

# RETHINKING YOUR CHECK VALVE And BOOM STRAINER

BY DAVID EBY

Some believe that the agricultural aviation industry will self-destruct within the next few years due to the perceived irresponsibility toward people, personal property, and the environment. In at least one state there has already been a citizen's movement to eliminate aerial applications simply because the people are weary of being exposed to drift, their personal property contaminated from leaking check valves, and the apparent lack of concern by aerial applicators. If this is true then one of agriculture's most efficient methods of application that was invented in this century will be lost. However, there can be another scenario. Through education, striving toward impeccable personal integrity, along with new products, aerial application could once again be the application method of choice. Thus, the goal of this article is to increase the aerial applicator's knowledge of two extremely important new products.

It has happened to every applicator. One of your best customers asks you to help him out in an emergency and spray a very toxic herbicide. Reluctantly, the plane is loaded hoping the ideal weather conditions will prevail. Arriving at the field you notice a neighbor's adjacent crop that is extremely susceptible to injury from the pesticide that is to be sprayed, and you were not informed of its proximity. Checking the wind it luckily appears calm but you have to pull up over the neighbor's field. Ten minutes later with the application almost completed, you methodically check the left wing while exiting over the neighbor's field and observe in *horror* as a check valve is streaming pesticide. Questions immediately go through your mind; how long was it leaking? Did it leak enough to do any damage? What is this one going to cost? Will you lose your license or your best customer?

The check valves currently used on most agricultural aircraft are technically called hydraulic diaphragm check valves. Designed at least 40 years ago, they were later adapted to agricultural

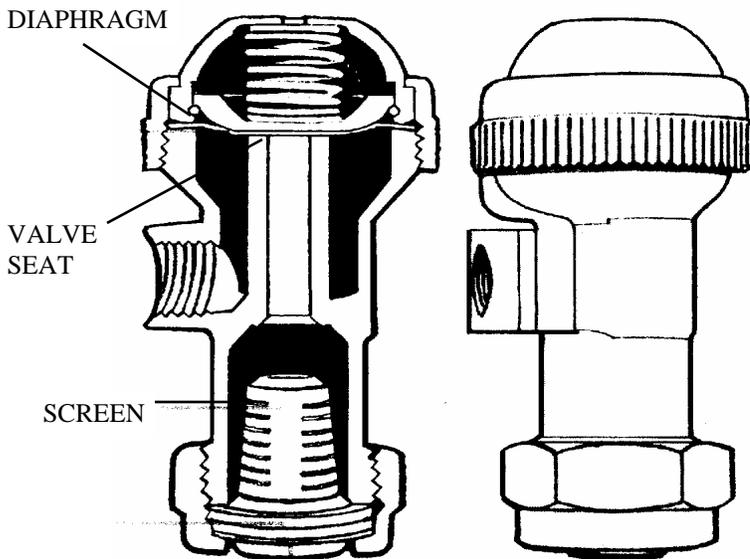


FIGURE 1

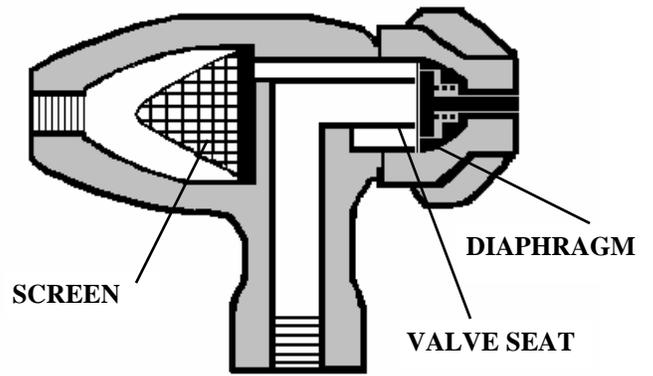
uses. The parts of a check valve the operator needs to be familiar with are the valve seat, the diaphragm, and the cap (Please refer to figure. 1). As the spray valve is opened the pesticide solution pressurizes the outer ring causing the spring in the cap to compress; usually occurring at 15 psi., allowing the pesticide solution to flow through the valve seat and out the spray tip.

