

# Innovative Fumigation

Ever since Royal Fumigation began operations at the Port of Wilmington, it has developed and used technological advances to benefit the Port's fruit importers and shippers, as well as the fumigation industry as a whole.

From Royal Fumigation's start in 1988, it has examined traditional approaches to the fumigation process in order to identify areas in need of change. Royal created procedural and technological solutions to improve both food and worker safety, expedite the fumigation process and improve the level of fruit quality from ship to market.

"The Port of Wilmington is one of the nation's largest ports for Chilean fruit imports and Royal is proud to be the company contracted by all of the Port's fruit importers and shippers to handle fumigation operations," said Royal Fumigation President Roy Richardson. "We know that preserving quality during fumigation is vital to protecting the product. That's why Royal does everything possible to innovate for quality."



Royal Fumigation has developed unique, large-scale, easy-to-operate fumigation equipment that enables easy monitoring of fumigation for more than 6,000 pallets.

One of Royal's earliest technological innovations addressed the problem of condensation on fruit. When fruit arrives at the Port colder than warehouse temperatures, condensation forms, and during the fumigation process, causes the fruit to spot.

To maintain top quality of the fruit, Royal focused on eliminating condensation by slowly increasing the temperature of the vessel hold during the voyage, so that fruit would arrive at the proper temperature for fumigation. This process avoids the need to blast the fruit with heat upon discharge or wait until the right temperatures are reached to begin fumigation.

Royal monitors the pulp temperature of the fruit throughout the unloading process and, with the cooperation of the Port, keeps strict control of the temperature of the warehouse and the fumigant gas. Minimizing breaks in the "cold chain" in this way prevents damage from over-heating and slows the ripening and decay process, resulting in better quality and higher value fruit.

Royal also focused on reducing damage to fruit and expediting the fumigation process by planning the fruit sorting operation in the warehouse.

When the fruit arrives at Wilmington, Royal and the Port's warehouse personnel assign each pallet to a location and revise floor plans throughout the unloading operation as circumstances change. This

helps Royal fumigate as much fruit at one time as possible, which can make the difference between fumigation on the day of discharge or a day later.

Royal's technological advancements include two proprietary fumigation systems. Royal's first development was a design that consists of lightweight frames and gates which can quickly create a fumigation chamber in almost any space. The company continues to look into further improvements and has created a more recent design that allows fumigation of large-scale cargoes of more than 6,000 pallets.

The large-scale equipment is unique due to its lightweight and simplicity, yet it incorporates gas leads, circulation equipment and all of the probes needed to measure the conditions inside the chamber for more centralized monitoring. This design was used during the 2000-2001 Chilean season, at which time USDA researchers and scientists attended nearly all of Royal's large fumigations for the purpose of collecting data on air circulation, placement of test lines and the like.

The second advancement insures the safe use of gas during the fumigation process by a patented method for sealing the chamber to the floor that is far safer, less labor-intensive and faster than other methods. The new equipment uses a seal that is compressed by the weight of the structure when it is lowered to the floor. It is far superior to traditional sand sealing, offers more protection to personnel and takes much less time.

Other examples of Royal's being on

# Technology at work in Royal's Port Operation Center

the vanguard of technological improvements include its use of gas lines (hoses) sheathed with stainless steel mesh to withstand the pressure of the heated gas. Royal also re-circulates the fumigant gas (methyl bromide) back into the fumigation chamber after the USDA takes readings. This eliminates the release of gas into the air where the inspectors stand.

