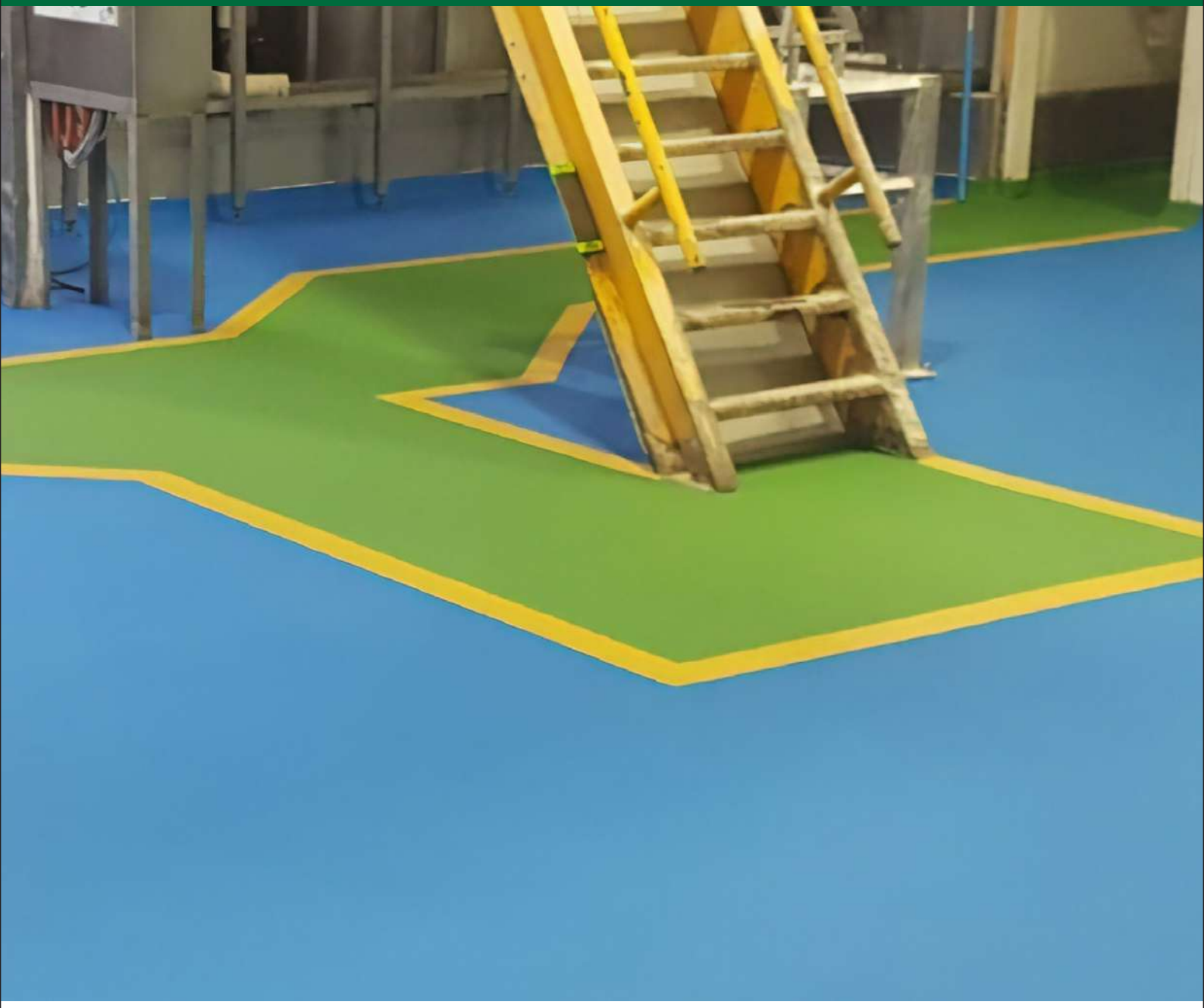
GET IN ON THE FACTORY FLOOR

Safe and Hygienic Floor Design for Food, Beverage and Pharmaceutical Facilities



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INTRODUCTION

For the food, beverage and pharmaceutical industries, the importance of high-quality flooring cannot be overemphasised. The quality and performance of a factory floor contributes to the uninterrupted use of the facility and maintaining a safe and hygienic environment.

Despite its importance to the efficient functioning of a factory facility, too little attention is paid to the design, specification and construction of factory flooring systems. Poorly-specified or installed flooring has a wide range of negative consequences, including risks to product and employee safety that can stop a business in its tracks.

The activities that take place in factory environments require careful consideration of flooring properties and installation. A fine balance must be achieved – factory floors must have good grip and slip resistance, while being easy-to-clean for day-to-day operations.

