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Complying with US Federal Regulations Surrounding Food & Beverage Floor Coatings

The rules that US food and beverage brands must comply with when it comes to facility design and construction are becoming ever more complex and codified as the combination of United States Department of Agriculture (USDA) and Food and Drug Administration (FDA) regulations, in conjunction with internationally recognized food safety management systems such as the HACCP and GMP, increases.

In large part this is because the hazards inherent in food production have multiplied due to an ever-growing population requiring more intensive food production processes on a much larger scale than ever before.

On top of this, food manufacturers need to take note of hygiene standards based on benchmarks from international bodies such as the Food and Agriculture Organization (FAO), International Food Safety Authority Network (INFOSAN) or the World Health Organization (WHO). These standards must also be maintained to avoid foodborne disease outbreaks and to guarantee the trust of international buyers.

Commentators on the global food industry have noted that access to the food export market will increasingly depend on the capacity of producers to meet regulatory requirements, with the most lucrative markets typically also having the most sophisticated and demanding regulations. To improve market access and maintain a competitive edge, exporters must be willing to meet these regulations.

Protecting Against Contamination at Source

Consumable food and beverage products, by their very nature, require special care in processing and handling. The environment where these products are processed, packaged and stored must guarantee food-safety through safeguarding the hygienic integrity of both physical facilities and daily operations.

Although often overlooked, the floor coating chosen to protect the concrete slab in these environments can have a huge impact on contamination control. Seamless floor systems are inherently more hygienic than tiles - with a radius coved skirting and completely seamless and impervious finish, cleaning is easier, removing the threat of microbes and bacterial growth in hard-to-clean joints, grout lines and crevices throughout all risk areas.

On top of this, food processing and preparation areas are a constant hive of human and mechanical activities, such as loading, packing, cleaning, food assembly, storage and the like. Then

there are the raw ingredients brought into these environments including hot oils, grease, acids and chemicals, which are commonly handled and often inadvertently spilled on facility floors. Faced with these punishing service conditions, food processing facilities need safe floor coatings systems that can offer resistance to this kind of daily abuse.

Government Regulations

The design and construction of food processing plants and food preparation facilities falls under the influence of two government agencies; the United States Department of Agriculture (USDA) and the US Food and Drug Administration (FDA).

The rules that determine which agency is responsible for regulating which food and beverage processes can be complex, however, in simple terms, the Food Safety and Inspection Service (FSIS) – run by the USDA – is responsible for ensuring the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labelled and packaged, as required by the Federal Meat Inspection Act, the Poultry Products Inspection Act, and the Egg Products Inspection Act.

This includes brands commercially producing foodstuffs containing more than 3% meat, 2% poultry or liquid, frozen or dried egg products. Food-related establishments or public restaurants are also under the jurisdiction of the FSIS and are subject to routine inspections, to ensure that businesses are following USDA regulations.

The FDA has a much broader regulatory control over a wide range of food products, supplements, additives and bottled beverages as well as a variety of pharmaceuticals, cosmetics and veterinary products. FDA inspections follow no regular schedule and the agency is likely to inspect only after a tip from the public about a possible food safety violation.

Where the two agencies meet up however is when it comes to defining floor coating expectations in areas where commercial food processing takes place. The USDA publishes its 'Sanitation Performance Standards Compliance Guide' whereas the FDA publishes a 'Food Code', which takes into account good manufacturing practices (GMP) and hazard analysis and critical control points (HACCP). Both agree that food contamination risks can be minimized by investing in a flooring product that incorporates the best food safety standards available into the design.

Regulations and Recommendations for the Design of a Food Processing Facility

The regulations covering food production include rules on the design, maintenance and management of any facility involved with the production, processing and storage of food or beverages, giving the operators of these facilities a lot of benchmarks to hit.

There are a number of steps that building operators can take to sufficiently prevent the growth and propagation of pathogenic microorganisms in a building so as to comply with stringent hygiene regulations – and ensuring a clean floor is one of the principle factors to achieving this.

US Federal Regulations on Food & Beverage Flooring Made Simple

- ✓ Seamless, joint-free finish
- ✓ Impervious to water
- ✓ Coved at wall junction
- ✓ Able to withstand cleaning routines
- ✓ Durable to avoid cracking and erosion

Ensuring a sanitary flooring surface is a crucial aspect of both sets of litigation. For example the USDA states that “walls, floors and ceilings within establishments must be built of durable materials impervious to moisture and be cleaned and sanitized as necessary,” while The Food Act suggests that “materials for indoor floor, wall and ceiling surfaces shall be smooth, durable and easily cleanable for areas where for establishment operations are conducted”. In both cases it is forbidden for food to be manufactured, prepared, preserved, packaged or stored under “insanitary conditions” that might contaminate food or render it unfit for consumption.

TIP:

Food establishments are covered by USDA regulations and can be subject to random checks.



It is often the floor that becomes the most contaminated area of a production site for a number of reasons. Dirt can enter the building beneath feet, bacteria can fall on the floor and get trapped within cracks and gravity will cause most of the contaminants on walls or stationary objects to end up on the floor. Floors and drains consistently generate a high percentage of positive test results for bacteria and lead to cross-contamination throughout the facility.

The USDA & FDA recommends that the floor is smooth finished and without cracks as seams, joints, grout lines and gaps can become ideal breeding sites for contaminants such as bacteria, fungi, mold and mildew. All of these could spoil consumable goods on the premises and potentially lead to fatal foodborne illnesses that could irreversibly damage a brand’s reputation and ability to function.

