

13 – Rice Drying on the Farm

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A good deal of Arkansas rice will be dried and stored on the farm each year. Rice has the highest quality it will ever have at harvest. The way that rice is handled during the drying and storage process will determine how much of this quality is retained. The market value of rice is partially determined by its milling yield.

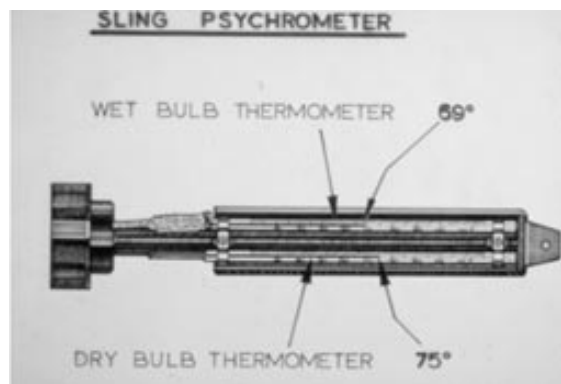
Rice should be quickly dried down to a moisture level of about 12 percent for storage – particularly if it is going to be stored for several months. The reduction of grain moisture is done by passing relatively large quantities of dry air over the rice after it is placed in the bin. The quality of this air determines the final moisture content of the rice kernel. This “air quality” is typically referred to as the equilibrium moisture content (EMC). If the air has an EMC of 12 percent, then the grain moisture will eventually reach 12 percent if air of that quality is moved over the grain long enough.

A given volume of air has the capability of holding a given amount of moisture. The amount of moisture that air can hold will depend on the quality. One way to increase drying potential or cause the grain to reach equilibrium with the air sooner is to pass larger amounts of air over the grain. Doubling the air flow will typically cut the drying time in about half.

As grain bins are filled and the grain depth increases, it becomes more difficult to pass air up through the grain. As the grain depth increases there is also less air available for each bushel of grain in the bin. High volumes of air are needed to carry the moisture away in a timely fashion when the grain is at high moisture levels. Most on-farm bins have a limited amount of available air capacity. These criteria dictate that bins should not initially be filled too full if the grain is at a high moisture content. Once grain moistures reach 15 percent or less throughout the bin, the bin filling process may be completed.

Care should be taken not to mix dry grain (moisture content less than 15 percent) with moist grain (moisture contents greater than 18 percent). Once the rice kernel is dried to a level below 15 percent, any rewetting may cause excessive fissuring and head rice yield (HRY) reductions. Rewetting may also occur if damp air is pumped through the grain.

The EMC may be determined by measuring air temperature and relative humidity. A sling psychrometer is one of the best tools for measuring relative humidity, and is relatively inexpensive. A sling psychrometer works by measuring the air temperature with a wet and dry bulb thermometer, and then using a table to determine relative humidity.

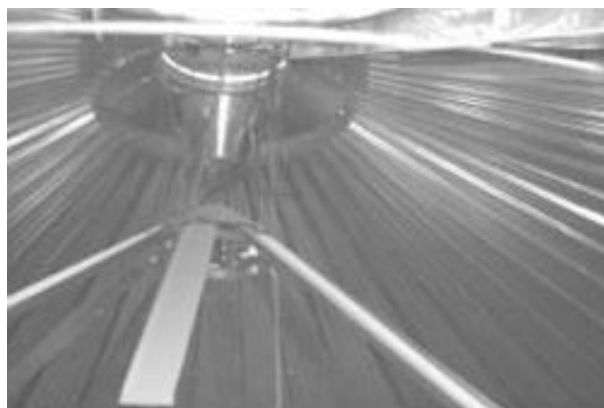


One should strive to maintain a steady EMC that is very close to the target storage moisture content. There are typically numerous days during and shortly after the harvest season when the EMC is at or below the desired level without adding any heat. At night or during damp weather conditions it may be necessary to add some heat to condition the air to a desirable EMC – or to maintain the same level available during the daylight hours. If heat is not available, it may be better to turn the fans off at night instead of pumping in moist air. Moist air that is pumped in at night has to be removed later. This increases drying cost and may result in significant HRY reductions. Fans should be turned off almost any time the EMC of the air is greater than that of the grain. The exception might be for very damp rice – to avoid heat buildup.

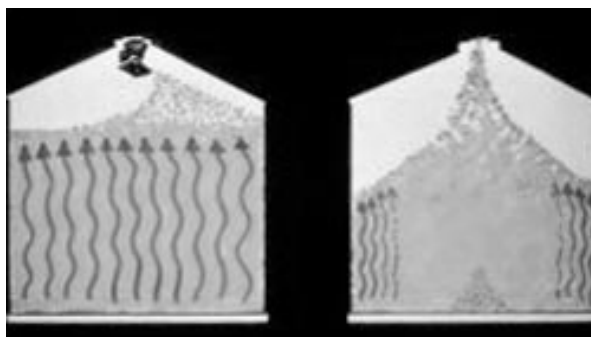


Stir-alls help to mix the upper and lower portions of grain in the bin. This speeds up the drying process and loosens the grain so that additional air may be moved up through the grain. Stir-alls also help to keep the grain level in the bin. Stir-alls should not be turned on unless the bottom end of the auger is about 1 foot deep in grain. They can run almost continuously after that point, when the drying fans are running. There is a concern among many producers that the stir-alls may grind away at the rice if left on, but there is no research evidence to support this. There will be a small amount of flour-like substance formed around the auger top, but the small particles were most likely already there and

are just being gathered in one place with the auger action.



Grain should not be allowed to cone as the bin is being filled. If coning occurs, the large particles will migrate to the outside and the flour-like small particles and trash will remain at the center of the cone. This results in a very nonuniform amount of air being passed through each portion of the grain. Most of the air will pass up the outside of the bin through the larger and cleaner grain. A level height should be maintained throughout the filling process. Once the separation occurs, it is hard to remedy – even if the bin is later shoveled level.



These drying concepts and other details are discussed in MP283, *Rice Drying on the Farm*, available at your local county Extension office. Rice drying is not overly complicated, but does require a good manager to maintain the highest rice quality.