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Equipment maintenance: Fertilizer applicators

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Abstract
Winter is a good time for crop producers and fertilizer dealers to work out the kinks in fertilizer application equipment for economic, environmental, efficiency, and safety reasons. Properly working application equipment translates into getting the most out of every fertilizer dollar. Overapplying to compensate for poorly calibrated equipment wastes money and could mean nutrient-rich runoff and consequently, a potential water quality problem. This article provides some tips for maintaining your fertilizer application equipment.

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Liquid fertilizer application equipment

The primary maintenance consideration for liquid fertilizer application equipment is the relatively high application volumes required. For example, an application of liquid nitrogen of 150 lb/acre using UAN solutions requires 50 gal/acre, adding up to 2,000 gallons for a 40-acre field.

Older centrifugal or roller pumps are not good choices to deliver high-capacity flow. Pump capacities of less than 40 gallons per minute and 1/2-inch distribution hoses on applicators are probably inadequate for larger sprayers. Check the pump closely for wear, regardless of its capacity, because suspension materials used for liquid fertilizers can accelerate wear and tear.

Look the sprayer over closely, paying attention to hoses and pipes. They need to be clean and free of clogs, kinks, and leaks. Consider Viton seals in check valves for heavy use to avoid rapid seal deterioration.

When you do get to the field, check for even application. And don't forget that the equipment should be rinsed and cleaned at the end of each day.

Dry granular fertilizer application equipment

Spinners can vary between spreading equipment models, but the checklist for obtaining a uniform pattern with dry granular fertilizer equipment includes inspection of the gate opening, divider (between two spinners) position, delivery point to the spinner, spinner speed, and vane-blade angle on the spinner. On pneumatic spreaders, check for uniform flow to each distribution tube and proper adjustment of trim tabs and deflectors at the exits of the tubes.

When applying granular fertilizer, wait for low winds and make sure the swath pattern is accurate. The physical properties of dry fertilizer material can be inconsistent, so it is important to ensure even distribution within the swath. When you are in the field, do a pattern

check by laying out several pans perpendicular to the direction of travel of the spreader.

Avoid using granules of varying size in the same application. Larger granules tend to roll off the "cone" when loading. Make several smaller cones as you load to avoid problems.

Anhydrous ammonia application equipment

The nature of anhydrous ammonia (a high-pressure liquid converted to a liquid-gas mixture as pressure drops while traveling to the knife outlet) makes safety a primary consideration when looking at equipment.

Check the condition of the knives to make sure they can penetrate the soil adequately and distribute anhydrous ammonia evenly, and remember to test them in the field, adapting spring pressure to current conditions, such as soil type, soil moisture, and soil compaction.

Make sure that hoses and pipes are clean and free of clogs, kinks, and leaks. Iowa Sate University researchers recommend connecting hoses from adjacent applicator shanks to different regions around the manifold outlet ring to improve distribution across the applicator's swath. Also, the length of each hose from the distribution manifold to each injection knife should be equal. Coil hoses that attach to knives near the manifold and secure them horizontally.

When connecting hoses during application season, avoid introducing ammonia into the line until necessary. Make all the connections, tighten the bleeder valves, and then open the valves starting at the furthest downstream valve and

work upstream, opening the valve at the tank that releases ammonia into the hose last. When disconnecting hoses, start closing valves at the upstream end and work toward the downstream end.

As you work with anhydrous ammonia this spring, stay upwind when operating valves. Also, keep a 5-gallon water supply available and a 6-ounce plastic squeeze bottle in your pocket for immediate treatment of accidental exposures.

Be aware of volatilization of nitrogen (N). Losing N to volatilization is an avoidable expense. Shallow (2-4-inch) incorporation of liquid and dry granular N urea-containing fertilizers can reduce potential volatilization loss. Anhydrous ammonia should be injected deeply enough to avoid losses. If you smell or see excess vapor escaping, reset the covering discs or "beaver tail" tabs.

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