

## The Use of *In situ* Resin Flooring in Healthcare

a report by

**Helen McGachie**

Chief Executive Officer, Resin Flooring Trade Association (FeRFA)

The healthcare environment requires a variety of performance criteria from its chosen flooring. Due to the complexity of the areas involved, differing types of flooring are selected to suit specific environments. However, irrespective of the specific areas and performance criteria, of paramount importance is hygiene and cleanliness. Seamless resin floors have been used for over 30 years in the strictest of hygiene environments, such as the food industry.

### Seamless Resin Flooring Systems

Resin flooring is applied *in situ* to a prepared concrete surface either as a flowing or trowelled mortar or as a surface coating. A polymerisation or curing process then takes place to produce the final synthetic resin finish. Large areas of seamless flooring can thus be installed without the need for any joints other than where there are movement joints in the base concrete. The lack of joints is beneficial since such recesses are more difficult to clean and risk harbouring harmful bacteria. The fully cured resin flooring is impervious, non-absorbent, washable and non-toxic.

In a typical hospital situation, the areas involved could be split into public and private, or more likely front of house and back of house. Typically, the areas involved would be:

- reception areas, waiting rooms and corridors;
- wards, staff rooms and stock rooms;
- theatres, X-ray rooms and intensive care units;
- laboratories and mortuaries; and
- kitchens, canteens and plant rooms.

With the wide range of conditions encountered, it is important to identify the specific environment in each case to choose a suitable flooring material. To give good service, the flooring material must satisfy all the mechanical, chemical, physical, biological and practical requirements of the user:

- mechanical – to support machinery and to withstand impact and abrasion;
- chemical – to be resistant to (and protect the substrate from) chemicals;

- physical – to withstand temperature changes (thermal shock) and prevent ingress of contaminants;
- biological – to not support biological growth; and
- practical – to be easy to clean, hygienic, slip resistant, aesthetically pleasing and durable.

### Resin Floor Finishes

The relative importance of each of the performance requirements will depend upon the specific environment and the activities being carried out at that particular location. It is important to be aware of each requirement since different resin flooring materials can perform very differently.

There are four distinct resin types commonly used in flooring – epoxide, polyurethane, methacrylate and polyester based.

For each of the resin types there is a range of flooring products available, of varying thickness and surface finish. These are illustrated in *Table 1*, which sets out the resin flooring trade association (FeRFA) classification scheme, which has also been incorporated in the British Standard Code of Practice for Resin Flooring, BS 8204-6: 2001.

Typical service conditions where resin flooring would be used are:

- light duty – light foot traffic, occasional rubber-tired vehicles;
- medium duty – regular foot traffic, occasional hard-plastic-wheeled trolleys;
- heavy duty – constant fork lift truck traffic, hard-plastic-wheeled trolleys, some impact; and
- very heavy duty – severe heavily loaded traffic.

Many of these types of flooring may be produced with special decorative effects by the incorporation of coloured particles or flakes in the surface.



Helen McGachie is the Chief Executive Officer of the Resin Flooring Trade Association (FeRFA), which represents the major product manufacturers, specialist contractors and specialist services providers within the UK industry. FeRFA is recognised as the leading authority on Resin Flooring by official bodies such as the British Standards Institution (BSI), BBA, Construction Industry Training Board (CITB), Construction Skills Certification Scheme (CSCS) and the National Building Specification (NBS).

Table 1: Types of Synthetic Resin Flooring

Type	Name	Description	Intended duty	Typical thickness
1	Floor seal	Applied in two or more coats Generally solvent- or water-borne	light	up to 150µm
2	Floor coating	Applied in two or more coats Generally solvent free	light to medium	150µm to 300µm
3	High build floor coating	Applied in two or more coats Generally solvent free	medium	300µm to 1000µm
4	Multi layer flooring	Aggregate dressed systems based on multiple layers of floor coatings or flow-applied floorings, often described as 'sandwich' systems	medium to heavy	>2mm
5	Flow applied flooring	Often referred to as 'self smoothing' or 'self levelling' flooring and having a smooth surface	medium to heavy	2mm to 3mm
6	Resin screed flooring	Trowel-finished, heavily filled system, generally incorporating a surface seal coat to minimise porosity	medium to heavy	>4mm
7	Heavy duty flowable flooring	Smooth surface	heavy to very heavy	4mm to 6mm
8	Heavy duty resin screed flooring	Trowel-finished, aggregate filled systems effectively impervious throughout their thickness	very heavy	>6mm

Terrazzo-like finishes (ground exposed aggregate) may be produced from certain trowel-applied floorings of types 6 and 8. A variety of colour options are available to suit any design. Slip-resistant or anti-static/conductive versions of all these categories are also available for use in sensitive areas such as operating theatres, X-ray suites and laboratories.

