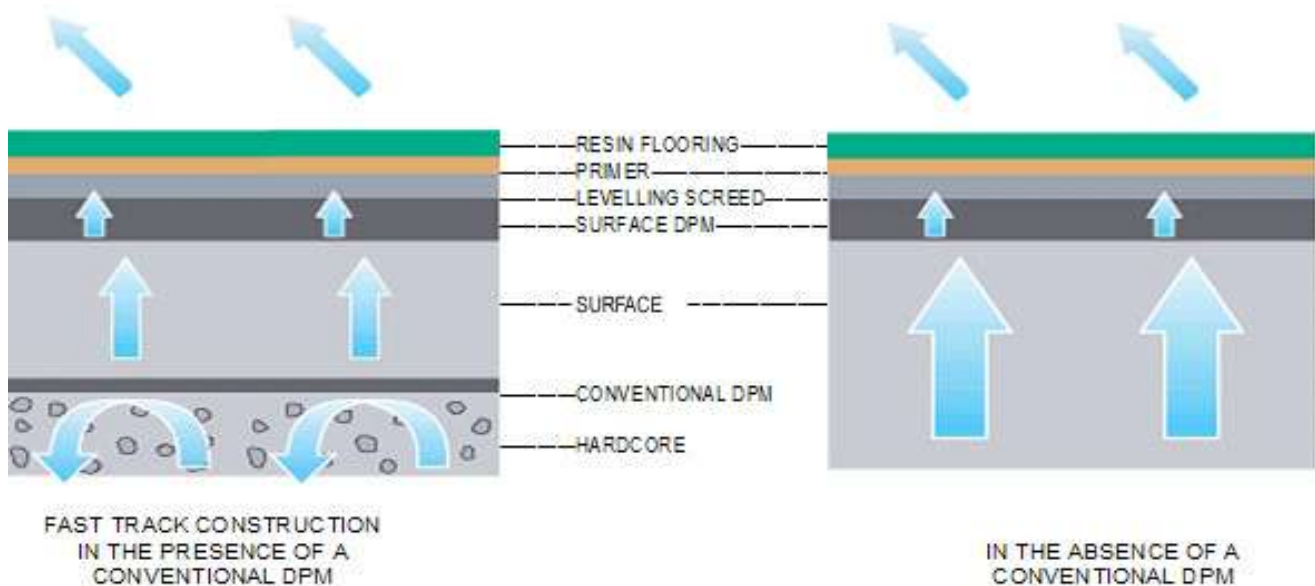


FeRFA GUIDE TO INSTALLING RESIN FLOORING SYSTEMS ONTO SUBSTRATES WITH A HIGH MOISTURE CONTENT

SURFACE DPM CONTROLS MOISTURE RELEASE FROM THE SURFACE



FeRFA Guidance Note No. 5



INTRODUCTION

Substrate moisture is a fundamental consideration in the specification of a final floor finish. Resin flooring products, such as 'surface damp proof membranes' are often used to address moisture concerns prior to the installation of a wide range of final floor finishes. However, this guidance note will only cover situations where a specifier requires a resin flooring system as the final floor finish.

For the purposes of this guidance note, high moisture content is defined as a substrate with a relative humidity (RH) of >75% or a moisture content in excess of 5% (by weight).

WHY SUBSTRATE MOISTURE CONTENT IS AN ISSUE

Many standard resin flooring systems do not exhibit a high level of moisture tolerance. Therefore, if moisture comes into contact with a primer with low moisture tolerance, prior to that primer achieving full cure, there is a risk that full bond strength may not be achieved. This in turn could result in blistering, partial delamination or complete failure of the full resin system.

Current UK building regulations require most buildings to be constructed with a effective damp proof membrane (DPM) within the floor structure. This DPM is normally created by the installation of a polyethylene or bituminous sheet within / below the main substrate structure.

Significant rising moisture can result in hydrostatic pressure (e.g where the groundwater table is higher than the substrate). This is not normally an issue where the building incorporates an effective DPM and other tanking / drainage methods that are performing as designed. However, in buildings constructed without a DPM, extra care should be taken to assess the moisture content, together with other associated factors, such as ground water table height. Significant hydrostatic pressure can result in final floor finish failure.

TYPES OF SUBSTRATE MOISTURE

In most cases, substrate moisture will be apparent due to the following situations :

The substrate is within an old building which was constructed prior to effective DPMs being a requirement of building regulations.

- Unless there is evidence to the contrary, it is prudent to assume that any pre-1970 building is unlikely to have an effective DPM incorporated into the construction.

The installed DPM has failed.

- A DPM can fail for a number of reasons, but failure is usually the result of incorrect installation or damage during installation (e.g. being punctured by steel reinforcement).

The substrate has recently been installed and has not had adequate time to dry sufficiently.

- Whilst best practice dictates that substrates should be allowed to dry naturally, due to the pressures of modern fast track construction, there is rarely time for this to occur. Instead, the early installation of resin flooring finishes is becoming more prevalent, which has driven the industry to develop the range of solutions now available.

The building is modern, but was built without a DPM as the initial use for the building did not necessitate installation.

- Certain building types, including warehouses and distribution centres, are often built without an effective DPM on the assumption that the floor will remain uncovered. However, if there is then a change of use, then moisture can become an issue.

TESTING FOR MOISTURE

Before specifying or commencing with the installation of any resin floor finish, it is important that the moisture content of the substrate is correctly identified.

It is widely recognised that the surface hygrometer is the preferred and most accurate method in the UK (as specified in British Standards BS8203 & BS8204). However, dense concrete substrates may require the instrument to be in position for several days in order to obtain a steady and precise reading.

