

Dry Corn Quickly to Avoid Problems During Storage

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As grain farmers shift gears from production to the post-harvest phase, it's worth taking another look at the information that helps guide good management decisions. Specifically, it's important to recall that corn has a limited shelf life that depends largely on the moisture content and temperature of the grain. The allowable storage period is the length of time good quality, aerated shelled corn can be stored before losing ½% of dry matter. Even so, with this amount of dry matter decomposition, it is assumed that corn loses some quality but maintains its market grade.

The table below can be used to estimate the shelf life of aerated, undamaged corn based on the moisture content and temperature of the grain. These values can be used to estimate the allowable storage times for other grains based on corresponding equilibrium moisture content but are not valid for corn held without aeration. In fact, unaerated, damaged corn may deteriorate 2 to 3 times faster than indicated by the values shown in the table. It is often common to see mold develop on fines and broken kernels several weeks before it becomes apparent on undamaged corn kernels.

An area of possible confusion is that the shelf life data were determined for aerated corn maintained at a constant temperature over the entire storage period. In practice, corn is not aerated while held in a truck, and temperatures change from harvest to storage.

Corn deterioration is a cumulative process and remaining shelf life progressively decreases during each step in the harvest-holding-drying-storage process. The amount of time lost depends on the corn moisture and temperature at each step and the initial grain condition. Values in the table can be used as a guide to accumulate the percentages and determine the safe storage period.

For example, assume corn was harvested at 24 percent moisture content and allowed to remain in a truck overnight (0.5 days) before unloading. The average temperature in the truck was 70°F and the corn was then placed in a holding bin with a cooling fan where it was maintained at 70°F for another ½ day (12 hours) before it was dried to 15% and cooled to 60°F. How long can the corn be held at 60°F without exceeding the shelf life?

From the table, the shelf life after 12 hours in the (unaerated) truck is 3.5 days (7/2), so 14% of the storage life is lost (0.5/3.5). After 12 hours in the aerated holding bin another 7% is lost (0.5/7), so the remaining storage life after drying to 15% moisture and cooling to 60°F is reduced by 21% (58 days) leaving 219 days or 7 months. Of course, cooling the corn further to 35-40°F during the Fall will add more days of safe storage, but should help to explain why corn that will be stored into the summer should be dried to 13% moisture.

The allowable storage times shown in the table assume typical harvest damage levels (1.5 - 2 percent), and may be conservative for corn that is screened before being put into storage. On the other hand, the storage times may be optimistic if excessive damage exists. While allowable shelf life data provides valuable information for holding corn, the values should be viewed as guidelines and should not be considered absolute.

Uniform aeration and safe, vigilant monitoring of stored grain will help to maintain quality and minimize elevator discounts when sold. More details on preserving farm stored grain is available from the Midwest Plan Service Handbook on Grain Handling, Drying and Storage (MWPS-13, 2017 ed.).

Equilibrium moisture content values for corn, grain sorghum, soybean and wheat are posted on the UK-BAE web page for grain storage

<https://www.uky.edu/bae/bae-extension-newsletter>

Grain Temp.	Corn Moisture, %wb							
	14%	15%	16%	18%	20%	22%	24%	26%
40	>365	>365	>365	288	142	84	57	42
50	>365	>365	336	128	63	38	25	19
60	>365	277	149	57	28	17	11	8
70	322	154	83	32	16	10	7	5
80	180	86	47	18	9	6	4	3
90	101	48	26	10	6	4	3	3