Having a seamless floor finish is vital to ensuring an effective cleaning program, allowing for the easy removal of contaminants. Resin flooring solutions can ensure a smooth, monolithic and crack free surface that will not only dramatically improve hygiene, but also protect the building’s concrete substrate and provide a level, reliable platform for the day-to-day operation of the facility.

However, the floor must also be robust and able to withstand the rigors of a production environment, which could include impacts from heavy traffic, equipment and dropped tools, thermal shock, wear from frequent cleaning and exposure to chemical abuse from sanitizers, acids, lubricants and the foodstuffs themselves. If a floor cracks or splits then it no longer assists with removing pathogens, and instead becomes the perfect site for contaminants to thrive.

**TIP:**

Non-toxic, phthalate-free cementitious urethane is well suited to food processing facilities.

Cementitious Urethane

To avoid this, resin or polymer flooring solutions have hardwearing properties that allow them to reliably withstand most industrial settings. This includes being highly chemical resistant and able to cope with sustained physical abuse for long periods of time. These properties, and the protection against harmful microorganisms that they provide, have made them an increasingly popular choice within the global food and beverage industry over the last fifty years.

Slaughterhouses, meat/fish/dairy processing, breweries, heavy-duty industrial food processing and pharmaceutical manufacturing facilities are subject to abuse, heavy traffic, chemical attack and the most hostile conditions out there. Cementitious urethane systems are advised in these abusive environments. Designed to exhibit a high cross-linking density, cementitious urethane systems are non-toxic, non-hazardous, phthalate-free as well as highly chemical and temperature resistant.

Antimicrobial additives that actively inhibit the growth of bacteria on the floor's surface can also be included into the cementitious urethane mix of the floor, further adding to the hygienic credentials of a site.

Epoxy Flooring

In the past, epoxy flooring systems have routinely been the choice for new construction and for use in concrete floor resurfacing. However, epoxy can de-laminate when introduced to radical heat changes resulting in frequent repair and renovation work as well as ultimately higher lifecycle costs. Epoxy systems still rank high on the preferred material selection list; however, trickier and more demanding environments are better suited with a cementitious urethane system.

**TIP:**

Epoxy resin provides a joint-free finish in light duty environments such as commercial kitchens.

Considerations for Construction Joints and Drainage

Alongside material choice, there are certain points on a floor that must also be carefully considered, as they are more likely to gather dirt and bacteria than others. The main sites that this applies to are expansion and control joints, termination joints around drains, doorways, hot stoves and equipment.

These construction details should be identified prior to the floor's installation to prevent undercutting, cracking and de-bonding of the surface from the substrate. With a cementitious urethane solution, expansion and control joints can be saw cut after the floor surface is in place, while termination points can be keyed to prevent lifting and undercutting.

The corner where the floor meets the wall is another area of potential bacterial growth. To make it easier to clean this area the FDA suggests that, "there must be coving at base junctures that is compatible with both wall and floor coverings. The coving should provide at least 1/4 inch radius and 4" in height." Cementitious urethane coving can be applied to this area to create a seamless surface that flows from the floor to the wall without gaps.

Cleaning and Maintenance

Intensive cleaning routines are essential to complying with hygiene regulations in order to prevent the growth and propagation of pathogenic microorganisms, which is a key factor in the definition of food sanitation.

However the hot water used to remove unwanted chemicals and production by-products from the building could in fact adversely affect the building's hygiene levels. This is because the thermal shock from the water could crack, delaminate or erode the surface of an epoxy coating, making it easier for pathogens to accumulate in gaps in the floor.

This failure occurs when the flooring material expands and contracts with the temperature changes at a rate significantly different to the concrete substrate underneath. Thermal shock resistant cementitious urethane coatings that move with the concrete slab below will not deteriorate in the same way as epoxies do and will maintain the seamless and smooth finish required for a thorough cleaning routine.

Moisture Vapor

Another vital consideration when installing a floor in a food plant is to protect against excessive moisture vapor rising from the concrete substrate that could blister or debond the top coating and make a previously compliant facility fail to meet hygiene standards. There are several options available to protect against this happening, the most common of which is installing a damp proof membrane above the concrete slab.

Slip Resistance

Because of water from wash downs, liquid from spillages and oils from products, food and beverage facilities are often wet and slippery environments. Cementitious urethane flooring systems include anti-slip aggregates designed to provide grip underfoot for the safety of employees alongside a seamless finish to easily clean away the spillages before they become a hygiene risk.



Key Considerations

The choice of systems, thickness and installation method can be tailored to different service conditions and circumstances of individual areas to ensure the facility stays within the demands of the law. Building operators are advised to complete a risk audit to check that the finished floor will be able to resist the level of chemical abuse and heavy impacts that it will be subjected to within the workplace.

A resin finish must also be installed by trained applicators, as the complexity of the systems means that it is practically impossible to achieve the high-quality finish needed for an ultra-hygienic floor without the proper knowledge and training.

The design of a production facility's floor can be seen as both a potential danger and a potential opportunity. It is dangerous to have an inadequate floor that is porous, cracked and difficult to clean because it can very quickly become the site of unhygienic contamination build up, which is illegal under federal regulations for food producers.

However if the right floor is chosen for the environment then it can provide a wealth of benefits, as it will allow for easier cleaning that effectively removes contaminants and satisfies the demands of regulatory authorities while simultaneously providing a reliable platform for efficient operational activities.



TIP:
Carry out an audit of performance requirements and site conditions prior to floor selection.

This guide has been produced to provide an overview of government regulations associated with food and beverage processing environments.

Detailed recommendations and advice are available from our network of regional technical and sales representatives.

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