at a recent meeting in Hereford, they were put to the test by a number of experienced sprayer operators to gauge pros and cons, as well as fine-tune design requirements.

This was done on a specially designed rig shipped over from Italy and each device was tested with 5-litre and 10-litre packs containing both low and high viscosity liquid.

Each pack was emptied into the tank and rinsed, while the ability to transfer part cans was also tried

and tested.

A run-down of the systems and operator feedback can be seen below.

### SYSTEM 1 – BANJO

The most basic system on show has a tank adaptor, which is retrofitted to the sprayer, and a container adaptor. The container adaptor is screwed on to a standardised 63mm thread on a liquid chemical carton. A clean water pipe is then attached.

The container adaptor is screwed into the tank adaptor, breaking the foil seal and gravity draws chemical into the tank. Speed of transfer can be controlled by turning the connector clockwise/anti-clockwise.

Once empty, the pressurised clean water line is switched on to rinse the container out.

A part-emptied can would be returned to the store with the adaptor attached and a new adaptor used



**The Banjo system has a tank adaptor retrofitted to the sprayer**



**The EasyFlow system also comes in a fast-fill, suction-based version**

for the next product.

### SYSTEM 2 – EASYFLOW

Similar to the Banjo, EasyFlow is comprised of male and female components. The female is fitted to the sprayer tank and a clean water line attached.

The square-ended container adaptor is screwed on to the can and is then coupled with the female and locked into place with a sliding clip. Once locked the container is pushed down to break the foil seal.

Chemical is released by turning the system anti-clockwise and flow rate is fully adjustable for measuring out part cans.

If only part of the container is required, the system is closed and pressurised water cleans both male and female parts before removal. For rinsing empty cans, the flow is



**The EziConnect uses a Venturi valve to suck neat chemical out of the attached container**

left wide open.

Similar to the Banjo, part-emptied cans are put back in store with the adaptor attached, and the next product to go in the spray tank is transferred using a separate adaptor.

It should be noted that Agrotop and Bayer have developed a suction-based version of the Easyflow – called the EasyFlow M – which is aimed more specifically at medium-to large-sized arable farms.

### SYSTEM 3 – EZICONNECT

The third system can be easily positioned next to an existing induction hopper and works on the same principle, using a Venturi valve to suck neat chemical →p58

out of the attached container.

A unique container cap is positioned on the EziConnect and locked into place by turning the top lever. A second lever at the bottom of the device pushes a probe into the can through a one-way plastic valve within the cap to draw chemical into the tank. Flow is fully adjustable for measuring part cans.

The rinse system is then used to wash out empty containers and when detaching full or part cans, the probe is withdrawn to allow a flow of clean water over the cap and EziConnect to ensure no residue remains on exposed surfaces when detached.

### HOW THE SYSTEMS FARED

After much discussion, the panel of expert operators made a number of key points about the systems on demo.

The first two work on a similar gravity-based principle and the following observations were made:

Both would be better suited to smaller spraying operations such as amenity and orchard or occasional users, due to slower transfer and rinsing.

The fitting and removal of adaptors could slow the filling process down when large, complex tank mixes are required and would be tricky with protective gloves on.

Plastic fittings exposed to the dirt, along with wear and tear of daily use on a large-scale operation, may require regular maintenance or replacement.

A need for foil seals on container openings was seen as a backward step, as they are currently considered by the industry as a cause of point source pollution.

If carrying large numbers of part cans in store, it would require multiple container adaptors to maintain a "closed system". Contractors would also need to carry multiple

### THE EXPERT PANEL

- \* Steve Lake, Burgate Farms, Guildford, Surrey – FS00TY winner 2011, treating about 6,000ha annually
- \* John Martin, Deverel Farm, Milborne St Andrew, Dorset – FS00TY winner 2015, farming 320ha combinable crops
- \* Nigel Kitney, Lower Eggleton, Herefordshire – Hutchinsons agronomist, tree fruit specialist and cider apple grower



**Nigel Kitney**



**Derek Howe**

- \* Derek Howe, Cirencester, Gloucestershire – Sprayer operator covering more than 1,400ha for Toby Baxter Contracting
- \* Andrew Myatt, Cheltenham, Gloucestershire – FS00TY winner 2009, covering just shy of 11,000ha of combinable crops annually
- \* George Sergeant, Kings Lynn, Norfolk – FS00TY winner 2013 and

now assistant farm manager at farming company Velcourt

- \* Iain Robertson, Bincombe, Dorset – FS00TY winner 2007, covering 2,000ha for David Foot with a Bateman RB26
- \* Peter Knight, Burgate Farms, Guildford, Surrey – director of arable farming and contracting business across Surrey, West Sussex and Hampshire



**Peter Knight**

adaptors on their rounds.

The systems would currently be best suited to smaller containers, with the 10-litre can unstable and requiring support when connected with the tank adaptor.

The EziConnect was the final CTS on demo and operators provided the following comments.

- \* The use of suction and air considerably speeded up the filling process, with quick and easy transfer and rinsing of containers.
- \* Connection between CTS and the container was stable and safe,

with the can's cap considered a standard setting feature.

\* Perhaps not as cost-effective or practical for small-scale operations.

Across all systems, it was also pointed out that the operator can no longer look in through the neck to see if the can has been effectively rinsed, so containers used with any CTS would need to be clear enough to check for cleanliness.

Cans should also have an obvious and accurate volume gauge on the side for measuring part loads.

If a product is prone to photo

degradation and needs to be packed in an opaque container, at least the bottom of the container must be clear.

Operators would also like any commercial system to be included in the National Sprayer Testing Scheme to maintain standards and safety once on farm.

Overall, it was agreed there is a place for both gravity-based and suction systems, but for modern arable units using large machinery, a fast filling, suction-based system would be preferable.

### WHAT THE SPRAYER OPERATORS WANT FROM A CLOSED SYSTEM

- \* Foolproof and intuitive
- \* Leak 'free' to ISO standard
- \* Measure part cans
- \* Simple, quick and effective rinsing
- \* Easy to clean between products, and when using part cans
- \* As quick as current filling practices
- \* Transfer high- and low-viscosity liquids efficiently
- \* Not cause foaming in the spray tank, or other cause of potential contamination
- \* Easy to maintain
- \* Cost-effective



The EziConnect can be mounted next to an existing induction hopper



A lever-mounted probe moves up and down to vary chemical flow