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From Experience

Starting Strong: Building Sanitary Design in From Day One

Ensuring food safety and reducing contamination risk are key reasons why the principles of sanitary design for food and beverage facilities must be used. Developed by the North American Meat Institute (now known as the Meat Institute), each of the principles – [11 in total](#) – play a significant role in the creation of food-safe facilities. While all of these principles are important, the first two set the foundation upon which the subsequent principles build upon, and are vital to include during the planning for any project:

- **Principle 1: Establish Distinct Hygienic Zones Based on Product Exposure Risk.** This principle begins with understanding the process, the state of the product, and associated packaging, and the level of risk at each step. Once hygienic zones are established, an understanding of where materials come from, where they are going, and how people interact with them is important, as this introduces risk of contamination to the product. Because of this, the establishment of hygienic zones influences the remaining sanitary design principles and facility decisions.
- **Principle 2: Design Personnel, Material, and Waste Flows to Minimize Hazards.** Controlling how people, products, and waste move through a facility is essential to minimize risk. It's not just about separating raw and finished goods: It's also about managing the flow of all materials between hygienic zones. Consider these examples:
 - If a line produces excess packaging or off-spec product, and that waste is carried to a disposal dock, the return of the waste receptacle to the sanitary area may introduce risk. Good design includes interventions such as single-use receptacles, or the introduction of a sanitation procedure.
 - If personnel paths cross between raw and ready-to-eat areas without proper separation or intervention, the potential for cross-contamination increases. Good design makes the right path the easiest path by anticipating these flows, creating discrete, planned waste paths, separating personnel and fork truck routes, and strategically placing drop zones to keep soiled traffic out of clean spaces.
 - Without clear zoning, it's all-too easy for someone to suit up in Personal Protection Equipment (PPE) and then walk through different zones, potentially carrying contaminants from low-risk zones into high-risk spaces. Good facility design mitigates this by creating physical and procedural barriers: designated entry points, visual cues, and controlled access that reinforce the boundaries between zones.

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Based on Hixson's experience, we recommend the following steps to make sure these principles are established at the start of and throughout the duration of every project:

1. Involve the right stakeholders. Consider giving representatives from Environmental Health & Safety (EH&S), operations, sanitation, and maintenance seats at the table during planning meetings.
2. Keep risk assessment in mind. Understanding where contamination could occur...whether through personnel movement, material flow, or waste handling... is what informs the layout and zoning of a facility. Prevention starts with identifying these risks early and designing interventions that reduce or eliminate them.
3. Adhere to training or operational protocols. Even the most hygienically designed space can fall short if teams aren't equipped and empowered to maintain it. Ongoing education helps employees understand how to preserve sanitary conditions, recognize risks, and respond appropriately. It's not just about knowing what to do: It's about building a culture where hygiene is second nature.

While the principles of sanitary design for facilities originated with the meat industry (Hixson, in fact, was on the original NAMI facility design task force), they are applicable across all wet food and beverage processing segments (though the level of sanitary design will vary depending on industry segment). Their relevance stems from a universal truth: Facilities built with hygiene in mind are better equipped to meet regulatory standards and industry codes, and they're more resilient against microbial threats. Prioritizing sanitary design from the outset establishes the framework so that every decision, from layout to flow, actively supports safety, minimizes risk, and contributes to long-term success.

Experience in Brief

The need to reprocess products (rework) is a special challenge that needs to be considered during design. How will the rejected product be transferred back to the start of the process without negatively impacting sanitary conditions? A dedicated strategy and planning on the path rework will take is essential to maintaining sanitary design standards.

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