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Limiting exposure to chemicals with closed systems

BY NANCY WESTCOTT

Lawn care, golf course and nursery handlers and applicators often transfer potentially hazardous chemicals and concentrates such as herbicides, insecticides, adjuvants and fungicides from large drums into smaller containers or mix tanks. This transfer process can have serious consequences if manual tip-and-pour techniques or poorly designed pumps are used.

Each year 1,800 to 3,000 preventable occupational incidents involving pesticide exposure are reported. Keeping workers safe is not just a best management practice — it is the law. The federal Worker Protection Standard was revised in 2015 and now has a greater focus on reducing pesticide exposures. A closed system of transferring chemicals can reduce unnecessary exposures by providing controlled delivery of chemical products without risk of worker exposure, overpouring, spilling or releasing vapors. Many of the revisions became effective in January.

“Beyond workers compensation, issues related to exposure, other huge potential liabilities are: U.S. Environmental Protection Agency or state regulatory fines, as well as cleanup or remediation costs,” says Kerry Richards, Ph.D., president-elect of the American Association of Pesticide Safety Educators and former director of Penn State’s Pesticide Safety Education Program. “This is particularly true if

a pesticide gets into a water source, kills fish or contaminates drinking water.”

According to Richards, the direct and indirect costs of a pesticide spill or injury can be substantial, not the least of which is the loss of wasted chemicals.

“Pesticides, particularly newer,

Closed systems can improve the safety and efficiency of chemical transfer.

concentrated formulations, are very expensive, so spilling a few ounces could cost you several hundred dollars in lost product during a single transfer,” says Richards.

Although a number of pump types exist for chemical transfer (rotary, siphon, lever-action, piston and electric), most are not engineered as a sealed, contained system. In addition, these pumps can have seals that leak or are known to wear out quickly. Some can be difficult to operate, making precise volume control and dispensing difficult.

Closed systems can improve the safety and efficiency of chemical

transfer, as well as prevent the spillage or loss of valuable chemicals or concentrated formulations.

"The availability of new technology that creates a closed or sealed system is ideal for handling pesticides or other dangerous chemicals and should become a best management practice," says Richards. "With such devices, pesticide handlers can maintain a controlled containment from one vessel to another and significantly reduce any potential for exposure or spill."

Tapping technology

Small, versatile, hand-operated pressure pumps, such as those manufactured by GoatThroat Pumps, for example, are engineered to work as a system which can be either closed or sealed. The pumps can be used for the safe transfer of more than 1,400 industrial chemicals, including aggressive pesticides. The

pumps function essentially like a beer tap. The operator attaches the pump, presses the plunger several times to build up a low amount of internal pressure, and then dispenses the liquid.

The device is configured to provide precise control over the fluid delivery, from slow (one-ounce) up to 4.5 gallons per minute, depending on viscosity, and are safe to use with containers, from 2-gallon jugs to 55-gallon drums.

Mike Cocino, assistant superintendent of Seaview Golf Resort in Galloway, New Jersey, sought a safer, more efficient way to transfer liquid fertilizers, wetting agents, biostimulants and other plant growth regulators from 55-gallon drums to measuring containers. These would, in turn, be transferred to mix tanks ranging in size from 1-gallon hand pumps to 300-gallon sprayers.

According to Cocino, sliding the

heavy drums off pallets with a dolly, and then tipping and pouring the drums was challenging, particularly in areas with limited storage.

"Drums can roll or fall, and you do not want to lose control of an entire drum," says Cocino. "When tipping a drum, it's difficult to pour out the right amount, and it's easy to over-pour or splash some of the contents out."

Getting to the needed drum typically required his staff to move a few other drums out of the way, which was labor intensive.

To address these issues, Cocino purchased three closed-system pumps. "Safety is a huge priority for us, and with the sealed pumps we're able to safely pump out whatever amount of product we need without moving or tipping any barrels," says Cocino. "The barrels stay safely in place, upright on their pallets, which is definitely a 'back saver.'"

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Because of this, we've eliminated any issues of spillage or related cleanup," he says.

Cocino estimates that by avoiding the need to move the barrels and tip and pour product, and clean up any potential spills, his operation saves at least 50 hours of labor annually.

"The closed, sealed pumps also allow my staff to safely and completely empty the contents of each barrel," says Cocino. Previously, tipping and pouring left a large amount of product at the bottom of each barrel due to the difficulty of removing it. And

sale container-plant nursery and landscaping company serving the Mid-Atlantic and New England regions, needed to adjust its well water to a lower pH for a pesticide spray application, it had to transfer sulfuric acid into the spray water as a buffering agent.

According to Shawn Jones, Lancaster Farms' propagation and research manager, the nursery chose to purchase 55-gallon drums of sulfuric acid to raise the water's pH. The drums of chemicals ended up being more cost-effective than multiple 2.5-gallon containers and easier to recycle. However, Jones was wary of the danger that tipping and pouring acid from the drums would pose, along with pouring bleach and another strong disinfectant for different uses in the propagation area.

"We use 40 percent sulfuric acid to buffer our spray water," says Jones. "Our irrigation water

is all recycled from ponds, with the drum storage areas relatively close to our water source, so we wanted to avoid any possibility of accidental spillage."

Previously, the nursery had used siphon pumps to transfer the acid, bleach and disinfectant, but Jones was dissatisfied with this approach. "None of our siphon pumps lasted more than six months before we had to replace them, and none allowed metering with the kind of precision we required," he says.

Instead, Jones chose to implement several closed, sealed pumps along with graduated cylinders for precise measurement. "With the pumps, the drums always remain in an upright position so they won't tip over accidentally." The one-

touch flow control dispenses liquids at a controlled rate. "We get precise measurement of chemicals into our mix tanks. We use every drop, spill nothing and waste nothing."

In terms of longevity, Jones' first sealed pump has already lasted six years and outlasted a dozen previous siphon pumps.

"Our pumps paid for themselves in safety and savings our first growing season and should last a decade or more with just routine maintenance or repair," concludes Jones. "Any grower, farmer, or nursery that needs to move or measure dangerous liquids safely and reliably should consider one."


Lawn care, landscape, and nursery chemicals can be expensive, and operators are always looking for ways to decrease the cost of inputs to help increase profits. Sealed

Taking the guesswork out of measuring costly materials, and providing an efficient means of transfer ... cuts input costs.

systems and closed systems allow for accurate and precise measuring of chemicals, meaning you're using only the amount of product required and not a drop more.

Taking the guesswork out of measuring costly materials, and providing an efficient means of transferring custom-blended or dilute products from original containers to mix tanks or backpack sprayers cuts input costs. This keeps expenses to a minimum, with the important bonus of increasing the safety of handlers by reducing the potential for exposure to chemicals. This boosts the bottom line, and also helps with Worker Protection Standard regulatory compliance. 🌱

The author is president of Westcott Distribution Inc., Milford, Connecticut.



A worker transfers fertilizer using a pump to prevent spills and exposure to chemicals.

Photo courtesy: Westcott Distribution Inc.

the precise control of product the pumps allow enables exact filling of measuring containers to the desired fill lines for more consistent results in mix tanks.

"Our golf maintenance operation is safer, cleaner and more efficient with these pumps," Cocino says. "Any golf course, lawn care, landscape or growing operation that requires the safe transfer of liquid chemicals should look into them."

Not to waste

When Lancaster Farms, a whole-