Sikafloor® FOOD & BEVERAGE FLOORING

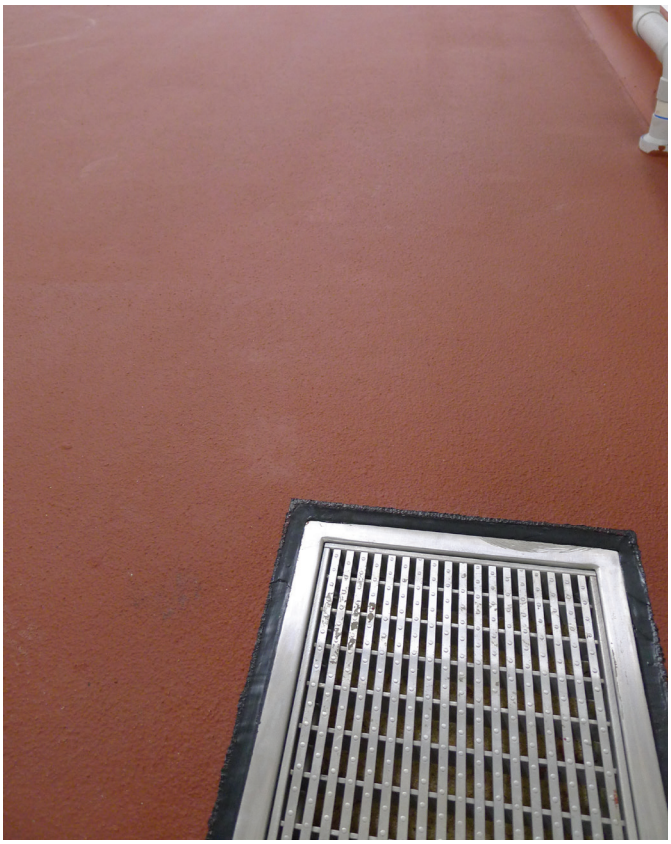
CONSIDERATIONS FOR HYGIENIC FLOORS

BUILDING TRUST

DESIGN OF THE TIMES

CONSIDERATIONS FOR HYGIENIC FLOORS IN FOOD & BEVERAGE ENVIRONMENTS

Choosing and installing the right floor is critical to every work environment. With that goal in mind, let's talk about getting it right the first time, because getting it wrong is too expensive to think about.



SUBSTRATE DESIGN

In new construction, designing the substrate of a floor - like all other elements of a production area such as columns, walls, equipment and drains - depends to a significant degree on a building's overall layout. Taken together, these elements will affect how the substrate is installed and where floor joints are placed.

