ESSENTIAL ELEMENTS
of
POTATO STORAGE

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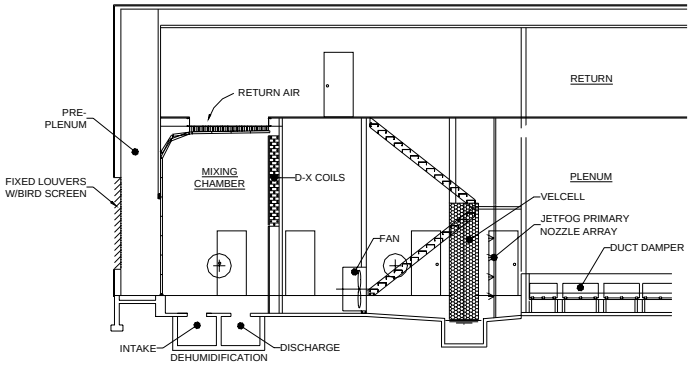
Never before in world history has so much emphasis been placed on preserving the quality of food. And, since potatoes play such an important role in human nutrition today, it is appropriate to take a quick look at the development of potato storage performance.

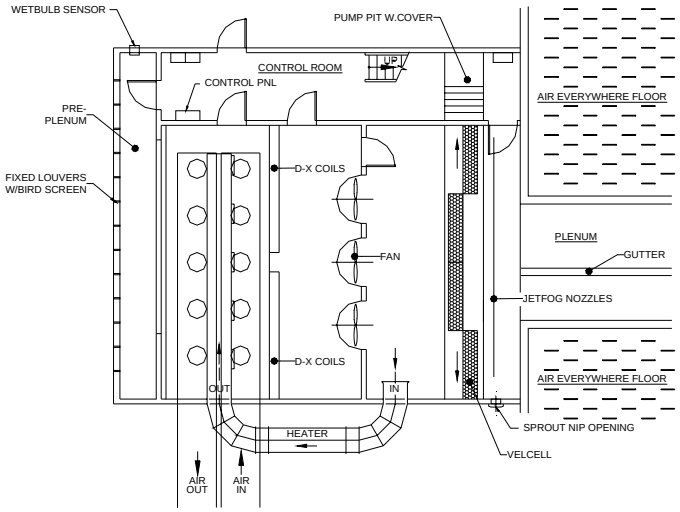
Just over 50 years ago, in 1952, Ray Krock initiated a system that required a revolution in potato storage. Most corners of the globe today are at least somewhat affected by the fact that McDonald's is the largest retail prepared food distribution system in the world. What has that got to do with potato storage? The requirement for consistent high quality potatoes out of storage fueled the horticultural research community to assist with growing higher quality product, and then ag engineering research presented the details necessary for minimizing losses in storage.

Of course, spud storage serves a much broader purpose than just taking care of french fry raw product for McDonald's, and the rest of the fast food industry. But the success of McDonald's is definitely the result of placing enough emphasis on quality and details to make the consumer happy. Since the basic task of storage is to preserve both the **quantity** and **quality** of the raw product placed in storage at harvest, the essential elements of modern potato storage provide the tools necessary for optimum storage management.

The first, and most important task for minimizing losses in potato storage takes place when potatoes are initially placed in storage: The creation of an optimum "suberizing environment" sets the stage for successful storage. During the first few weeks in storage the deposit of the waxy, fatty substance, suberin, produced by Mother Nature, into tuber cells adjacent wounds turns the surface of damaged areas and the skin into corklike tissue. An optimum suberin deposit is essential to prevent moisture loss and also significantly assist with disease resistance.

The potato storage and system contribute to three factors necessary for an optimum suberizing environment: Potato temperature in storage, Oxygen and CO_2 levels in the supply air, and Supply air relative humidity. **The Essential Elements** of today's potato storage focus on energy-efficient design techniques to provide incredibly tight supply air temperature: ±0.1°F (±0.05°C). Since airflow is the lifeblood of the potatoes in storage, exceptionally uniform air distribution is provided by a well-designed under-floor concrete air distribution system. Optimum supply air humidification is significantly enhanced since the whole under-floor concrete air distribution cavity is an extension of the humidification system. Although the list of details necessary to get the job done is extensive, the result is definitely cost-effective.





Very significant progress in storage design and storage performance has taken place during the past 30 years. Today is simply an appropriate opportunity to reflect on this knowledge, and present the current thoughts, ideas, and expectations for new storage from some of us that have been involved in storage research and development the past several decades. Attention to all the essential elements necessary to minimize losses results in cost-effective potato storage system performance. There is simply no excuse, today, to construct or remodel a storage that provides anything less than top storage performance.

Potato storage designed and constructed today must completely address the factors and conditions associated with the particular potato crop to be stored. Whether potatoes are to be stored in pallet boxes or bulk, potato variety, soil and weather conditions at harvest and available harvest equipment are all part of the picture to be considered when planning a new storage. Preservation of the *quantity* and *quality* simply means minimizing losses: weight loss, quality losses, and loss due to spoilage. Research has shown that for every percent of weight loss during storage there is an additional percent of quality loss. Our constant goal has been to continuously polish the multitude of details that determine storage performance… Those details that ensure an optimum environment for the raw product in storage, plus the details that protect the storage investment itself.

The requirement for a predictable, quality french fry has had plenty to do with storage performance today. It is important to note, though, that the fast food industry unceasingly requires higher standards for potatoes. Potato quality for the fresh market has similar demands. And, what the market will accept today, simply won't be good-enough tomorrow. When you recognize that potatoes may be in storage as long, or longer than it took to grow them, there should be as much attention, care, and concern for the storage phase as was devoted to the growing phase. Potato storage is the "second half" of a successful potato crop.

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