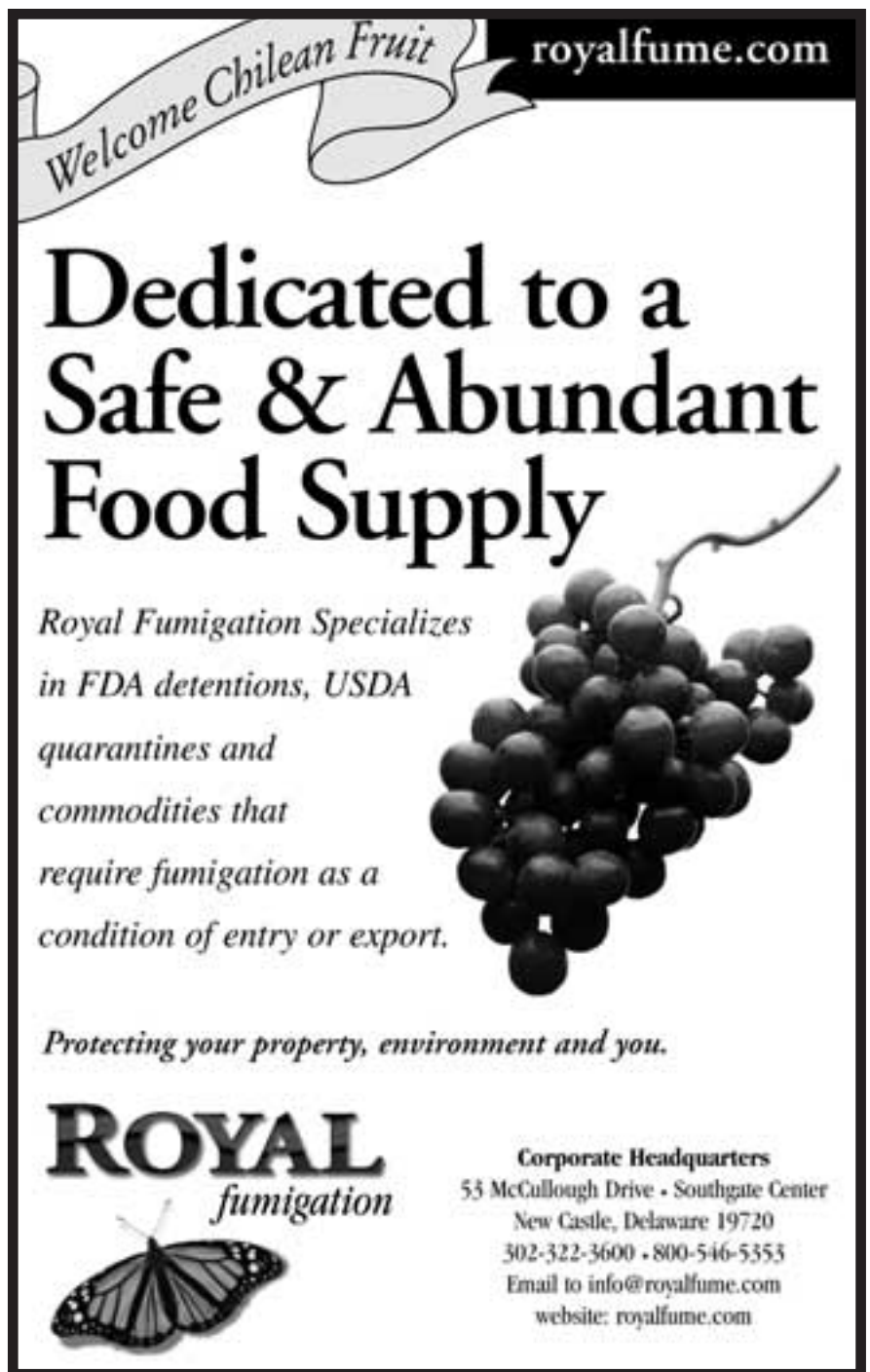
Further, Royal developed the only tarpaulin approved for use beneath the fire sprinkler systems in warehouses and, in the process, helped fire marshals find ways to fight warehouse fires without using chemical fire retardants that would destroy the fruit.

Royal's vision doesn't stop with the fumigation process. Royal has spent more than five years researching ways to re-cool fruit after fumigation. Using forced air, it is able to re-cool fruit after fumigation in just six hours or less – a significant difference from conventional post-fumigation cooling which takes anywhere from three days for fruit in wooden crates to a week or more for fruit in cardboard boxes.

Royal's innovation can increase storage life up to two weeks or shelf life up to five days, and longer storage life helps preserve the price of the fruit. Royal's technology and the Port's operations were recently highlighted at a "Quality Control of South American Fruit in the United States-From Ship to Market" seminar, held in Wilmington, Delaware. A second seminar is planned

to take place in Chile. Be on the lookout as Royal continues researching and developing innovations that will

improve the quality and safety of the fumigation process to ensure a safe and abundant food supply.



Welcome Chilean Fruit


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## Dedicated to a Safe & Abundant Food Supply

*Royal Fumigation Specializes in FDA detentions, USDA quarantines and commodities that require fumigation as a condition of entry or export.*

*Protecting your property, environment and you.*

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