In this whitepaper, we examine common safety and hygiene issues associated with factory floors and the importance of purpose-built factory flooring. We also take a close look at designing and specifying factory floor systems to improve food (product) and human (factory personnel) safety. Against this backdrop, we consider the benefits of food-grade anti-microbial resin flooring systems in factory and warehouse applications.

FACTORY FLOORS: SAFETY AND HYGIENE ISSUES

In the food, beverage and pharmaceutical industries, factory floors are subject to a variety of challenges. Below are several examples:

- Floors are often exposed to water, grease and chemicals.
- Heavy foot traffic from workers and visitors.
- Impact of heavy machinery.
- Temperature variation – from cold freezers to hot kitchens.

Food processing plants will often be subject to high concentrations of salt, alkaline and oil compounds that can substantially degrade the floor.[1] The floor may also be exposed to other by-products like fats, dairy products, sugar solutions, blood, and natural acids, as well as harsh cleaners and disinfectants.[2]

Under these conditions, common flooring issues include cracking in the subsurface, water pooling in joints and crevices, fractures, cracks, or separation on the floor surface. These issues create potential sites for bacteria growth.

While flooring surfaces are not usually in direct contact with food, the presence of bacteria on the floor of a food processing plant presents a serious hygiene risk. Microorganisms can be transported from the floor through water drops and air particles, and spread from worker's shoes or equipment. In such environments, there is a significant possibility that food products and food packaging materials can become contaminated with harmful bacteria.

Floor degradation, water pooling and other damage also present a safety risk, leading to slip or trip hazards. An increased risk of slipping can also be caused by poorly-specified flooring that does not provide adequate slip resistance for its intended purpose.

According to Safe Work Australia, slips, trips and falls result in thousands of preventable injuries every year.[3] Between 2003-15, slips, trips and falls caused 386 deaths.[4] The majority of these fatalities (56%) were caused by environmental factors such as slippery floor surfaces.[5]

REGULATORY REQUIREMENTS

The overarching regulatory requirement for food-grade flooring is found in the Australia New Zealand Food Standards Code ("the ANZ Food Standards Code"). Under Standard 3.2.3, flooring must be designed and constructed in such a way that is appropriate for the activities conducted on the food premises.[6] More specifically, floors must:

- be able to be effectively cleaned;
- be unable to absorb grease, food particles or water;
- be laid so there is no ponding of water; and
- to the extent that is practicable, be unable to provide harbourage for pests.

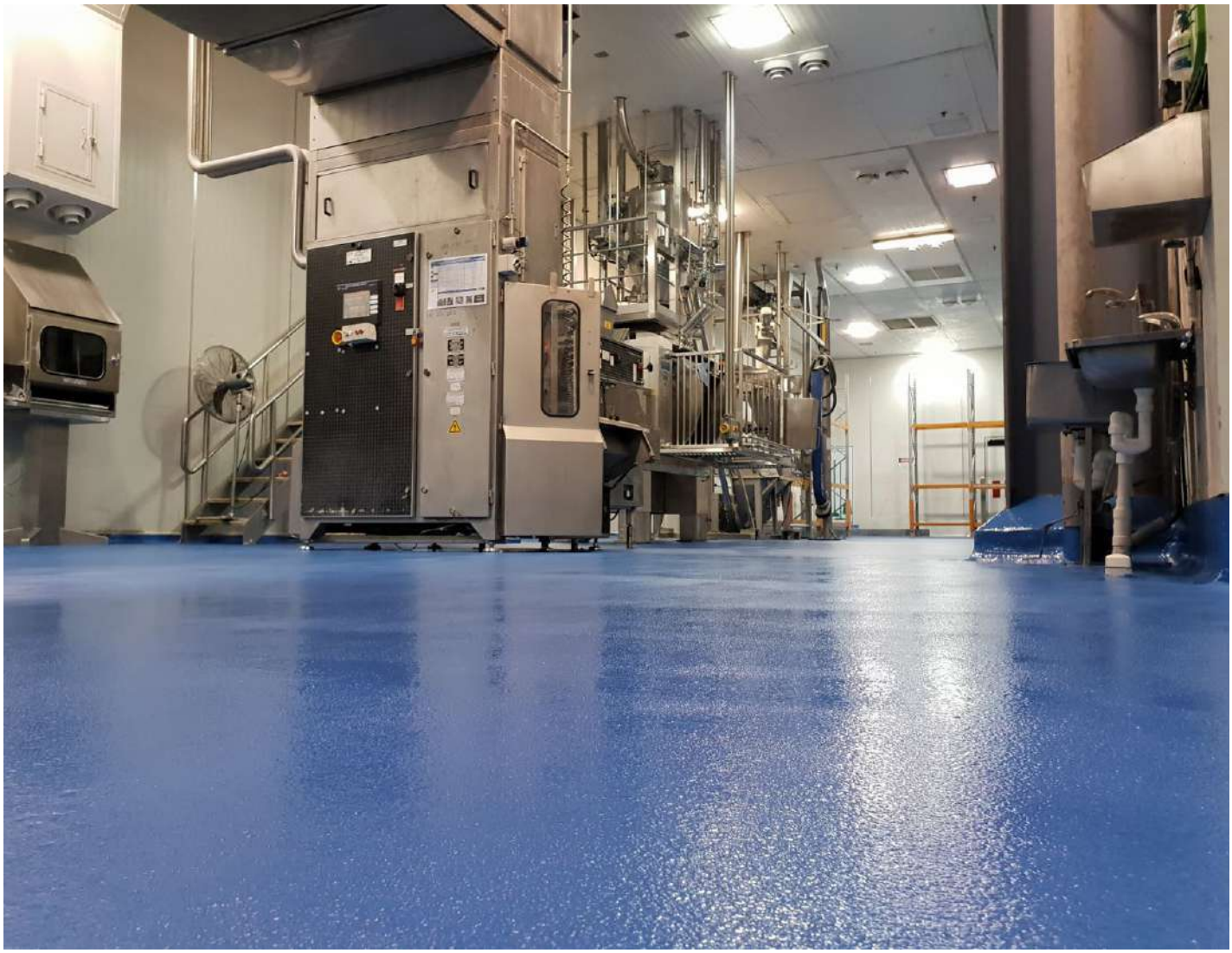
These requirements provide a useful guide to the performance properties required of flooring for food, beverage and pharmaceutical facilities. Further guidance can be found in related industry guidelines such as the NSW Health publication, "Floor Coverings in Healthcare Buildings: Technical Series TS-7".[7]

