

WHITEPAPER



A CHECKLIST FOR DURABLE FOOD & BEVERAGE FACILITY FLOORING



An overview of durable
flooring in food & beverage
environments.



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A Checklist for Durable Food & Beverage Facility Flooring



Floors within food and beverage processing facilities have to be able to withstand a long list of complex challenges — any of which could easily cause the failure of an insufficiently robust flooring solution and make the site vulnerable to problematic hygiene and cleaning issues.

Thickness

As a general rule, the thicker the system the longer its service life and the better able it will be to withstand damage from heavy impacts, chemicals and extreme temperatures. This highlights the value of having a detailed knowledge of the site's operational activity to avoid specifying a thin floor finish that will crack when faced with the reality of the building's daily use.

Flowcrete Australia has developed the Flowfresh range, a comprehensive selection of cementitious urethane resin floor screeds, to ensure that food and beverage producers have a solution that will match the specific criteria of their site.

Flowfresh is installed in a mortar form created by combining cement and water-based cementitious urethane technologies. It can be laid in a variety of thicknesses, from 2–9 mm, depending on the on-site conditions, meaning that it can be installed in a wide range of locations, from storage rooms, kitchens and corridors to intensive processing and manufacturing areas.

Localised floor movement or existing structural joints can crack even the sturdiest of floor finishes. To solve this, flexible joint solutions can be installed during the application process that protects against damage from these sources.

Heavy Impacts and Mechanical Wear

Many simple aspects of the working day could lead to an impact or wear related floor failure. As more often than not a food and beverage processing facility's interior will contain exceptionally heavy machinery, forklift trucks will need to drive around the site and the staff may be carrying (and potentially dropping) tools, mechanical parts and a number of other items.

All of these factors could chip away at the floor finish. If the floor coating is a thin system, then this initial impact could expose the substrate. This chip could become an area where oils, water, chemicals, food by-products and greases can access the substrate and undermine the coating — causing mass delamination and serious hygiene problems.

A 6–9mm thick floor finish is a benefit in heavy manufacturing areas, as not only will it have a better chance of dissipating the impact but should a chip ever occur then it would not progress down to the substrate. The floor's impact resistance should be tailored to your environment, the higher the likelihood of a severe impact the thicker the floor coating should be to protect the critical bond layer where the coating meets the concrete.

Anticipated traffic loadings need to be particularly accounted for, as just a hand pallet truck when fully loaded could weigh in excess of 1 metric ton. When repeatedly moved this will put a lot of pressure through the small wheels and into the floor, especially over areas where it is being pulled in a tight turning circle.

The compressive strength of the floor system can be used to determine the suitability of the floor to the task at hand. Going back to the hand pallet truck scenario, a compressive strength of at least 40–50 N/mm² would be required.

Temperature Resistance

Thermal shock is a common occurrence in food and beverage processing sites and certain agricultural facilities for a long list of reasons - blasts of freezing air below -23°C emanating from the open door of a cold store unit, steam cleaning to remove stubborn blood, grease and other chemical contaminants, spillages of boiling fats or oils and hot ovens to name just a few. This immediate temperature change can lead to cracks, bubbling, peeling or delamination.

This is another reason to carefully consider the thickness of the chosen flooring system, as the thicker the system the less likely it will be to fail when subjected to thermal shock. Locations where the cleaning regime will include steam



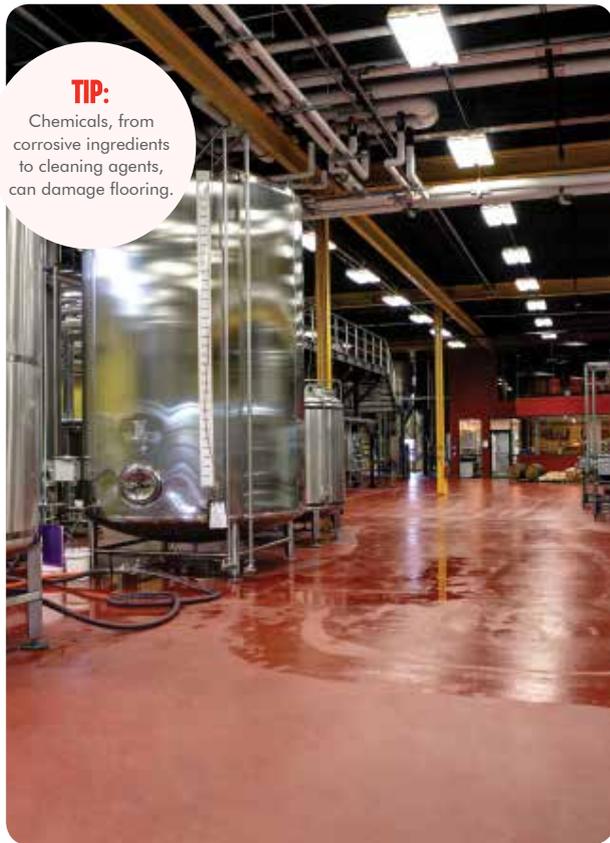
TIP:

