Managing High-Temperature Grain Dryers for Energy Efficiency

High-temperature grain dryers, whether continuous flow or batch flow, are capable of high-speed grain drying to accommodate increasing grain yields and farm sizes statewide. Dryer design and dryer management are both key to achieving maximum grain drying energy efficiency.

**Wet holding**

Wet grain holding capacity allows drying to continue through temporary stops in harvesting (overnight, rainy days, and breakdowns). At a minimum, the wet holding capacity should equal the difference between the daily harvest amount and the amount that can be dried during daily harvest hours (approximately 4-8 hours of harvest capacity). Some producers plan for a full day of harvest capacity in wet holding. Greater capacity may cause problems with the allowable storage time for the wet grain.

Wet holding bins should have aeration rates of 0.5 to 1.0 cubic feet per minute per bushel (cfm/bu) of capacity to keep grain cool.

If wet holding bins are not emptied every day, they should be equipped with hopper bottoms or power sweep augers that remove grain from the bottom of the bin so that no wet grain is trapped for extended periods. Additional calculations for wet holding capacity and other topics can be found in the *Grain Drying, Handling and Storage Handbook* (MWPS-13) available from Midwest Plan Service.

**Adequate airflow**

Airflow rate is the primary key to drying rate. Factors that reduce airflow rate with the same electrical input rob your system of efficiency.

Accumulation of fines on drying floors and screens reduces airflow. Use proper combine settings, grain cleaners, gentle handling, and frequent checking and cleaning to minimize fines accumulation.

Grain resistance to airflow is directly proportional to the depth (thickness) of grain. But fan performance drops faster as airflow resistance increases. Excess grain depth or improper matching of fans to the drying system can hinder drying rate and efficiency.

corn typically use temperatures of 120 to 180 degrees Fahrenheit.

Risks of grain discoloration and quality loss increase above 200 degrees. Seed grains, specialty grains, and in-bin dryers may have lower temperature limits.

Column dryers equipped with multiple heating zones can utilize higher drying air temperatures in the upper zones where moisture is being removed faster and lower temperatures in the final drying zone. This variable temperature approach can maximize energy efficiency while protecting grain quality.

**Drying temperature**

Drying rate and drying fuel efficiency both increase with increasing drying temperature. High temperature dryers for

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Controls and sensing
As additional efficiencies are sought, close attention to controls and moisture and temperature sensing becomes increasingly important. Check and calibrate your moisture meters and temperature sensors frequently. Consider additional sensing equipment and automated controls to avoid over-drying and finished grain moisture variability.

Managing for energy efficiency
- Maintain airflow by cleaning screens and floors, watching combine settings and grain damage, and matching fans and grain depth for optimum performance
- Use higher drying temperature within the recommended range for your dryer to increase fuel efficiency
- Calibrate your moisture meter and temperature sensors often to increase reliability and avoid over-drying

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