

# How to Handle Winter Salt and Stratification in Your Liquid Fertilizer Tank

Heartland March 2015

The winter cold is starting to break, and you are preparing to use various starters and liquid fertilizers for the upcoming agricultural season. Liquid fertilizer that has sat in aboveground storage tanks through a cold winter is not exactly the same as when it was placed in the tank. Cold temperatures can have two possible effects on liquid fertilizer: stratification and/or salting out.

Stratification results in pockets of varying product concentrations within an aboveground storage tank. With cold temperatures, some liquid fertilizers will salt out, leaving the product in your tank in a combination of salted product and liquid product. The salted product can cause big headaches in the field by clogging sprayers, planters, and applicators.

The main liquid fertilizers that salt out at lower temperatures are 32% nitrogen solution and ammonium thiosulfate. Ammonium thiosulfate salts out 45° F while 32% nitrogen solution salts out at 31-32° F. Other concentrations of nitrogen solution have lower salt out temperatures: 30% salts out at 15° F and 28% salts out at 0° F.

Is there product salt in your storage tanks? 'Maybe' is the answer if you stored 32% nitrogen solution or ammonium thiosulfate in aboveground storage tanks through the winter. The amount of salt varies based on the average winter temperatures, fullness of the tank, and exterior color of the tank.

With either stratification or salting out of liquid fertilizer in a tank, the remedy is the same.

## **Turning Salt Back Into Profit**

When the agricultural season starts, the liquid fertilizer stored over the winter is still cool. With products that salt out, particularly 32% nitrogen solution, it is important to not circulate the product during the winter months or the early spring months when the product is still cool. Doing so can result in the salt crystals cutting the tank's internal liner and salt being pumped out, causing havoc with sprayers and applicators.

To turn the product salt back into solution or to de-stratify a tank of liquid fertilizer, the product in the tank needs to be drawn down to approximately half full. Drawing down

the tank can be done in the early spring despite chilly temperatures. The salt sinks to the bottom of the tank. Thus, good liquid fertilizer product can still be extracted from the tank without interference of the salt. A stratified tank has the denser, fully concentrated product at the bottom of the tank, so you can be assured that the product you are drawing out is quality strength.

Mother Nature's help is required next. Five to seven days of sixty to seventy degree temperatures with sun directly on the tank is needed. This is to increase the temperature of the product in the storage tank. Increased temperature of the liquid fertilizer decreases the viscosity of the liquid (product will mix faster) and promotes faster dissolution of the salt.

If you have a PVC internal tank liner, this period of warm weather on the tank is even more crucial if there is salt in the storage tank. The salt crystals can be very sharp and can cut the liner if cold product with salt is circulated. For tanks with liners, a solid seven days of warm temperatures is preferred before circulating the product in the tank.

After the aboveground storage tank has been drawn down and exposed to warm temperatures, circulating the product in the tank is the final step. Pull the liquid fertilizer product out through the tank suction and pump it back through the inlet. Let this circulation process continue to run for twenty-four to forty-eight hours with regular supervision. This makes the product in the tank spin and churn, returning the salt to usable liquid fertilizer solution and creating a consistent concentration of product.

If you have a sparge system in your tank, the better process to churn the product for dissolving salt is still through using the suction and inlet connections on the tank. Most sparge systems simply mix the liquid product without churning the salt on the tank bottom.

Now that the product salt has been dissolved and the product thoroughly mixed, you are ready to use or sell the rest of your liquid fertilizer supply.

### **Steps to Limit Salting of Product**

While it is almost impossible to prevent any salting of 32% nitrogen solution or ammonium thiosulfate, steps can be taken to minimize how much salt is in your tank after winter. First, paint the external portion of the tank a dark color, such as black, dark blue, or dark green. Dark colors absorb more light wavelengths and convert them to heat. This one step will increase the internal temperature of the tank product by eight to ten degrees compared to a light tank exterior.

Second, store the product in larger quantities. The larger the tank full of product, the slower the temperature of the product as a whole will drop in winter. A tank with a capacity of a million gallons or larger is best to store salt-prone liquid fertilizers. A

tangent concept is to fill the tank with product before winter begins. This strategy ensures the tank and product are warmer and can better retain the heat within the tank.

Finally, location plays a key role in how to store salt-prone products. A general rule of thumb is that if a tank storing 32% nitrogen solution or ammonium thiosulfate is located north of U.S. Interstate I-80, the capacity of the tank should be at least one million gallons and filled to capacity to store product through the winter. If the tank capacity is smaller, the product should be cut to 28% nitrogen solution, which has a lower salting out temperature of 0° F.