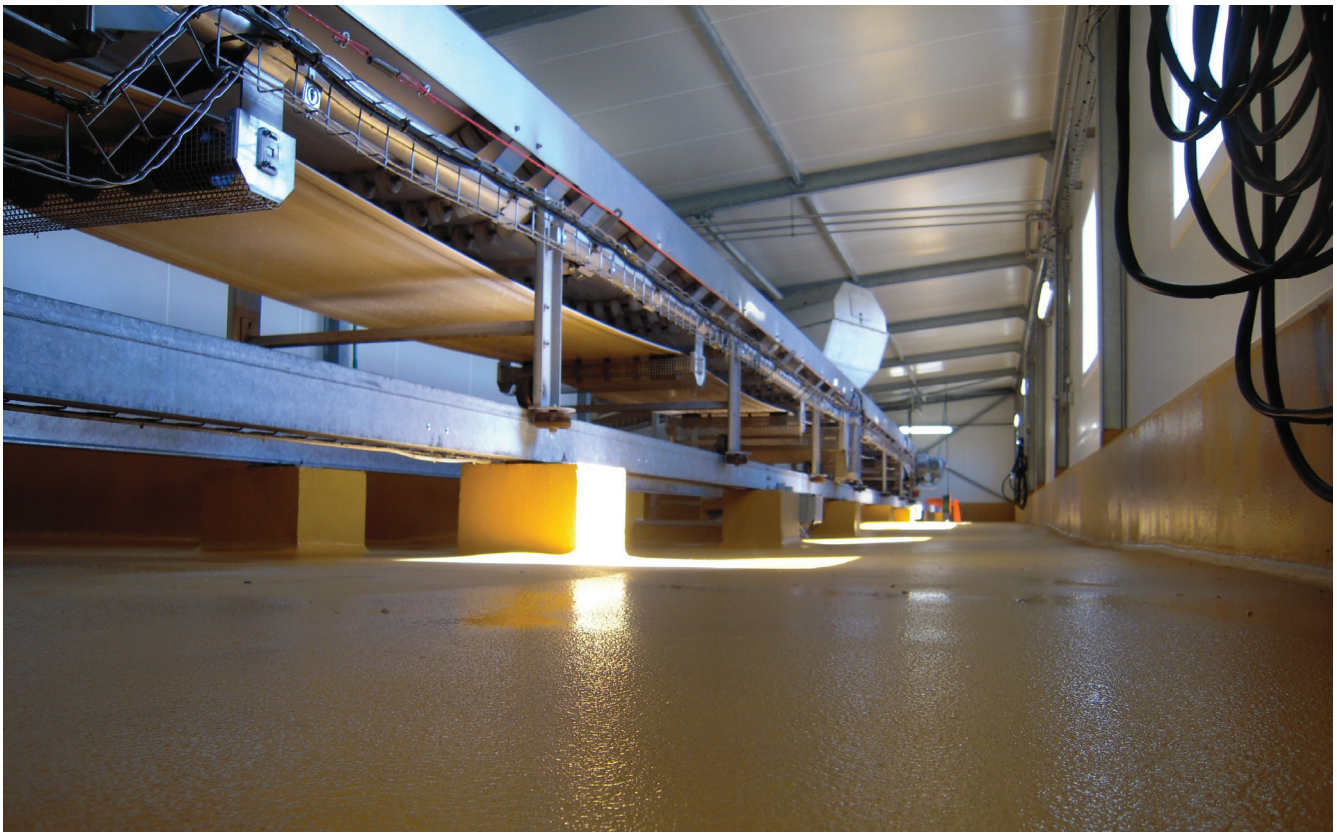
JOINTS

Joints are required in a floor surface to compensate for the movement of the concrete slab beneath. In general, the size and flexibility of a joint is determined by the amount your building moves. Take chemical resistance, which is often considerably lower in flexible joint sealants compared to the surrounding floor finish.

Joints can't be eliminated completely, but their number can and should be kept to a minimum. They should be placed as far as possible from areas that are subject to high traffic. Conversely, they should be close to areas that experience high temperature variations (to allow for resultant floor movement) and high elevation points to avoid moisture.

CONCRETE AND SLAB

Most substrates installed under a hygienic floor are cement-based. These are concrete structures installed directly on the ground or suspended from above. Screeds aren't as thick as slabs and are normally used to provide falls, or to create a new floor base in a renovation project. Fully-bonded screeds follow the joint structure in the concrete substrate and are generally three inches thick or less whereas non-bonded screeds are thicker. Substrate slabs of good design are characterized by the least number of joints possible and their placement in low-risk areas.



DRAINAGE, FALLS AND TRANSITIONS

Channels and gullies should placed close to, but never under, processing equipment. This will ensure their optimal performance while they still remain accessible for cleaning and maintenance. Moving liquid across the floor to a drain is best done using gravity created by floor falls (a gradual slope as the term suggests.)

Falls, drains and transitions will affect the number of joints and how they are positioned. A transition to a drain for instance, does not require a joint, while a transition between a long, wide channel and the floor will - particularly if it exposed to high traffic, hot liquids and movement. Movement can be minimized through the correct placement of concrete reinforcement under the channel.

FLOOR FINISH

Floors in food and beverage manufacturing facilities must meet a dizzying array of requirements. The surface has to be easy to clean and must not support bacterial growth. The surface should prevent slips and falls, as well as look appealing. It should also be sufficiently robust to handle all possible assaults from forklift traffic, harsh cleaning chemicals, impacts and thermal shocks.

The reasoning underlying these requirements is simple: Unless floors are properly maintained and sanitized, they can become a breeding ground for harmful microorganisms. For example, a common pathogen found on floors in food premises is Listeria Monocytogensca, which studies have shown can become persistent if not managed properly.

Some may argue that flooring surfaces are not food-contact surfaces and as such require less attention. This is a risky proposition because microorganisms, when present on the floor, can potentially be transported through water droplets, air particles or other means onto food products and the packaging materials that contain them.

