

## Storing Borate Solutions

Shell-Guard Concentrate, Shell-Guard RTU and Armor-Guard are all used as aqueous solutions. Since time and temperatures affect each of these products differently, we will address each product individually.

### Shell-Guard Concentrate

Shell-Guard Concentrate will remain stable for many years. As a concentrate it will not freeze. However, the viscosity increases as it gets colder and at very cold temperatures (below 10°F) it may get so thick as to appear frozen. As it warms up, the viscosity will decrease to the point where it can be poured out of the container. Freezing temperatures will not affect Shell-Guard Concentrate's performance, and it can go through many cycles of heating and cooling without any problems.

For proper use, Shell-Guard Concentrate must be mixed with an equal volume of water (one gallon of Shell-Guard Concentrate to one gallon of water). Using warm water makes it easier to mix. Once the concentrate is mixed with water it must be used within 24 hours. The reason is that after 24 hours, borate salts will begin to precipitate from the solution forming white crystals on the sides and bottom of the container. If a solution is left in the spray equipment too long the crystals will clog the spray tip and/or filter screen. Once these crystals form they are very difficult to redissolve. The colder it is the faster the borate salts will precipitate from the solution.

If you have mixed Shell-Guard Concentrate that you want to keep, you need to get it out of your sprayer and rinse out the sprayer ASAP. If borate crystals form in the container and the solution heated to about 95°F there is a good chance that the crystals will re-dissolve. If that solution is not used within 24 hours, the borate crystals will form again.

## Shell-Guard RTU

One common assumption about Shell-Guard RTU is that it is simply Shell-Guard Concentrate that has already been mixed with water. This is not the case. Shell-Guard RTU is formulated differently than mixed Shell-Guard Concentrate. Although the chemical components are the same as those in Shell-Guard Concentrate they are present in different percentages to keep the borate salts in solution. If Shell-Guard RTU is subjected to cold temperatures (less than 40°F) for extended periods of time, there is a chance that some of the borate salts will begin to coat the inside walls of the container. This is not a sign that the RTU is freezing, it is just that the temperature has reached a point where the solubility of the borate salts has dropped below 10%. Like most salt solutions, the lower the temperature, the lower its solubility. Once crystals have formed, the solution needs to be warmed to 80 to 90°F for the borate salts to re-dissolve. The best way to warm it up is to fill a bucket with hot water, place the container of RTU into the bucket, then after an hour take it out and shake it until the crystals disappear. With 2.5 gallon containers it is a bit more difficult to do this unless you have a large container.

## Armor-Guard

Armor-Guard is typically used as a solution by dissolving one pound (two of the enclosed scoops) of dry borate powder in one gallon of water. Using warm water speeds up the process. It should be mixed up in a bucket, not in a pump-up sprayer. Once the solution in the bucket is clear and no undissolved Armor-Guard present, then it can be transferred to a garden sprayer. As with Shell-Guard Concentrate, once it is dissolved in water you have about 24 hours before borate salts begin to precipitate from the solution. The colder it is the more rapidly the salts will crystalize. Solutions of Armor-Guard can and will freeze if the temperature drops below 20°F. It is not worth trying to save or salvage Armor-Guard solutions that remain unused.