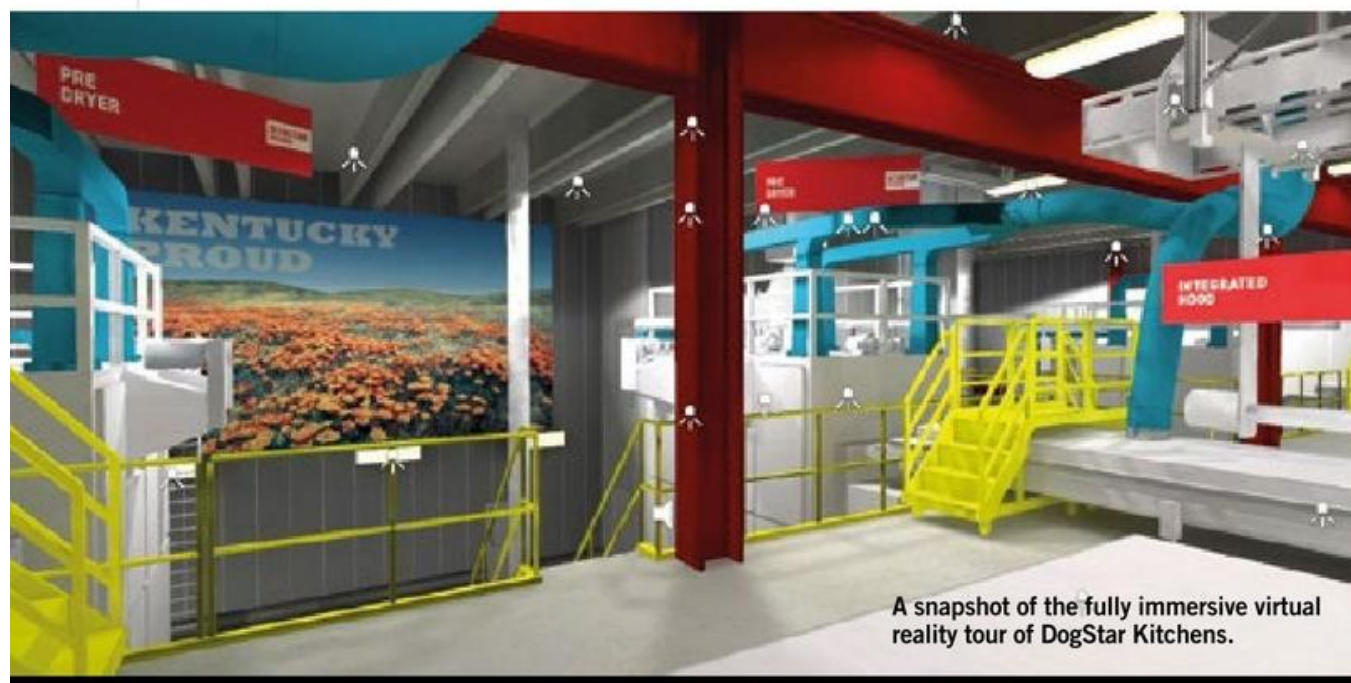


# Innovative Tech



A snapshot of the fully immersive virtual reality tour of DogStar Kitchens.

## From the Ground Up

Advancements in building design, construction, and technology energize the food industry

BY LINDA L. LEAKE, MS

**I**magine touring your new, fully furnished food manufacturing plant before construction and equipment installation are complete.

Executives at Champion Petfoods, LP, Edmonton, Alberta, Canada, did just that relative to their first U.S. facility, called DogStar Kitchens, in Auburn, Ky., which became operational Jan. 4, 2016. DogStar produces 220 million pounds annually of freeze-dried and kibble pet food under its Acana and Orijen brands.

Champion employed Gray Construction, Lexington, Ky., to provide engineering, architectural design, and construction for the project, a 371,000-square-foot state-of-the-art masterpiece on 85 acres.

While Gray Construction has been providing design-build and construction management services for the U.S. food and beverage market for nearly 60 years, DogStar Kitchens was its first pet food facility project, according to Stephen Gray, the firm's president and CEO.

It was Gray Construction's use of virtual reality (VR) that allowed Champion

to "step into their facility" before it was finished. VR is a computer technology using head-mounted goggles with a screen in front of the eyes that generates realistic images to simulate one's physical presence in a virtual environment.

"Providing a fully immersive experience, the quality and accuracy of the virtual environment gave Champion an unprecedented understanding of what their kitchens would look and 'feel' like, even in the earliest phases of design," Gray says. "VR is really an extension of building information modeling (BIM) to show customers how their facilities will function."