So what causes the check valve to leak? It is really quite simple. As every operator knows, when a check valve is leaking and he removes the cap, there is a particle of

debris caught between the valve seat and diaphragm. By removing the particles the check valve quits leaking. Therefore, to work properly any diaphragm check valve must have a clean sealing surface between the valve seat and the diaphragm in order not to leak.

Some applicators have discovered this and have been screening spray solutions as they are being pumped into the aircraft. Experience has shown this helps to alleviate the problem, but it is not the complete solution. There is still debris that appears after straining due to hose deterioration, particles that escape past the loading screen, or pesticide reactions. For a complete solution to leaking and drip-check valves a final screen needs to be located just prior to the diaphragm area. (See figure 2.)

### AFS W/O ON-OFF CHECK VALVE



**FIGURE 2**

The answer is the AFS check valve, which was designed specifically for agricultural aircraft. Benefits include a large 20 mesh self-cleaning conical screen just prior to the diaphragm, ability to handle high and low volumes, optional on-off valve, aerodynamic shape, with the spray tip placed 4 inches below the spray boom right where it should be--all in one product! With this final screen being 20 mesh, its holes are twice as large as the boom strainer screen allowing for almost no maintenance all season; yet, it is small enough to keep the check valve from leaking.

It would be self-defeating to introduce a screen in the check valve just to create another problem of possibly plugging the check valve screens. So, to complete this system, consider the



AFS WITH ON-OFF CHECK VALVE

AFS WITHOUT ON-OFF VALVE CHECK

boom strainer. The most common strainers on agricultural aircraft are either Transland or Agrinautics and until recently, were manufactured mostly in cast aluminum. Upon close inspection the most common problems associated with the strainers are gaps between the screen and strainer body because the screen length was incorrect (even on new assemblies), and using wire mesh screens that distort and create gaps which allow unfiltered spray solutions into the spray boom. In addition casting part lines remained on the strainer body not allowing the front of the screen to seal positively against the strainer body.

Realizing that in order for diaphragm check valves to work properly, aircraft must have sealed strainers. It would now be possible to solve the second most serious problem in agricultural aviation with one new product.

It never fails. Once or twice a year your load is partially empty and you are 20 miles from the loading site. Noticing the boom pressure beginning to drop half way across the spray run the “money” handle is slowly pushed further and further down. Suddenly you realize that the boom strainer is plugged and the next spray run confirms it. In order to keep 5 gpa your boom pressure is now 60 psi. Should you continue flying forcing the spray out at high pressure or waste an hour flying back to the airstrip. At \$500 to \$1000 per hour gross that is an expensive option not to mention the time involved sucking the spray out and restraining it, hoping it doesn’t do it again and not to mention landing with a loaded aircraft. Now is when you remember the self-cleaning AFS boom strainer. Realizing that simply a quick pull on the cable would wash the debris off the screen with as little as 16 oz. of fluid and the spray job could be completed on time and on schedule. (See figure 3.)

The *cockpit controlled AFS self cleaning boom strainer* kit provides; a non-collapsible 30 or 40 mesh screen of proper length with a front seal and a new stainless steel end cap with a flow deflector, push-pull cable, and valve. With this unit your boom strainer can be cleaned while spraying in a moment. Now you can rest at night without worrying about whether tomorrow’s spray mix will plug your strainer.

It is vital that the industry challenge the environmental agenda and that operators and pilots totally refute the reputation aerial applicators have of environmental insensitivity. We now have the technology and the products specifically designed for agricultural aircraft to eliminate two of the most persistent problems aerial applicators have. The AFS check valves and the AFS self-cleaning boom strainers are two products that were designed to keep aerial applicators flying into the 21st century as leaders in *protecting the environment*.

### AFS SELF-CLEANING BOOM STRAINER

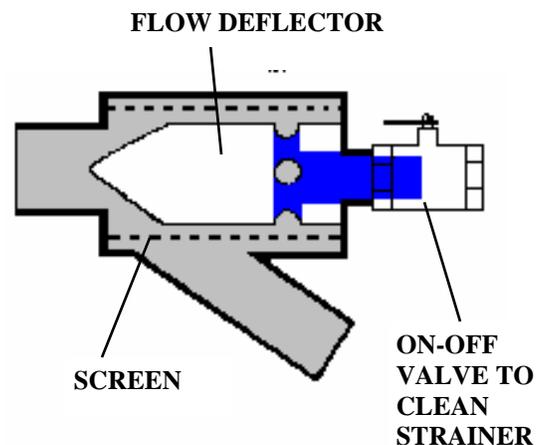


FIGURE 3

For more information please please visit our web site [www.aeroflow.com](http://www.aeroflow.com) — 800.833.2013 — 219-862-4669 fax.

