



Contact the Flooring Specialist

+44 (0) 1270 753 000

uk@flowcrete.com

Durable Food & Beverage Facility Flooring Checklist



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.

FeRFA categorises resin flooring into eight distinct types based on the formulation and thickness of the systems. This ranges from thin floor seals at Type 1 to trowel finished and aggregate filled heavy duty resin floors at Type 8.

Flowcrete UK has developed the Flowfresh range, a comprehensive selection of polyurethane resin floor screeds, to ensure that food and beverage producers have a floor that will match their site's specific criteria.

Flowfresh is installed in a mortar form created by combining cement and water-based polyurethane 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 protect 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 requirement should be tailored to your environment, the more chance and severity of impact, the thicker your 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 tonne. 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 emanating from the open door of a cold store unit at -25°C, 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.

TIP:

Areas with hot ovens need floors that can cope with thermal shock.



This is another reason to carefully consider the thickness of the flooring system, as the thicker it is the less likely it will be to fail when subjected to thermal shock. Locations where the cleaning regime includes steam cleaning at 120°C should install a robust polyurethane screed, as they are much better in these situations than epoxy or methyl methacrylate floors. A system such as Flowfresh HF in a 9 mm thick layer will provide an effective barrier against the majority of extreme temperature situations.

Thermal cycling, when the floor's temperature is gradually raised and lowered, can also affect the finish. Polyurethane 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 will crack along the surface, creating unsightly and unhygienic gaps where contaminants can accumulate.

TIP:

Many on-site liquids can cause an underspecified floor to fail.



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 polyurethane systems such as Flowfresh is recommended, as it can withstand prolonged exposure to temperatures as low as -45°C and as high as 105°C .

Chemical Resistance

Chemical attack is described as the breaking down of the floor's polymer structure so that it no longer fulfils its function. It is crucial 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 surface erosion, softening or embrittlement as well as blistering or delamination. If the chemicals eat into the underlying concrete then it could 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 the chemical agent's reactivity. Some systems will be able to withstand intermittent but not prolonged exposure to a chemical, therefore the amount of chemicals on-site and the frequency with which they are likely to come into contact with the floor needs to be known.

The high cross-linked density of Flowfresh means that it can survive sustained contact with the corrosive chemicals 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. 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 and cleaning chemicals used, the frequency of washing 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 vapour 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 facility's capacity to maintain a productive and hygienic working environment.

When specifying the floor remember to ensure that all the elements, including the joint sealant,

drainage and wall coating not only fulfil their specific roles but that they also do not negatively affect the floor's durability.

By carefully considering the demands placed on the floor within each area of the complex and sourcing every element from a single reputable supplier with F&B industry experience, then facility operators can rest assured that the floor components will work together without failure for the long term.

This guide has been produced to provide an overview of hygienic 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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uk@flowcrete.com



+44 (0) 1270 753 000



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