According to the U.S. National Building Information Model Standard Project Committee, BIM is a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life-cycle, from earliest conception to demolition.

"By creating a VR walk-through of the proposed facility in the early stages of a

project, manufacturers can engage with equipment suppliers and vendors, which allows them to better plan how operations will be conducted in the facility," Gray elaborates. "VR also enables processors to prepare for food audits well in advance of the first one ever occurring, thus ensuring the highest level of food safety. By enabling the manufacturer to experience engineering functions firsthand in the design process, VR prompts a conversation between the manufacturer and engineer that previously didn't exist."

"The VR technology helped us visualize the layouts and the movement throughout the Kentucky kitchen so that adjustments could be made to accommodate people and product process flows," says Frank Burdzy, Champion's president and CEO. "It was also a powerful tool to engage our customers in envisioning our commitment to food safety and excellence in food making."

"While still a relatively new technology, the visual enhancement to BIM that VR provides could become increasingly valuable in the food processing industry given the growing complexity of projects," Gray adds.

Burdzy is quick to point out that DogStar Kitchens was designed and built to comply with the Food Safety Modernization Act (FSMA) and to operate beyond the human food safety standards, and therefore beyond the European Pet Food Industry Federation standards. "We use the highest level of food safety practices in our kitchens, including zone controls to separate our fresh and cooked ingredients," he relates. "Gray Construction's understanding of the importance of food safety, processes, and flow of ingredients was corroborated by our DogStar Kitchens' ability to achieve the Safe Quality Food certification within our first year in operation."

In 2016, Gray Construction won a prestigious Design-Build Institute of America Team Award for DogStar, the first pet food facility in the world to be so honored.

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DogStar also topped organizations in both human and animal food industries to capture the Global Food Safety Initiative's inaugural 2017 Global Markets Award.

### Improved Floor Coatings

Sherwin-Williams Protective & Marine Coatings (S-WP&MC) now offers water-based floor coatings featuring improved hot-tire staining resistance and no hot-tire pickup.

Introduced commercially Aug. 1, 2017, these products, AquArmor WBU Water-Based Urethane Floor Coatings, are the next generation of water-based, aliphatic urethane coatings designed for industrial venues, according to Casey Ball, S-WP&MC's marketing director for resinous flooring.

Ball says that the new coatings, which work on poured concrete floors and any type of walls, deliver high-performance application and aesthetic characteristics that rival solvent-based products, with the added benefit of lower volatile organic compounds than solvent-based formulations.

"The coatings' wet edge application properties help to minimize the potential for roller lap marks, ensuring a consistent gloss sheen for GP4410 and a consistent satin sheen for GP4411, the two finishes available in the line," Ball explains. "After curing, the coatings offer the best resistance to hot-tire pickup and hot-tire staining compared to other water-based floor coatings, preventing tires from leaving excessive, permanent stains.

"The products also offer superior chemical-resistance properties, helping to enhance the aesthetics of food and beverage manufacturing facilities and warehouses," Ball adds.

### Reflective Insulation

Reflective insulation is one of the fastest growing technologies in the world, including in the food industry, says Bruce Wester, director of sales for Fi-Foil Co., Auburndale, Fla., a manufacturer of reflective insulation systems and radiant barriers.

While first introduced for commercial applications about 15 years ago, Fi-Foil has only recently started marketing its Retro-Shield System to the food industry as a viable insulation solution to meet some FSMA requirements, Wester relates.