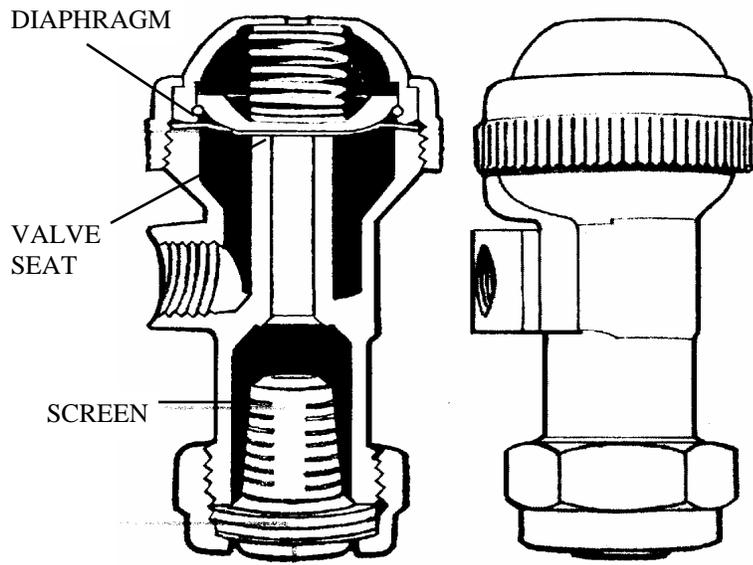


FIGURE 1

**AFS STANDARD CHECK VALVE**

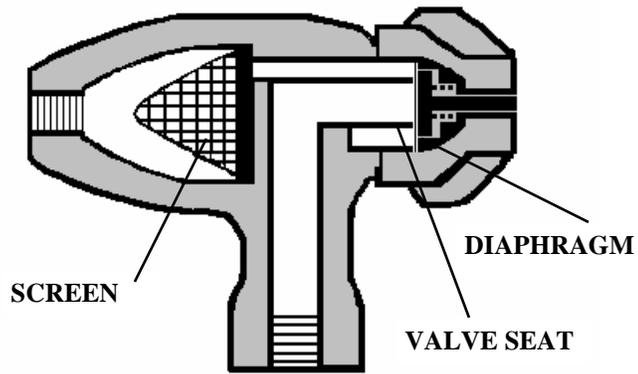


FIGURE 2



AFS WITH ON-OFF CHECK VALVE

AFS WITHOUT ON-OFF VALVE CHECK

### AFS SELF-CLEANING BOOM STRAINER

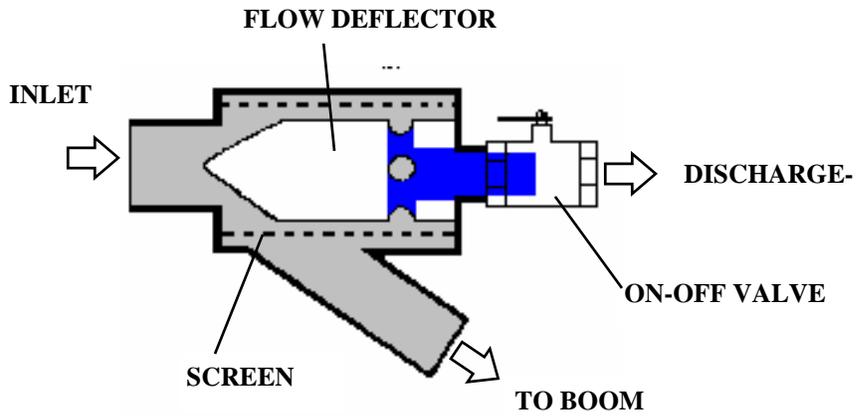


FIGURE 3