

Suction walls improve airflow distribution in passive-ventilated potato box stores



Figure 1. Example of a suction wall with 'letterbox' openings, providing a non-positive drying system

Storage of potatoes in the best possible conditions requires two key elements: a dry crop and uniform temperature across the store. If airflow is uneven, temperatures will vary, gradients will build up and there is a high risk of condensation, resulting in a poor-quality crop.

An effective ventilation system is, therefore, key to achieve a dry crop. Drying is ideally achieved in a positive ventilation system in which air is forced through the crop, as in a bulk store. In many box stores, however, air will often move passively around boxes rather than through them, taking the path of least resistance. One way to improve this is to use a suction wall system to reduce any prospect of short-circuiting.

The potato storage ventilation system at OGE Chapman & Son in South Lincolnshire is a good example of how to significantly enhance a passive airflow delivery to the stored crop.

The system achieves uniform control through the engineered suction plenum across the back wall of the store. This has precision cut slots that line up with the pallet slots but, because they are slightly smaller than a standard pallet opening, they offer a little resistance to the airflow, which helps create a more even spread of air returning to the fan (Figure 1).

This particular system was designed and supplied by Farm Electronics, now part of the Tolsma Grisnich Group.



Benefits of suction wall

As a result of using the suction wall, OGE Chapman & Son has seen significant improvements in drying time compared with a conventional overhead throw system. In addition, more even temperatures are achievable throughout the store, thus reducing fridge run time, dehydration, and the risk of condensation and sprouting.

“The money spent on the plenum was worthwhile,” says owner Jamie Chapman: “The plenum was fitted into a new-build store but the cost of the plenum was not a big percentage of the overall cost of the new store project. The benefits are there for all to see in the way the store performs and mean that the business can deliver high-quality potatoes to meet our market needs.”

An analysis of the pattern of airflow shows a uniform delivery of air along the pallet slots (Figure 2). There is some fall of air along the top edge and a slightly higher concentration where the fans are located in the centre of the store but, overall, the distribution is very good.

“The plenum wall provides benefits throughout the storage period, providing a better product to market at the end”

AHDB storage specialist Adrian Cunnington comments: “For what is still a passively ventilated store, the uniformity of airflow in this type of installation is remarkably even. Having a balanced plenum like this gets the best out of this type of store and would be a worthwhile option, if upgrading.”

Medium (7.72–8.64) High (8.65–9.57)
Very High (9.58–10.48)

| | | | | | | | | |
|------|------|------|-------|-------|-------|------|------|------|
| 8.58 | 8.14 | 8.12 | 8.32 | 9.16 | 8.16 | 8.16 | 7.72 | 7.79 |
| 9.37 | 9.16 | 9.37 | 9.39 | 8.89 | 8.63 | 9.16 | 9.19 | 8.61 |
| 9.37 | 9.10 | 8.80 | 8.80 | 9.20 | 8.97 | 8.55 | 8.24 | 9.29 |
| 9.21 | 9.39 | 9.24 | 10.28 | 10.48 | 9.82 | 9.10 | 9.44 | 9.59 |
| 9.68 | 9.67 | 9.57 | 10.44 | 10.26 | 10.34 | 9.69 | 9.52 | 9.09 |
| 9.08 | 9.34 | 9.46 | 9.86 | 10.04 | 9.86 | 9.49 | 9.41 | 9.51 |
| 9.84 | 9.47 | 9.66 | 10.07 | 10.18 | 9.95 | 9.54 | 9.17 | 9.64 |

Figure 2. Air velocity values for store with installed suction wall, as measured from the back of the store. The store is 7 boxes high and 9 boxes wide.



About OGE Chapman & Son

OGE Chapman & Son are third generation farmers from Long Sutton, in South Lincolnshire, farming Grade I silt soils around The Wash. They grow 72 ha of Markies and Agria for the fresh chipping market. All potatoes go into long-term storage and are then marketed in the spring period from the beginning of March to around the end of May.



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