The only joints required are those corresponding to movement joints in the base slab, and these must be continued up through the resin flooring. Careful design of the base slab can reduce the need for joints, and place those that are necessary in less vulnerable areas; for example, where there is little traffic or the floor is kept dry.

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#### Design and Detail

Joints are a point of weakness on any floor, not only from a design point of view but, more crucially in healthcare, from a hygiene point of view. Seamless resin floorings therefore have an edge over other types of flooring since joints can be kept to a minimum. In contrast, ceramic tiled floors may have more than 10m of joints per square meter of area.

Resin floorings are usually fully bonded to the concrete substrate. They level out surface irregularities within their own thickness and generally do not rely on levelling screeds, except where they are needed to create drainage falls or compensate for irregularities in the concrete base.

Movement joints need to be filled with a flexible sealant that has adequate chemical resistance for the conditions, an appropriate movement accommodation factor and sufficient mechanical strength to protect the joint edges from premature breakdown.

Satisfactory performance of joints relies on the adhesion of the sealant to the flooring on either side. Should the bond fail, contaminants can enter the resulting void and remain beyond the reach of routine cleaning. In wet environments, contaminants can be carried down to the concrete base where bacteria can flourish and chemicals can cause erosion and subsequent delamination.

In general, the resistance of the sealant to chemical

attack will be less than that of the resin flooring. Consequently, the sealants may well need to be replaced during the lifetime of the floor. Frequent checking of the integrity of the joints should therefore be a regular maintenance item.

### Conclusion

The healthcare environment presents a very wide range of diverse requirements for any flooring system. Often regulated under tight budgetary controls, it is important that the correct selection is made to provide a cost-effective and practical solution. A damaged floor can reduce efficiency, cause personal

### Attractive and Decorative

Innovation in product manufacture has led to the introduction of a new range of decorative resin flooring systems. Colour, texture and design are now key considerations, with products available to suit every design concept, from attractive terrazzos to contemporary creations.

### Impervious and Non-absorbent

Correctly specified resin flooring is effectively impermeable to water and is non-absorbent, unlike concrete, which is inherently porous.

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injury, and lead to unpleasant and unhygienic working conditions. The high cost of reinstalling a floor, in terms of disruption, inconvenience, and loss of practical use of a sensitive area such as an operating theatre, makes it important to get the floor right the first time. This requires a thorough understanding of the environment, the best possible design, and the choice of the most suitable product for the job. Even with the correct floor design and the correct floor finish specified, the correct installation is still needed to make the floor work.

In summary, resin floors are:

### Easy to Clean and Disinfect

As with all floors, good housekeeping and the correct cleaning regimes are important, but a dense, seamless, resin flooring will facilitate easier cleaning. Many resin floors are unaffected by sterilising agents and biocides and some are designed to be regularly steam cleaned.

### Non-toxic

Once fully cured, most resin floors are non-toxic.

### Maintained in a Sound Condition

The minimum requirement for joints in resin flooring reduces the possibility of mechanical breakdown and facilitates maintenance. As a consequence, there are resin floors in arduous environments still giving good service after 15 to 20 years.

Resin floorings have amply demonstrated over many years their ability to satisfy all the demanding requirements of an industrial environment such as food or pharmaceuticals, and now with decorative commercial options available, resin flooring makes the ideal choice for any healthcare environment. Resin flooring should be provided and installed by experienced manufacturers and specialist contractors, such as those who are members of FeRFA, to ensure the best possible results. ■

### Further Reading

1. *FeRFA publications: all freely downloadable from [www.ferfa.org.uk](http://www.ferfa.org.uk)*
  - *Guide to the Specification and Application of Synthetic Resin Flooring.*
  - *Guide to the Selection of Synthetic Resin Floors.*
  - *Minimising Slips in the Workplace with the Use of Industrial Resin Floors.*
  - *Anti-Static Flooring.*
  - *Chemical Resistance of Resin Flooring.*
2. *British Standards: available from BSI, telephone 0208 996 9000.*
  - *BS 8204-6: "Synthetic resin floorings – code of practice".*
  - *BS EN 13813: "Screed material – properties and requirements".*