

Facility Design: Small Space Improvements

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Every food production facility faces challenges when designing or improving operations for optimal food safety. Large plants often evolve through multiple additions and renovations, creating traffic patterns that may no longer support ideal hygienic design. Smaller facilities can quickly outgrow their available space during periods of rapid growth. Back-of-store production areas frequently share space with storage, other food preparation activities, or restroom access points.

This article focuses on practical improvements that can be implemented in smaller and back-of-store production environments. While a complete redesign may not be feasible, many effective changes and operational controls can significantly reduce food safety risks.

Dedicated Production Area



Whenever possible, establish a dedicated production area with restricted access limited to production personnel. This should include an entrance point with a handwashing sink used prior to entry or upon entry. Also, be mindful of clothing articles so that they do not create unnecessary hazards for safety or foreign material concerns. If dedicated space is not available, schedule production during times when other employees are not using the area. This helps to prevent cross-contamination from outside sources and should help efficiencies with food production.

Traffic Flow and Access

Personnel and material movement should be controlled to minimize contamination risks. Deliveries, customer traffic, and employee access to restrooms should be separated from production activities whenever possible.

Physical barriers such as partition walls can help define production spaces. Air curtains may also be used to help maintain positive air pressure and reduce the introduction of airborne contaminants and foreign materials. When physical separation is not possible, consider alternative delivery paths and restrict production during periods of heavy traffic. Another good practice, particularly as you grow is to implement footwear disinfection (Foamers/footbaths) or a captive footwear program to prevent contamination coming into the production area.

Other Food Preparation Activities

Many back-of-store operations conduct multiple food preparation activities within the same space. Unlike products that are cooked and consumed immediately, ice cream may be frozen, hardened, stored, and consumed days or weeks later. Because of this difference, ice cream production should be separated from other food preparation activities whenever possible. If shared space is unavoidable, activities should be scheduled at different times with thorough cleaning and sanitizing completed between operations.



Food Allergens

Food allergens can create health issues with many individuals who are sensitive to specific foods, like peanuts, tree nuts, wheat, soy, sesame, milk, and egg. These are all common ingredients in ice cream, so great precaution must be made to avoid unintentional cross-contact. Foods (or ingredients) with these major allergens should be stored apart from those without a rule of thumb. Also, when preparing ice cream with those allergens, you should work to make all recipes without these allergens first and then add products with allergens as you progress through the production shift. You find more on [allergen controls](http://www.safeicecream.org) at www.safeicecream.org

Drains and Floor Design

Floor drains are an important component of facility sanitation. Ideally, drains should be located away from areas where finished product is dispensed or exposed. Drains should be cleaned after production hours and not opened during a production operation. Floors should be properly sloped to prevent standing water and promote effective drainage as well as safety concerns with movement.

Walls and Ceilings

Wall and ceiling surfaces should be smooth, non-absorbent, durable, and easy to clean. Well-maintained surfaces help prevent the accumulation of dirt, moisture, and microorganisms. Intermittently cleaning walls, floors, and ceilings lead to a well-maintained production environment with a reduced risk of harboring foodborne bacteria.

Product and Ingredient Storage

Finished products and production ingredients should be protected from unnecessary traffic and handling. Whenever possible, finished products should be transferred from production-area hardening freezers to separate storage freezers outside the production room. Similarly, ingredient refrigerators within the production area should be reserved exclusively for production materials, with separate refrigeration available for front-of-store operations. Keep in mind allergen concerns when storing ingredients as well.

Air Control

Maintaining an efficient air handling system to provide filtered and treated air is important. The lower the humidity level the better. Try to, in effect, seal off the production area from air flow that could come from the outside or from nearby traffic areas. By having air vents inside the production area (not above any exposed product) and the air returns outside of the production area (pulling air out from under a door or through a vent) you will help insure positive air pressure inside your production area, which is ideal.



Pay close attention to the location of air vents and HVAC systems. Condensation from vents can create food safety hazards, and airflow should be directed away from exposed ingredients and finished products. Air filters should be inspected and replaced routinely.

As a general rule, avoid placing equipment, utilities, or overhead structures directly above batch freezers and open product zones.

Cleaning and Sanitation

All cleaning should be performed at the end of the shift to prevent splashing/overspray or other concerns with finished products. Thorough cleaning should be completed daily with all equipment cleaned per the manufacturer's specifications for time, temperature, concentration, and agitation. Also, chemical suppliers can help with cleaning tips and guides for your supplied cleaning chemicals. Sanitation should be completed prior to running production operations as a way to ensure you are starting with clean equipment. Also, rely on manufacturer or chemical supplier specifications for sanitation steps.

Trash Control



First, any trash or waste in the production area should only come from the production process. No other waste or trash generated in the facility should enter the production area. Trash and waste, generated in the production area, should be removed (in a cleanable container) to outside the production area and then another non production worker should move the waste to the appropriate dumpster. If this is not possible, the production worker can remove the trash at the end of the production process when he/she will not be returning into the production area. This helps insure production workers do not walk through dirty floors and parking lots and possible contaminate the production area.

Final Thoughts

The objective is to maintain a production environment that is as clean, controlled, and as separate as possible. Think of the production area like an operating room: unnecessary traffic, uncontrolled airflow, and potential contamination sources should be minimized.

While improvements such as scheduling changes, physical barriers, and equipment upgrades may require investment, they help protect product quality and consumer safety. Every facility has limitations, but every facility can take meaningful steps toward reducing risk.

Most importantly, don't hesitate to seek guidance from industry peers. Food safety is pre-competitive, and professionals throughout the ice cream industry are often willing to share best practices and lessons learned. Resources may be found by visiting SafeIceCream.org which can provide additional support and information.