

Sprayer Cleanout

What You'll Learn...

- Regular sprayer maintenance including thorough cleanout is important to extend the life of the equipment and achieve most effective applications.
- A well maintained sprayer can be cleaned more thoroughly between applications of different chemistries.
- Very small amounts of residual herbicides can contaminate succeeding loads and cause crop damage.
- Installing an internal spray tank nozzle will improve sidewall rinsing and tank cleaning.
- Proper cleaning includes tank, hoses, booms, filters, screens, nozzles, and all equipment that comes in contact with chemicals, as well as the exterior of the sprayer.
- Cleanout in the field after concluding the application of the same herbicide for the day is a preferred method.
- Always avoid leaving pesticides in sprayers overnight or for extended periods of time, as this will make thorough cleaning more difficult.

Importance of Sprayer Cleanout

Weed management doesn't stop with a herbicide application. Proper sprayer maintenance and cleanout should be conducted to help avoid the potential for crop injury from a contaminated sprayer. Minute amounts of some herbicides can cause serious injury to susceptible crops.

Chemical particles can become lodged within small cracks in fiberglass tanks, hoses, and nozzles. Particles can remain in hidden areas and will dissolve back into solution and contaminate new loads, creating a potential for crop injury on susceptible crops.

Additionally, the corrosive nature of some chemistries can cause significant maintenance problems if sprayers are not thoroughly cleaned after each use. Cleaning should include the exterior of the machinery as well as the tank, hoses, boom, nozzles, filters, and other pieces of equipment that chemicals pass through (Figure 1).

Preplanning

Planning for sprayer cleanout should start well before loading the sprayer. The cleanout process must be performed in a manner that protects employees, family members, livestock, pets, water supply, nearby gardens, yards, and other environmentally sensitive situations. A specific cleanout area may need to be constructed that provides necessary protection while providing the means to properly clean the spraying unit. An area enclosed by concrete, along with proper rinsate and runoff collection basins should be considered.

Cleanout in the field after concluding the application of the same herbicide for the day is a preferred method. This keeps the active material within the intended use area. However, precautions are required for the protection of ground and surface waters and other sensitive environmental issues. Cleanout in the field requires enough water for triple rinsing, cleaning agents, personal protective equipment, and pesticide labels. Product labels should already be with the sprayer operator. As part of the preplanning for field cleaning, a determination needs to be made as to how the required materials reach the field. Extra water and other materials may be on a nurse trailer or possibly on the unit itself.

Most importantly, the application equipment should be calibrated to apply the desired rate on the acreage to be treated without having significant amounts of left over product. Left over solution presents the challenge of where to dispose or apply it without applying more to a crop than the label allows.

Cleaning Agents

Water alone may not be sufficient to thoroughly clean a sprayer unit. Common household chemicals and commercial cleaning products may be required to sufficiently clean, dissolve, and remove chemical residues from the system. Product labels should be reviewed to determine recommended products for sprayer cleaning. Rinsate should be removed and disposed of properly. Common cleaning agents include:^{1,2,3}

- Water - may be sufficient if the same chemistry is to be applied the next day. Several rinses can dissolve and dilute residues within the system.
- Household ammonia - can raise the solubility of some

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herbicides by increasing the pH. It can penetrate and loosen deposits and residues. Can make sulfonyleurea herbicides more soluble and easier to remove; however, it does not deactivate or decompose this class of herbicides.

- Chlorine bleach - can deactivate and decompose most sulfonyleurea and other herbicide products into inactive compounds; however, some tank-mix partners may inhibit decomposition. Chlorine can be dangerous as it can combine with ammonia based fertilizers to produce chlorine gas, which is irritating to eyes, nose, throat, and lungs. Rinsate containing chlorine is not labeled for cropland application.
- Detergents - can help remove water and oil-soluble products. Commercial detergents formulated for tank cleaning may perform better than household detergents.
- Kerosene or fuel oil - can be used to remove products which have an oil base, such as 2,4-D esters. The oil rinse should be followed by a detergent or ammonia rinse.
- Activated charcoal - can deactivate organic herbicides. A 3% suspension of activated charcoal and water can be flushed through the system to tie up and deactivate pesticide residues. Rinsate should be removed and disposed of properly. The system should then be flushed with water as any remaining charcoal can deactivate portions of the next pesticide.

After using cleaning agents, solids may be loosened and can clog nozzles or filters. Be sure to remove filters and nozzles to clear any potential debris that will interfere with spray patterns.

General Cleaning Process between Crops

Before starting the process, acquire necessary protective gear and clothing and review label(s). Unless the label(s) specifies another cleaning process, the recommendations below should be followed.³ Local extension or university sources should be consulted for additional cleaning instructions.

1. Fill tank half full of water and begin flushing system for at least 5 minutes with a combination of agitation and spraying. Rinsate is best sprayed onto appropriate cropland. Interior surfaces of the tank should be thoroughly rinsed, including baffles, plumbing fixtures, and tank opening. Pressure sprayers using hot water can help in removing dried residues; however, unacceptable and hazardous vapors may result with the use of hot water.



Figure 1. Filters and screens should be cleaned to remove residues.

2. Fill the tank with water and add 2 quarts of household ammonia, 4 pounds of trisodium phosphate detergent, or a commercial tank cleaner for each 50 gallons of water and agitate for 15 minutes. Operate the booms to ensure that all lines have been filled with the solution and let stand for several hours. If a growth regulator herbicide has been in the tank, the solution should be left in the tank overnight. Agitate and spray solution onto suitable area for the rinsate.
3. Add additional water and rinse the entire system again with a combination of agitation and spraying. Open the bottom tank drain to allow any residual water with possible contaminants to drain out (collect and dispose of appropriately). Nozzles, screens, strainers, and other individual components should be removed, washed in a bucket containing a solution of water and a cleaning agent, and replaced.
4. System should be rinsed and flushed with water a final time.

Sources:

¹ Pringnitz, B. A. 1997. Sprayer clean-out guidelines: avoiding crop injury due to contamination. PAT-30. Iowa State University.

² Johnson, B. et al. 1999. Cleaning field sprayers to avoid crop injury. G4852. University of Missouri Extension.

³ Petersen, D. E. et al. 1998. Cleaning field sprayers. MF-1089. Kansas State University.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. SOME OF THE PRODUCTS DISCUSSED HEREIN MAY BE RESTRICTED USE PESTICIDES. Tank mixtures: The applicable labeling for each product must be in the possession of the user at the time of application. Follow applicable use instructions, including application rates, precautions and restrictions of each product used in the tank mixture. Monsanto has not tested all tank mix product formulations for compatibility or performance other than specifically listed by brand name. Always predetermine the compatibility of tank mixtures by mixing small proportional quantities in advance. Roundup Ready PLUS® is a registered trademark of Monsanto Technology LLC. Leaf Design® is a registered trademark of Monsanto Company. All other trademarks are the property of their respective owners. ©2014 Monsanto Company. 06052014LGM