Cementitious PU provides excellent durability to withstand heavy machinery.

cleaning at 121°C should install a robust cementitious urethane screed, as they are much better in these situations than epoxy or methyl methacrylate floors. A system such as Flowfresh SR in a 9 mm thick layer will provide an effective barrier against the majority of extreme temperature situations encountered in a food and beverage facility.

Thermal cycling, when the floor's temperature is gradually raised and lowered, can also affect the finish. Cementitious urethane systems have a thermal coefficient of expansion similar to that of concrete, meaning that when the floor is exposed to thermal cycling the floor finish will expand and contract in line with the concrete substrate. Flooring materials that fail to move with the substrate may crack across the surface, creating unsightly and unhygienic gaps and cracks where contaminants can accumulate and in extreme circumstances shear off as a complete sheet.

Care must be taken to ensure that an appropriate flooring system has been selected for areas where the floor will be exposed to hot temperatures for long periods of time, for example underneath hot ovens or next to a furnace. In these instances a thick cementitious urethane systems such as Flowfresh is recommended, as it can withstand prolonged exposure to temperatures as low as -42°C and as high as 121°C.

**TIP:**

Chemicals, from corrosive ingredients to cleaning agents, can damage flooring.

Chemical Resistance

Chemical attack is typically described as the breaking down of the floor's polymer structure such that it is no longer able to fulfill its function. To that end, it is crucial to ensure that the resin flooring system you choose caters to the chemical conditions to which your environment is subjected.

Under specification for chemical exposure can lead to erosion of the surface, softening or embrittlement as well as blistering or delamination. If the chemicals manage to eat into the underlying concrete then it could potentially even permeate into the soil underneath with potentially disastrous consequences for the local environment.

There are many factors that will affect the chemical resistance profile of a resin flooring system including its thickness, resin / polymer basis and reactivity of the chemical agent.

Certain systems will also be able to withstand intermittent exposure to a chemical but not prolonged exposure, therefore not only the type of chemicals but also the amount on-site and the frequency with which it is likely to come into contact with the floor needs to be known. The high cross-linked density of Flowfresh means that it can survive intense and sustained contact with the corrosive chemicals that are most often found in catering, manufacturing and processing areas, such as organic and inorganic acids, oils, greases, sugars and cleaning chemicals.

Resin flooring will not be affected by most special purpose cleaning materials when these are used in accordance with the Chemical Cleaning Manufacturers' instructions. Specific cleaning instructions should also be sought from the resin flooring manufacturer. A small spot test in an inconspicuous area is a worthwhile precaution before applying any new cleaning product. The cleaning regime should specify the type of equipment to be used, the type of cleaning chemicals to be used, the frequency of the cleaning and the water temperature.

Moisture

Moisture rising up from the substrate can cause even the most durable resin flooring system to blister if it is not dealt with. This type of floor failure most often occurs when the finish has been applied on top of very new concrete or on to a slab that does not have an effective damp proof membrane. In these situations the salts within the concrete floor are drawn to the surface in a hygroscopic action, creating blistering.

If there is any doubt about the moisture vapor levels within the substrate then a moisture test needs to be conducted to ascertain whether a damp proof membrane or a moisture tolerant primer is required.

Design Durability into the Floor Plan

The durability of the floor has a direct impact on the capacity of a food and beverage facility to maintain a productive and hygienic working environment.

When specifying the flooring solution remember to ensure that the other flooring elements, including the joint sealant, drainage and wall coating not only fulfill their specific roles but that they also don't negatively affect the durability of the floor finish.

By carefully considering the demands that will be placed on the floor within each area of the complex and sourcing all the elements of the floor from a single reputable supplier with experience in the food and beverage industry, then facility owners and operators can rest assured that each component of the floor beneath their feet will work together without failure for an extended period of time.

This guide has been produced to provide an overview of durable flooring in food & beverage environments.

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

For more information on Flowcrete's specialist flooring solutions, get in touch with the team today...



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