

Valves Produce More Accurate Spray Patterns

By H. Erdal Ozkan

Spray equipment often needs more effective pressure and flow control at the nozzle to optimize the application of pest-control products. This is especially true for manually operated equipment such as backpack and compression sprayers. These sprayers have little to no pressure regulation, making accurate and consistent applications of pest-control chemicals difficult.

The constant flow valve (CFV) is an innovative device designed to provide pressure and flow control at the nozzle independent of the pumping action of the applicator or the pressure from the sprayer. The effect of flow control at the nozzle is significant.

Originally developed for use in Third World countries where backpack sprayers are often the only means of applying pesticides, the CFV was part of a Dupont Stewardship program to reduce worker exposure and increase spray consistency with manually operated equipment. It worked so well overseas that U.S. experts in pesticide technology took notice.

The CFV is easy to insert between spray wand and nozzle. It's small (2.5-inches), lightweight (20 grams), and constructed of high-grade Delrina plastic with a stainless-steel throttle pin and spring. The valve maintains a steady flow because the diaphragm and spring inside the valve sense inlet pressure from the pump and continuously work to modulate the size of the inlet orifice.

The flow rate remains constant regardless of changing input pressures at or above the pre-set operating pressure of the valve. Conversely, if pumping stops or pressure drops below the desired level, the valve shuts off with no dripping at the nozzle.

I first encountered it during a technical session of the American Society of Agricultural Engineers. The valve makes sense because it controls flow rate and droplet size — both critical to accurate pesticide appli-

cations. The result is more uniform applications at correct rates without waste of material, water or labor.

Droplet sizes and spray patterns are consistent so there is no overapplying or underapplying of spray solutions. There's better on-target deposition of material and significantly less potential for drift and worker exposure. There's also reduced labor because operators don't need to pump sprayers as often with accurate regulation of pressure.

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With constant pressure and flow, there is a consistent, even distribution of chemicals throughout the entire application. In addition, the equipment can be accurately calibrated to deliver the chemical at the labeled rate. For manually operated equipment, it provides water conservation and a reduction in the effort required to make an application.

Since it's placed close to the nozzle, the valve can increase the function and effectiveness of motorized equipment as well. Retrofitting a backpack sprayer with a CFV resulted in a reduction in chemical use of more than 20 percent when sprayed in concentrated amounts. Fortunately, the reduction in chemical amounts didn't change its efficacy.

The CFV allowed a more controlled application and a uniform application of chemicals. Also, the amount of fine spray particles was reduced, and off-target movement of the spray solution was minimized.

The valve comes in four pre-set pressures

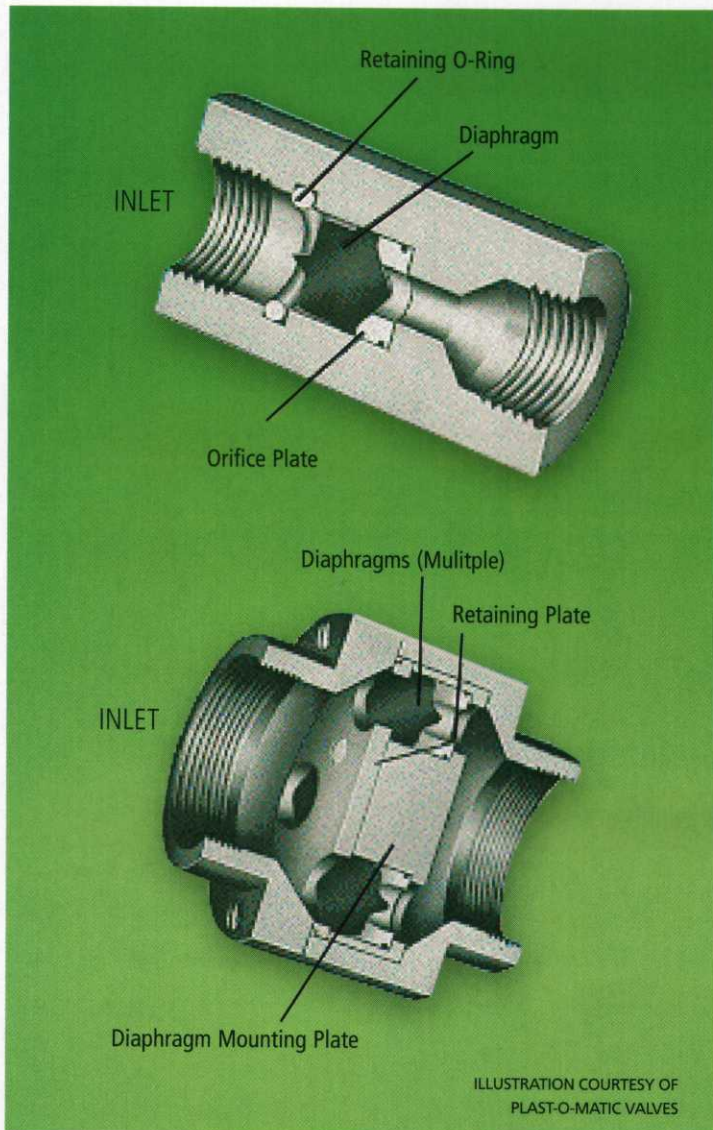


ILLUSTRATION COURTESY OF PLAST-O-MATIC VALVES

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— 14.5 pounds per square inch (psi), 21 psi, 29 psi and 43.5 psi. It's also built with thread sizes to fit most sprayers. For most applications using manual spray equipment, the 21-psi CFV is recommended.

The valve also works as a check valve. When pressure drops below the operating pressure, the valve closes completely with no dripping from the nozzle. Benefits of using the CFV and the constant flow that results include:

- Accurate, consistent flow of spray solution;
- Constant and predictable spray pattern;
- Predictable droplet spectrum;
- Ability to select a nozzle most appropriate for application;
- Better water management;
- Closes completely (no drips) when pressure too low;
- More on-target deposition of spray solution;
- Even distribution of spray solution over the treated area;
- Precise and cost effectiveness of chemical application;
- Reduced labor investment for manual sprayers;
- Focus on application of chemicals to targeted areas instead of focusing on equipment operation; and
- Limited potential for worker exposure and environmental contamination.

It takes people a while before they learn how to use spray equipment, so superintendents and other industry professionals are showing keen interest in the technology, especially for new employees.

Inexperienced workers often overpressurize, walk too fast, spray too much and finish the tank before they should. Even experienced operators find it difficult sometimes. The increased use of CFVs should help ease the situation in the field.

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