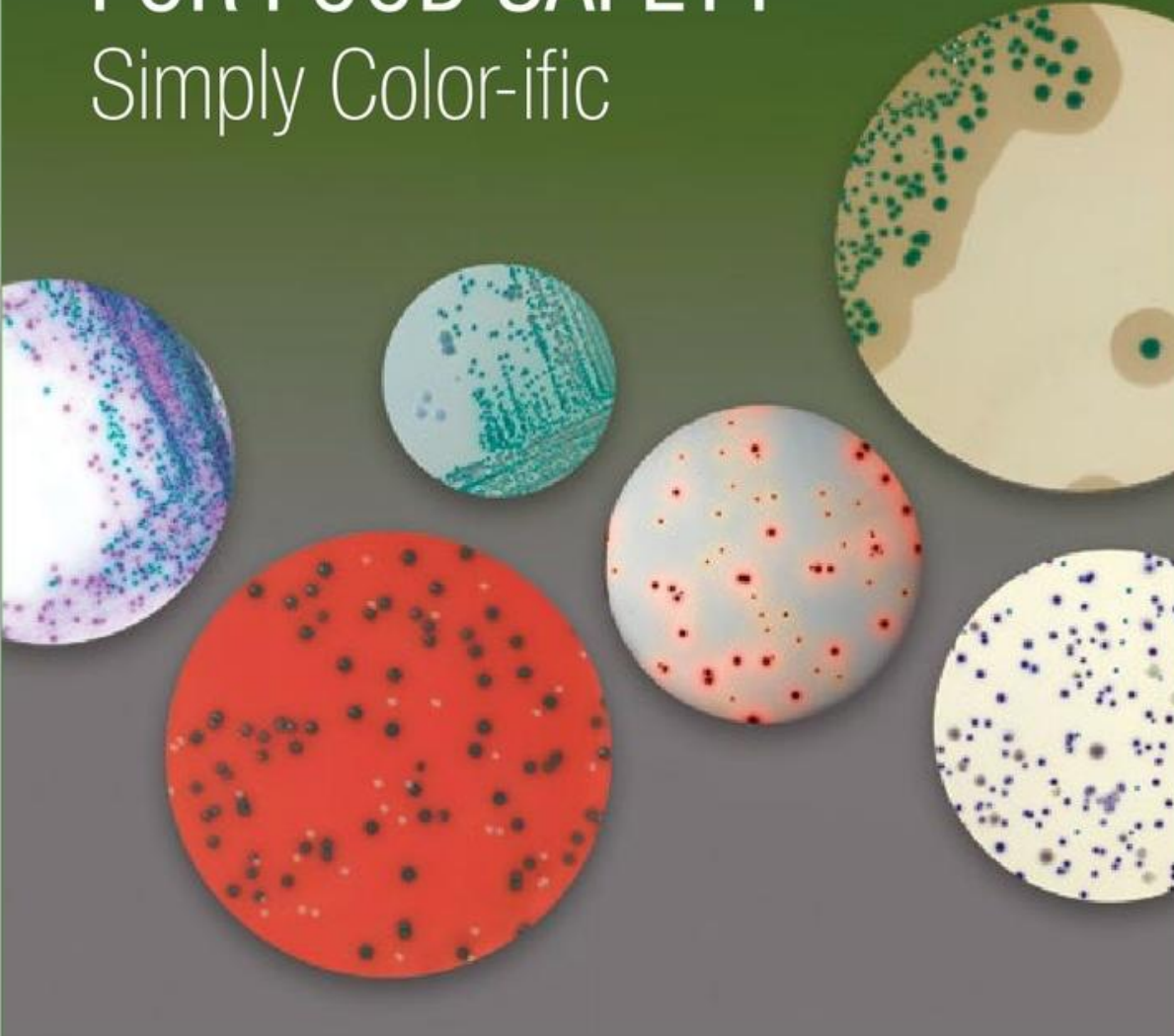
Explaining reflective insulation technology, Wester says that heat is transferred by three methods: conduction, convection, and radiation. "Traditional insulating products resist heat transfer by slowing down conduction through materials such as fiberglass, recycled paper, or foam," he notes. "Key to traditional insulation is the small air spaces within those products, since air is a tremendous insulator."

Reflective insulation works differently, Wester says, by incorporating highly reflective foils or metalized films, either alone or as part of an engineered product structure, to reduce the most dominant of the three forms of heat transfer, radiant energy, through high reflectance and low emissive surfaces that block more than 90 percent of radiant energy transmission.


*(Continued on p. 16)*

# CHROMOGENIC SOLUTIONS FOR FOOD SAFETY

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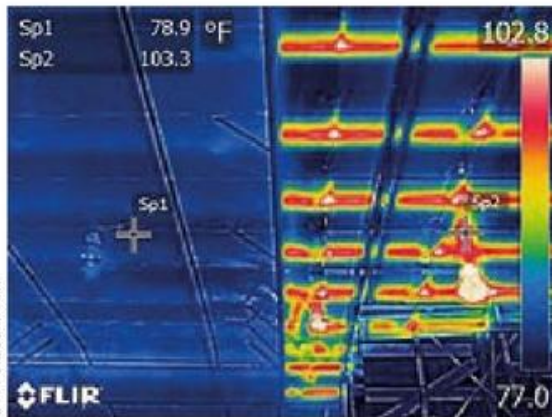


## INNOVATIVE TECH

## From the Ground Up

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“Reflective insulations also incorporate air as an insulator by creating air cavities within a product and/or in conjunction with the building structure around them to reduce the convective component of heat transfer,” Wester explains. “In the case of our RetroShield system, it addresses conduction, convection, and radiation plus



Thermal image shows how Fi-Foil's RetroShield stopped the transmission of heat through a building's roof and the metal beams.



