"Often Imitated, Never Duplicated"

Setting the Record Straight – VFDs for Potato Storage

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In consulting with potato growers and storage managers who have installed VFDs, or those who are considering installing VFDs, some common misunderstandings have become apparent. The following discussion is intended to set the record straight regarding VFDs and their use.

Common misconceptions about VFDs:

1. **"VFDs will guarantee you less shrinkage"**
   Many factors impact how much shrinkage will occur in a given storage. Among these are harvest temperature, level of disease, stress, and harvest damage, pulp temperature, sprout control, storage temperature, relative humidity and ventilation system management. VFDs clearly provide the potential for consistent shrinkage reduction, but they are not a silver bullet and will not make up for poor harvest conditions, handling, and/or storage management.

2. **"A good minimum fan speed is 50%"**
   The "right" minimum fan speed varies significantly from storage to storage and year to year. A storage designed at 20 CFM/Ton may be able to operate at 25% to 50% speed (equivalent of 5 to 10 CFM/Ton) during winter holding. However, a storage designed at lower airflow rates may need to operate at 60% to 80% speed to provide the same amount of airflow. Another factor that must be considered is storage temperature. Potatoes stored at higher temperatures typically have higher respiration rates and need more airflow to remove the additional heat of respiration. Storage managers should not spend too much time focusing on minimum fan speeds. Instead, they should concentrate on the condition of the potatoes, and maintaining the optimum "pile temperature differential" or Delta-T. The is the temperature difference of the tubers between the bottom and top of the pile (or (difference between the plenum air and return air temperatures). If a grower

is aiming for a 1.5°F Delta-T, and this can be achieved at 30% or 40% fan speed, then great! However, if the fans need to operate at 50% to 60% to maintain the 1.5°F differential, then that is the appropriate operating point for that storage at that particular time.

3. **"I'll have to buy all new fan motors if I install VFDs"**
   This is simply not true. For new construction or replacement motors, it is best to purchase premium efficiency, "inverter-duty" rated motors, specifically designed for VFD use. However, non inverter-duty rated motors are commonly used with VFDs without any problems. If motor failures do occur, a variety of motor protection devices, such as output reactors, can be installed.

4. **"At low fan speeds you do not get even airflow distribution down the length of the plenum or through the potato pile"**
   Operating with VFDs at reduced fan speeds does not impact airflow distribution in a properly designed ventilation system. Extensive airflow testing in commercial storages equipped with VFDs has documented that uniform airflow is achieved at fan speeds as low as 10%. In fact, some storages with undersized plenums or other design flaws may benefit from operation at reduced fan speeds compared to full fan speed operation.

VFDs are a tool in the storage manager's toolbox that should not be overlooked. They provide the ability to precisely control the amount of airflow delivered to the potatoes and avoid over-ventilation and under-ventilation that can use excessive power and compromise potato quality. In this manner, they allow for optimization of the storage environment from the minute the first potato is loaded into the storage until the final potato is sold. VFDs have the potential to provide tremendous economic returns in the form of reduced shrinkage and smaller power bills and should be strongly considered by every grower who stores potatoes. Contact the Gellert Company (1-888-GELLERT or www.gellert.com) or your local Gellert Dealer for more information regarding Variable Frequency Drives and their use.

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