GRAIN QUALITY
Task Force

Fact Sheet # 6
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Purdue University

Shifting from Corn Drying to Corn Storage

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As the harvest is finally beginning to wind down, it is time for farmers and elevator managers to shift their attention from drying the corn crop to storing it. Proper storage management, and deciding when to move the grain for sale, will be especially critical this year, since the storage quality of the crop has certainly been compromised.

Problems that may lead to hot spots and mold development in the bin include:

- High harvest moisture contents, which have led to non-uniform and incomplete moisture removal during drying.
- Excess trash and fines that were generated by shelling the wetter than normal corn.
- High drying temperatures that have increased breakage susceptibility.

Other factors contributing to potential storage problems are:

- The lateness of the harvest, which has caused a bottleneck in drying and cooling operations; thus, much of the corn may not have been dried enough for safe storage.
- High yields, which have caused overfilling of grain bins and piling of corn in outdoor piles, both of which should be used only as temporary storage solutions.

Safe Storage Temperature

Most storage problems result from improperly cooling the grain in the storage bin. The most common mistake is to stop running the aeration fan before the cooling front has moved through the entire grain pile.

This can lead to condensation and crusted layers of spoiled grain in the bulk.

Four separate storage management periods can be distinguished and are illustrated in the diagram below:

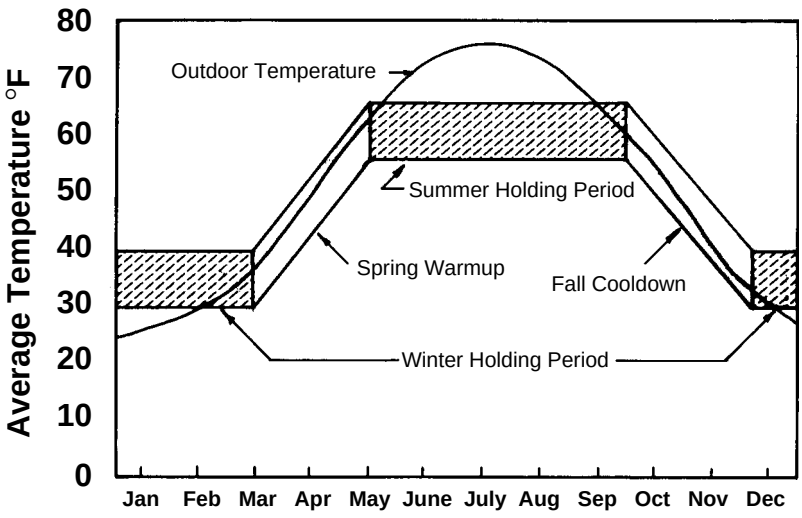
(1) fall cooldown,

(2) winter holding,

(3) spring rewarming, and

(4) summer holding.

Farmers and elevator managers should have completed the fall cooldown for much of this year's corn crop by now, and be at the start of the winter holding period. For winter storage in Indiana, the grain should be cooled to 35-40° F before the end of December. An aeration cycle can be started when the average daily temperature is 10-15° F cooler than the grain temperature. For example, if the high and low daily temperatures are 40° and 30° F, respectively, the average temperature is about 35° F. Thus, if the grain temperature is above 45° F, the aeration cycle should be started.



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Aeration Cooling Time

The fan operating time depends solely on the airflow rate in the storage bin. An aeration fan is usually sized for about 1/10 cfm/bu, while an in-bin drying fan is usually sized for 1 cfm/bu. It is very important to recognize the difference in order to operate the fans long enough to move the cooling front completely through the bulk, and yet not so long as to waste electricity. The following table summarizes the approximate times for the last cooling cycle before the winter holding period for a range of common airflow rates.

Airflow rate, cfm/bu	Cooling time, hours
1/20	400
1/10	200
1/4	80
1/2	40
3/4	27
1	20
1.5	13

Turning the Fan Off

With low airflow rates (up to 3/4 cfm/bu), the fans can be run continuously even if high humidity perists for a day or two. Any rewetting is minimal and is offset by good weather periods. With higher airflow rates (above 3/4 cfm/bu) the cooling cycle is short enough that the fan can be shut off to avoid high-humidity air.

If air is pushed through the grain, temperatures should be checked about 1 foot into the upper surface in several locations to confirm that the cooling front has moved completely through before the fan is shut off. If air is pulled through the grain, the air temperature should be measured in the duct before it is exhausted by the fan.

Additional Management Tips

Before initiating the last aeration cooling cycle for winter storage, the grain surface should be leveled. This will assure more uniform airflow through the entire bulk and prevent the development of hot spots in the peaked grain. If no grain spreader was used to fill the bin, a core should be drawn first. Removing the core will take out much of the fines accumulated below the spout and will significantly reduce spoilage potential. For bins that are overly full, corn should be withdrawn for feed or sale. These bins can otherwise not be properly aerated, leveled, and monitored during the storage season.

Finally, upon completion of the cooling cycle, each of the aeration fans should be sealed by covering it with a tarp, plastic sheet, or board. This will prevent air from being drawn into the bin causing moisture migration, as well as help keep insects and rodents out. Roof fans and vents must be left uncovered, however. Remember that grain quality can never be improved during storage.

For more information, obtain a copy of AE-90 "Managing Grain for Year-round Storage," and/or AED-20 "Managing Dry Grain in Storage" from your local CES Office.

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