The wet edge application properties of S-WP&MC AquArmor WBU Water-Based Urethane Floor Coatings help minimize the potential for roller lap marks, ensuring a consistent sheen.



Esbelt's Metal Detectable Conveyor Belt POLER 0802MD helps address the issue of plastic contamination of food products.

creates a continuous insulation barrier to stop that transfer of heat or cold. Reflective insulations can also be combined with traditional insulations to help them perform better and create an optimized solution.”

It is widely accepted by building scientists that heat transfer can be substantially minimized by controlling the radiant energy passing through the ceilings and walls, Wester points out. “The RetroShield System is designed to virtually eliminate radiant heat transfer,” he says.

### Roofing Diagnostics Tools

There haven't been any major innovations in roofing products of late, says Fred Sitter, marketing manager for Royalty Roofing, Seymour, Ind., a company that serves the food industry. “Although there have been modifications to product formulations and roof membrane thickness, most commercial roofing materials in use today have been around for decades,” Sitter relates. “However, a recent development relative to roofs is the use of infrared technology to identify problem areas.”

Since its wavelength is too long to be detected by the human eye, thermal energy, also known as infrared energy, is light that isn't visible. Thus, it requires a thermal imaging device or infrared camera that detects infrared energy, converts that energy to an electronic signal, and then produces a thermal image on a video monitor.

Thermal imaging is non-invasive and allows for quick evaluation of a large area. “Thermal imaging shows temperature variations on the rooftop, which in turn can indicate the presence of problematic moisture under the roof surface,” Sitter relates.

While a roof represents only about 5 percent of the cost of a commercial building, 70 percent to 80 percent of lawsuits associated with commercial buildings, including food processing facilities, are centered around failures in the integrity of the roofs, Sitter notes.

“Roofing failures impact the whole environment of a building, so timely, accurate detection of roof leaks and moisture penetration is critical to the food industry because water damages insulation and other building components, including drywall, ceiling panels, etc., and can cause mold growth and create an environment for pests to breed,” Sitter emphasizes. “Such a setting would threaten a company's objective to process food safely. Ensuring rooftop watertight integrity should be a part of any food manufacturer's safety strategy.

“To that end, cameras that detect infrared radiation are being used with increasing frequency to inspect roofs and pinpoint leak locations,” Sitter adds. “And drones are being used to carry the cameras, which can provide a safe alternative to humans climbing on a roof.”

### Conveyor Belt Innovation

Conveyor belts can get jammed, break, or wear down, sometimes resulting in bits of plastic entering the food production line, notes Donald Harvey, business development manager in the U.S. and Canada for Esbelt, S.A., Barcelona, Spain, a manufacturer of conveyor belts.

In November 2016, Esbelt introduced in the U.S. an innovative new conveyor belt that is helping to address this issue of potential plastic contamination.

Esbelt's Metal Detectable Conveyor Belt Poler 0802MD incorporates a unique formulation of DuPont Hytrel TPC-ET thermoplastic polyester elastomer (Hytrel), which is detectable in metal detection and X-ray inspection machines, according to Franco Marabelli, global business consultant, development material handling, for DuPont Performance Materials.

“A special food grade Hytrel has been enriched so that it can be detected by metal and/or X-ray detectors and offer the flexibility of rubber with the strength and processability of thermoplastics to produce conveyor belts,” Marabelli elaborates.

“It's important to keep in mind that the Poler 0802MD's metal detectable and X-ray inspection qualities are dependent on the capacities of the specific metal detector that is utilized and its setup by the end user,” Harvey adds. “There are three variables facing metal detection and X-ray inspection today, namely the product type to be inspected, environmental noise, and setup, so it's important to conduct tests with each product to determine detectable size.” ■

Leake, doing business as Food Safety Ink, is a food safety consultant, auditor, and award-winning journalist based in Wilmington, N.C. Reach her at [LLLeake@aol.com](mailto:LLLeake@aol.com).

For bonus content, go to October/November 2017 on [FoodQualityandSafety.com](http://FoodQualityandSafety.com) and click on “From the Ground Up.”