IMPERMEABILITY

An important characteristic of a hygienic floor is impermeability or lack of porosity. This feature is often best produced by dense resin-rich systems, some of which have system build-ups that include aggregate in the binder liquid. Caution is advised, however, relative to how much aggregate is used. If the ratio of aggregate weight to binder exceeds the manufacturer's recommended ratio, pores in the resin surrounding the aggregate particles won't close properly. To compensate, topcoat sealants can be employed, but these tend to wear out rapidly due to normal traffic and abrasion. The results: a decrease in floor performance and food safety - coupled with a likely increase in maintenance and plant downtime.

ANTI-SLIP PROPERTIES

The most common method of providing grip to new flooring is to broadcast aggregate onto the top of the wet surface before it hardens. Aggregate varies in size and type and can create numerous profiles. The most common types are silica and quartz.

Transparent or pigmented topcoats are applied over the aggregate to lock it in. This prevents premature breakout, thereby extending the life of the anti-slip surface. Some resin-rich mortar systems come with aggregate already included, but they are generally not as rough as broadcast systems.

Ultimately, the degree of slip resistance needed will likely vary from one part of the facility to another, taking into consideration what's taking place on the floor, the cleaning regime and the type of contaminants present.

ODOR

Offensive smells can result in loss of products during production and loss of sales at retail. Odors inside the plant can issue from strong solvents such as styrene and other highly volatile materials, which if inhaled can seriously affect employee health. Other solvents and volatile organic compounds (VOCs) can also emit strong odors.

The best safeguard against exposure to these bad actors is simple: never use them in the first place.

The fact is, most food plants have prohibited the use of any coating systems containing solvents that create hazardous odors.

DURABILITY

Mechanical shocks and impacts. Wear, abrasion and exposure to chemical agents. Heavy and/or sharp falling objects. Thermal shocks, high point loads and dragging and shifting pallets. The stresses affecting floors in a food processing plant are legion.

The greater the thickness of the floor, the greater its ability to provide good resistance to these and other assaults. Recommended thickness will depend on a detailed assessment of the type and magnitude of specific stresses the floor will encounter. One rule of thumb: For resin-based flooring in a food processing facility, 1/4 inch thickness is a minimum, but a thickness of 3/8 inch is better, especially in wet areas.

When it comes to chemical resistance, different floor coatings react differently to type, concentration, temperature and exposure duration, and should be assessed case-by-case. Among the most challenging chemicals are phosphoric or nitric acids, as well as caustic or chlorine solutions used to clean production equipment, floors and walls.

Other hazards include the elements of normal production - namely lactic, citric and acetic acids, blood, wet sugar, oils, fats, greases, etc. Notably, even if the amounts of these compounds are relatively low, evaporation can increase their concentration and corrosive properties.

Temperature within a plant can affect evaporation, as well as exert significant stresses on its own.

For example, the temperature of the floor adjacent to a freezer may range from 32°F or below to an ambient 72°F or higher. The flooring system must be able to function in both conditions. Even more potentially damaging is thermal shock, which is caused by a sudden and substantial change in temperature - up to 200°F or higher and back again - in a few minutes or even seconds. Thermal shocks can be caused by high temperatures spills from cooking or the cleaning of vessels and pans. Hot cleaning-in-place (CIP) fluids and hot water rinses drained from production equipment (and onto the floor after high temperature cleaning and sanitation) is another typical cause.

Thermal shock can make flooring systems crack and in some cases de-laminate. To avoid this possibility, the floor must have thermal expansion coefficient close to that of the concrete substrate below, good cohesive strength and a low modulus of elasticity. Thickness of the floor also plays an important role. The top layer should be no less than 3/8 inch thick for water or chemical discharges from 190°F.

"I GET TO SLEEP AT NIGHT KNOWING THAT SIKA'S PURCEM IS ON MY KITCHEN FLOOR."

- Ernest Crawford, Dal-Tex Restaurant Management

WHO WE ARE

Sika AG is a globally active specialty chemicals company. Sika supplies the building and construction industry as well as manufacturing industries (automotive, bus truck, rail, solar and wind power plants, facades). Sika is a leader in processing materials used in sealing, bonding, damping, reinforcing, and protecting loadbearing structures. Sika's product lines feature high quality concrete admixtures, specialty mortars, sealants and adhesives, damping and reinforcing materials, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

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