The feasibility of leaving surface hygrometer boxes for several days on site is questionable. In addition, an accurate reading cannot be guaranteed over existing smoothing compounds and adhesives thereby necessitating the need to mechanically remove these compounds just to take the tests!

Due to these limitations, other forms of invasive testing (e.g. 'in depth' hygrometer or Vaisala probe) and non-invasive testing (e.g. surface moisture meters) have become popular and may be considered, although the

results should only be taken as a guide. Regular calibration of all these instruments is essential and may prevent costly disputes on site.

Readings should be taken at various points across the floor to create a detailed and accurate assessment of substrate condition.

SOLUTIONS FOR HIGH MOISTURE CONTENT SUBSTRATES

The range of solutions available will vary depending on substrate moisture content levels and an individual manufacturer's product range. However most will fit into one of the following categories:

Specialist surface DPM

- These products are specifically formulated for application to high moisture content substrates and create a layer of controlled permeability (typically less than 4g / sq m / 24 hrs). This controlled permeability can assist in protecting against and managing rising moisture.
- Because of the controlled permeability of these products, it is essential that the properties of the final resin system are considered to ensure that there is a compatible level of moisture vapour transmission to prevent failure.

Moisture barrier

- These products create a largely impermeable barrier that stops moisture rising further and thus affecting less moisture tolerant resins and resin finishes. It is recommended that compatibility of the subsequent resin flooring system is checked to ensure long term integrity and performance.

Moisture tolerant primer

- Many manufacturers have developed specialist primers for use in high moisture situations. It is recommended that compatibility of the subsequent resin flooring system is checked to ensure long term integrity and performance.

Standard primer

- In certain cases and subject to the actual level of substrate moisture, standard primers may be used, followed by the installation of a standard resin system. Guidance should be sought from the manufacturer prior to specification and use.

Vapour Permeable Systems

- To overcome the challenge of primer selection and the compatibility of the subsequent resin flooring finish, some manufacturers have developed vapour permeable systems.
- As these systems are effectively 'open' to water vapour diffusion (breathable), they also offer the possibility to coat substrates where the condition of the DPM is in question.

- In all situations, it is advisable to check with the manufacturer to confirm suitability prior to installation, which will avoid future issues and / or failure.

APPLICATION AND CURING

It is essential that all substrates are suitably prepared prior to the installation of any resin system. Please refer to section 5 of the FeRFA publication 'Guide to the Specification and Application of Synthetic Resin Flooring' for further information.

Most of the solutions available can be applied by trowel, roller or squeegee, but whichever method is recommended it is essential that sufficient thickness, as specified by the product manufacturer is applied evenly on the floor and that the coating is free from holes / pinholes.

To ensure that expected performance is realised, many manufacturers will recommend that a second coat of primer is applied, with the second coat being installed at right angles to the first to ensure complete and uniform coverage.

Failure to observe these basic requirements can result in an increase in the moisture vapour transmission rate and / or subsequent failure of the flooring system.

The cure time of these products will generally be between 2 and 24 hours dependent on resin type.

LIMITATIONS OF THE SOLUTIONS AVAILABLE

Any compound (cementitious or otherwise) must be moisture tolerant when used below the solutions described. Screeds based on calcium sulphate binders (often known as gypsum, anhydrite or hemi-hydrate) are now being used increasingly because of their rapid cure potential. However these screeds can be adversely affected by outside moisture. Consequently the suppliers of these types of screed do not recommend the use of a surface treatment where the risk of retained moisture can lead to subsequent degradation of the screed.

As there are conflicting views with respect to moisture testing, always check the screed manufacturer's recommendations for testing and always insist that tests are carried out by an expert.

The solutions described are not designed to resist hydrostatic pressure.

The solutions described cannot be relied on to prevent osmotic blistering (Please refer to separate FeRFA Guidance Note on Osmosis).

POINTS OF BEST PRACTICE

It is always advisable, where possible, to allow new substrates to dry naturally. However, given that good quality conventional concrete substrates take approximately one month per inch of thickness to dry to an adequate level, this is often not possible.

Where a resin system is to be installed onto a new substrate, it is advisable to recommend that the specifier / client / building contractor design a substrate capable of achieving a compressive strength of 25 N/mm² and a tensile strength of 1.5 N/mm² at the planned time of installation.

Always refer to manufacturer guidelines and installation instructions, to ensure that suitable products are selected and installed, in line with required performance characteristics.

SUMMARY

There are a number of solutions available to allow resin flooring systems to be installed onto high moisture content substrates. However, a clear understanding of performance requirements and project parameters must be gained to ensure that appropriate solutions are specified and installed.

In all situations, it is advisable to check with the manufacturer to confirm suitability prior to installation, which will avoid future issues and / or failure.

GLOSSARY OF TERMS

- Screed:** A layer of material laid in situ, directly onto a base, to achieve one or more of the following purposes:
- to obtain a defined level
 - to carry the final flooring
 - to provide a wearing surface
- DPM:** Damp proof membrane. An impervious material, used within the construction of ground bearing floors to stop rising moisture and prevent damp.
- Moisture:** Water or another liquid that causes dampness
- Relative humidity:** The ratio of the amount of water vapor in the air at a specific temperature to the maximum amount that the air could hold at that temperature, expressed as a percentage. Testing for relative humidity measures the concentration of water in the substrate.
- Substrate:** The underlying material to which a [finish](#) is applied.
- Hydrostatic Pressure:** The pressure created within a substrate by the level / height of liquid. The absence of a DPM or the failure of a DPM, especially in areas with a high water table, can result in the pressure within the substrate exceeding that of the atmosphere, resulting in floor finish de-bonding / failure.

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