

Corn Grain Quality

Grain Quality

- Corn grain quality is increasingly important as more grain is used for processing and other specialty end uses.
- Corn grain quality is determined by hybrid, growing conditions, harvest practices and drying operations.
- Except for growing conditions, these quality factors are generally under the control of the grower.



Hybrid Selection

- Selecting hybrids rated highly for grain quality traits is the first step in producing highest quality grain.
- Pioneer® brand hybrids are rated for resistance to prevalent ear rot diseases and test weight.
- High test weight is a grain trait that helps kernels resist breakage during threshing and handling.



Pioneer hybrids are rated for resistance to common ear rots such as Diplodia

Harvest Practices

Harvest Timing

- Harvesting grain at too high of moisture can result in severe kernel damage during threshing and drying.
- Conversely, allowing corn to field dry too long can lead to reduced yield and quality if stalk or ear rot diseases or insect feeding damage are increasing.
- Monitor stalk quality. If stalks lodge, ears can come in contact with the ground which can lead to ear rot development.



Combine Settings

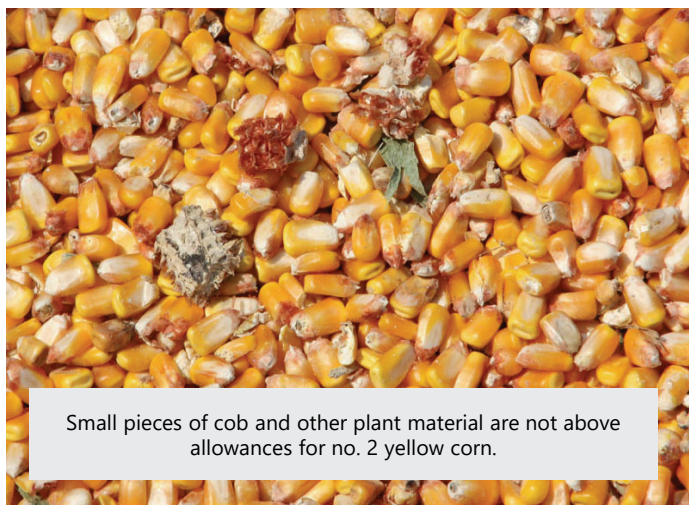
- Proper combine settings and operation are critical to preserve grain quality.
- Optimum ground speed depends on the condition of the crop, but should generally be as fast as possible without plugging the head or threshing mechanism.
- Snapping rolls should be set relative to ground speed. A setting that is too fast will cause kernels to be shelled and lost and increase breakage of ear butt kernels.
- Use the lowest possible cylinder/rotor speed that will shell the grain within acceptable loss levels (1% in good-standing fields).
- Begin with manufacturer suggested sieve and fan settings and check and adjust frequently. Crop conditions can change rapidly during autumn days.



To reduce grain damage from augers, replace worn auger flighting. Keep internal augers as full as possible by running the combine at capacity.

Grain Handling and Drying

- Broken kernels and fines can create problems during grain storage, and lower quality for many end uses.
- A rotary screen, gravity screen or perforated auger housing section can be used to screen out the fines.



Small pieces of cob and other plant material are not above allowances for no. 2 yellow corn.

- Stress cracking is the major quality problem associated with improper drying and cooling of grain
- Kernels with a large number of stress cracks are more likely to be broken, produce smaller grits during dry milling, absorb water too rapidly during wet milling, and are more susceptible to insect and mold damage during storage.
- The wetter the grain the lower the temperature must be to maintain a better kernel quality and density.
- High temperature drying followed by fast cooling can have a devastating effect on stress-cracking of corn kernels. For most grain uses, this drying method is unacceptable.

Table 1. Effect of dryer method on stress crack formation.

Drying Method	% Stress-Cracked Kernels
Natural air and low temperature in-bin	5% or less
Medium temperature and slow cooling	10-25%
Medium temperature and stirring in-bin	15-35%
High Temperature and fast cooling	60-100%

Source: Post-Harvest Pocket Guide, Purdue Univ. Extension.



Carefully consider end use of grain when making decisions regarding drying method and temperatures.

Table 2. Maximum recommended kernel temperature during drying.

Product	Maximum Kernel Temperature
Shelled Corn - Animal Feed	130 °F (54 °C)
Shelled Corn - Wet Milling	100-130 °F (38-54 °C)
Shelled Corn - Dry Milling	100-120 °F (38-49 °C)
Shelled Corn - Snack Foods	100 °F (38 °C)

Source: Pioneer Hi-Bred.

- When using a continuous-flow grain dryer and as colder temperatures approach, take caution in not over-cooling the grain. This can cause stress fractures. Cracked and broken kernels don't store as well as whole kernels.
- Freezing temperatures can cause stress fractures in grain, especially in higher density kernels.
- After harvest, it's important to check your grain on a weekly basis for four to six weeks until you are sure it's stable.