Across the country, Work Health and Safety Legislation set out obligations to create safe workplaces. The *National Construction Code* (NCC) and related Australian Standards also include specifications that aim to create safe public spaces and work environments.

In relation to safe floor design, the Australian Standards relating to slip resistance are a primary consideration for designers and specifiers. The relevant Standards include:

- *AS 1428.1:2009 Design for access and mobility, Part 1: General requirements for access - New building work*; and
- *AS 4586:2013 Slip resistance classification of new pedestrian surface materials*.

The Standards Australia handbook, *HB 197-199: An introductory guide to the slip resistance of pedestrian surface materials*, provides further guidance on the requirements for slip-resistant surfaces for a variety of settings. Note that, depending on the type of floor system, installation, technical specifications and performance requirements may differ.



DESIGNING FLOORS TO IMPROVE SAFETY AND HYGIENE

Slip Resistance

Designers and specifiers should consider purpose-built flooring that includes non-slip additives to meet regulatory requirements for slip resistance. It is prudent to consider whether the flooring system will deliver long-term and sustainable slip resistance. Flooring manufacturers should be able to supply evidence of slip testing under the relevant Australian Standards, performance and suitability on request.

Slip resistance is usually associated with greater surface roughness. However, excessive surface roughness can make the floor more difficult to clean. This trade-off is discussed further below.

Chemical, Temperature and Impact Resistance

For superior longevity and durability in factory environments, flooring that is chemical, temperature and impact resistant should be selected. These properties are necessary due to frequent exposure to chemical and food production by-products, and other high-impact activities that take place on factory floors.

Given the high hygiene standards for food, beverage and pharmaceutical facilities, the floor system must also be able to withstand harsh cleaning procedures that may involve aggressive cleaning chemicals.

Cleaning and Maintenance

Floor surfaces that are easy-to-clean and maintain contribute to hygiene and product safety. When selecting a flooring system, the cost of cleaning and maintenance should be considered, particularly the frequency of cleaning, techniques and the required equipment.

As mentioned earlier, floor surfaces that exceed requirements for slip resistance may damage cleaning equipment and trap food particles. Designers and specifiers must balance providing enough slip resistance to prevent falls, with enabling efficient cleaning and maintenance.

Choosing the appropriate flooring solution for your specific application context is key. The correct level of slip resistance will be dependent on the factory's specific use, what activities will occur on the floor and the type of contaminants the floor will be exposed to on an ongoing basis.

Absorption of Grease, Food Particles or Water

The ANZ Food Standards Code also requires that flooring surfaces do not absorb grease, food particles or water. The physical properties and installation of the floor coating are the key considerations in meeting this requirement. Most resin floor coatings are impervious to contaminants if installed correctly.

Proper installation when the floor is laid is imperative otherwise the floor coating can be compromised. For example, installing a floor coating over wet or greasy concrete or in unfavourable temperature conditions can lead to issues like bubbling, peeling and delamination.

Harbourage of Pests and Bacteria

Designers must take measures to ensure floor systems minimise the harbourage of pests and bacteria. Flooring that is not seamless is vulnerable to germ buildup within gaps and cracks. Designers and specifiers should consider the following measures to ensure a seamless floor:

- joint-sealing;
- coving; and/or
- sealing around drains to prevent trapping of water.

