WHITE PAPER

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Food Safety

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SUMMARY

The changes brought on by the Food Safety Modernization Act are designed with an eye toward prevention rather than reaction. The food safety plan provides the backbone to compliance for facilities to assess the operation, identify hazards and implement preventive controls. Preventive controls requirements increase and manifest as administrative type measures when good engineering practice is omitted or ignored. Engineering solutions are a far more effective way of eliminating and controlling hazards.

According to the Centers for Disease Control approximately 48 million people become sick annually due to contaminates in our nation's food supply. Of those who become ill some 128,000 are hospitalized and roughly 3,000 die. Needless to say, for manufacturers there is a lot riding on ensuring your raw materials, processes and products are safe for consumption.

Quality programs have evolved to focus attention on prevention rather than response to quality issues. Likewise, the Food Safety and Modernization Act, signed into law in 2011, marked a similar change in how our nation will operate to protect the food supply. There are seven major rules to implement FSMA.

1. Preventive Controls Rules for Human Food
2. Preventive Controls Rules for Animal Food
3. Produce Safety Rule
4. Foreign Supplier Verification Program Rule
5. Accredited Third-Party Certification
6. Sanitary Transportation Rule
7. Intentional Adulteration Rule

With regard to the preventive controls rules, facilities registered with the FDA must develop a Food Safety Plan. The FSP must include an analysis of hazards and risk-based preventive controls. These hazards include biological, physical as well as chemical sources. A further requirement is that the FSP be developed by a Preventive Controls Qualified Individual (PCQI). This plan depends on many pre-requisite programs such as Hazard Analysis of Critical Control Points (HACCP), British Retail Consortium (BRC) and ISO 22000.

The Food Safety Plan also provides a basis for good engineering design for food safety and sanitation. When embarking on a new facility or upgrade to an existing one there are numerous factors to consider and methods to address. Effective engineering design can be applied to reduce or eliminate potential hazards, minimize the need for administrative controls and the associated labor costs.

Facility Layout

One of the key factors in creating a design for food safety is the flow of production through a facility from raw materials to finished product. In general, it is a best practice to create an orderly flow and maintain a good separation between raw ingredients and finished goods. Even within the process flow it may be advantageous to create a sufficient distance between upstream and downstream processes to minimize downstream contamination of further refined intermediates. Allergens are also of concern. A layout that segregates non-allergen and allergen materials helps to minimize the potential for contamination.

Traffic patterns for the movement of materials and personnel should also be evaluated. Again, the goal is to minimize or prevent the contamination of downstream processes and finished goods storage. Creating distinct hygienic zones can have several benefits. They can be used to separate multiple production lines, control the flow of materials and personnel and reduce the potential from cross contamination between allergen and non-allergen materials.

Many food production processes involve a transition from wet to dry or vice versa. Typically, it is critical to keep dry processes dry to prevent the potential for microbial growth, particularly pathogens. In many cases a sterilization or kill step is involved. This critical control point marks the transition from raw material to finished product from a biological perspective. Layout can play a major role in minimizing the risk of downstream contamination.

Utilities and maintenance areas are often overlooked in this regard. Typically, these areas are not or cannot be maintained at the standards required for production. Therefore, their location has the potential to increase the risk to food safety. Placement of employee facilities such as break areas, restrooms and locker rooms can help ensure outside elements are not brought into the manufacturing environment. Traffic patterns again are key to addressing this risk.

Equipment selection and layout

Raw materials often have varying degrees of quality with respect to the potential for biological, chemical or physical contaminants. Depending on the sourcing options it may be necessary to incorporate processing steps to prepare and minimize the potential for incoming raws to impact operations. Post processing equipment such as screeners, magnets and metal detectors help reduce the risk for foreign material and metal to end up in the final product.

Equipment selection has a food safety component. Materials of construction are of a concern. The effects of corrosion on product contact surfaces from the product itself or cleaning solutions may need consideration. Sanitary design minimizes product buildup and dead zones, and ensures complete drainage and emptying. Lubrication of moving parts often presents a challenge. Food grade lubricants might be an option. Other methods that provide an effective barrier between lubricants and the product side may need to be considered.

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Building design

Walls and partitions are effective means of separating areas of the process such as raw material storage, wet processes from dry. They also can be used to regulate traffic patterns to reduce risks mentioned previously. Walls need to be constructed such that floor junctions and penetrations are sealed to eliminate potential areas for pest harborage.

Good lighting is required to adequately maintain sanitation. Lighting deters pests. Visual inspection of production areas and equipment is supported by well-placed and effective lighting.

The production environment also presents challenges to overcome. Moisture removal or dehumidification can deter microorganism growth. Sensitive areas and open product zones might require enhanced filtration to minimize airborne contaminants.

Security

One of the biggest changes within FSMA is the attention to food security. Food security refers to the prevention of intentional adulteration or contamination. Facility layout, lighting and building design all play roles in deterring the threat of an outside agent. Within the facility traffic patterns and security systems can limit access to sensitive process areas and the potential malice of the disgruntled employee.

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