

Ventilating Correctly After Cool Down Pays Off

Adequate ventilation, done in order to manage the by-products of respiration and maintain a uniform pile temperature, is critical to managing one's potato pile through long-term storage. Yet, over-ventilation can cause significant quality and weight loss, as well as increase power consumption unnecessarily.

Potato tubers oxidize glucose in their mitochondria to produce the nutrients that keep them viable through dormancy. This process of respiration produces significant heat, moisture and carbon dioxide as by-products. While the water is retained in the tubers' cells, the CO₂ and heat are released and must be removed from the storage space in order to maintain a consistent, optimal storage environment.

Successful long-term tuber storage depends on maintaining a uniform humidity and temperature throughout the pile. The ideal relative humidity for dry, healthy tubers is 92 to 97 per cent, and 80 to 90 per cent for wet, leaky tubers. For most varieties and end-uses, the temperature differential between the top and bottom of an 18' pile should not exceed 1.5 C (2.7 F). *Certain* processing varieties require a smaller differential. Consult with industry experts to determine differential recommendations for your varieties.

While the by-products of respiration can be controlled with a certain level of ventilation, additional fan time may be necessary to manage temperature fluctuations caused by internal and external convection factors, such as cold spots near doors in winter. In order to best manage these temperature disparities, operate fans periodically throughout the day.

While it is almost impossible to eliminate small temperature differences within a storage building, ventilation is not a good option to manage significant building maintenance issues. Buildings with inadequate insulation and/or drafts may require continuous ventilation to prevent condensation and maintain temperature. Opting to invest in building improvements to address these issues is a wise investment that will result in a significant improvement in tuber quality, reduced weight loss, and energy savings.

Invest in accurate temperature sensors for your pile and then calibrate them regularly in order to have a clear guide as to when ventilation is necessary. The ventilation system should include controls that automatically turn on ventilation when the sensors identify a heat differential exceeding user-set limits.

Managing CO₂ levels is also critical, particularly for processing varieties. CO₂ should not exceed 2500 ppm for most French fry varieties and 2000 ppm for chipping potatoes (as well as certain French fry varieties). Removing CO₂ often requires sacrificing the supply temperature to maximize fresh air intake. CO₂ should be purged in brief intervals so tubers are not subjected to unfavourably warm or cold temperatures for prolonged periods.

While fear of hot spots and condensation can make it tempting to over-ventilate, ventilation should not be done any more than necessary in order to minimize shrink and unnecessary power consumption. Typically, 120 cfm per ton of potatoes per day of ventilated air is enough to manage the by-products of respiration. That said, the amount and schedule of ventilation should be determined by the variety and condition of the crop, its end use, and the airflow capacity of the ventilation system. More ventilation is necessary when the crop's respiration rate is higher, especially in warmer temperatures or if tubers are immature, damaged or diseased.