The process of coving, which refers to creating a seamless transition from the floor to the wall by installing an epoxy mortar cove at the perimeter, allows for easy cleaning around the sides and corners of a room where dirt and bacteria are prone to build up.

Drainage

Pooling of water is dangerous in terms of hygiene (as it fosters bacteria growth) but also poses a slip hazard for workers. Allowing for proper drainage is critical. Falls to any drainage should be measured so they are consistent and ensure water flows to the drain rather than pooling on the floor. Typically a fall of 1 in 100 or 1% is regarded as ideal – gradual enough to hardly be noticed, but sufficient to encourage directed flow of surface fluids.

RESIN FLOORING: A DESIGN SOLUTION

Choosing and installing the right flooring system is critical to every work environment. Ideal for warehouse and factory installations, resin flooring provides a design solution that balances the above requirements while enabling the effective functioning of factory operations.

Resin flooring is applied to a prepared concrete surface as a surface coating. A polymerisation or curing process produces the final synthetic resin finish. The main types of resin flooring are PMMA (PolyMethylMethAcrylate), polyurethane (PU), polyurethane cement (PU Cement) and epoxy. Each type of resin floor has unique characteristics – positive and negative – that need to be considered and matched with the requirements of the specific floor being designed.

As a broad group, resin flooring offers the following generic advantages:

- hard-wearing, durable surface can withstand heavy traffic and movement of machinery;
- prevents damage and degradation to existing concrete floors;
- chemical-resistant, non-porous surface;
- anti-slip additives can be used to meet slip resistance requirements; and
- easy-to-clean and low maintenance.

Leading flooring manufacturers offer food-safe resin flooring systems with anti-microbial properties to promote safety and hygiene. Non-toxic and nil-odour options are also available and preferred.

Specifiers can also utilise resin floor coatings to indicate the site traffic management plan (line marking and floor graphics) and to improve interior aesthetics. A wide range of colours and finishes are available, and many have found that a fresh, consistent resin floor improves the brightness of factory workspaces.

ALLIED FINISHES

Allied Finishes specialises in antimicrobial, fast-curing flooring and drainage solutions for the food, beverage and pharmaceutical sectors. This Australian company supplies and installs premium floors that are durable, safe, compliant and delivered fast; reducing production downtime to deliver uptime for their valued customers.

Allied Finishes' expert team works closely with architects and engineers as well as site and maintenance managers to provide premium flooring solutions and high quality assurance through exceptional service and industry expertise. This is why the company is trusted across the industry, developing strong relationships with many well-known food and beverage facilities.

Allied Finishes – your allies in innovation, compliance and assurance.

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SteriFloor – Food Grade Antibacterial Flooring Systems

SteriFloor is a range of food-safe concrete protection systems that are suitable for food and beverage facilities, and also the pharmaceutical industry, providing hard-wearing surfaces with very good cleaning properties, exceptional durability, and an excellent appearance.

The SteriFloor range is ideal for floors in food processing areas, laboratories, freezers and cool-rooms, warehouses, dry packing rooms, and other factory and storage areas. It can be applied in various thicknesses (up to 10mm), with a light to heavy duty non-slip film and provides a high level of protection to the existing substrate. The range is non-toxic with nil-odour even when being laid, making it perfect for the food and beverage industry.

SteriFloor is available in a range of colours (meeting the requirements of *AS 2700-2011 Colour standards for general purposes*) and once cured, is typically satin in finish.

Allied Finishes can add coving, line marking, joint sealing and drainage to its SteriFloor range.

Summary of features and properties:

- Antimicrobial
- Food-safe system
- Fast curing
- Chemical, temperature and impact resistant
- Asset protection with long term durability
- Allows for a superior depth anti-slip aggregate for a long term slip resistant surface
- Easy to clean
- Variety of colours
- Satin-set finish

REFERENCES

1 Smedley, Kevin. “Importance of Flooring for Food Processing Plant Hygiene.” Food Safety Tech. https://foodsafetytech.com/column/importance-of-flooring-for-food-processing-plant-hygiene (accessed 15 September 2020).

2 Ibid.

3 Safe Work Australia. “Slips trips and falls.” SWA. https://www.safeworkaustralia.gov.au/slips-trips-falls (accessed 15 September 2020).

4 Ibid.

5 Ibid.

6 Australia New Zealand Food Standards Code, Standard 3.2.3.

7 NSW Health and CHAA. “Floor Coverings in Healthcare Buildings: Technical Series TS-7.” AusHFG. https://aushfg-prod-com-au.s3.amazonaws.com/TS7%20Floor%20Coverings%20in%20Healthcare%20Buildings_0.pdf (accessed 15 September 2020).

All information provided correct as of September 2020

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