FERFA GUIDE TO FLOWABLE POLYMER SCREEDS AS UNDERLAYMENTS FOR RESIN FLOOR FINISHES

FeRFA Guidance Note No. 8

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1. INTRODUCTION

1.1 Scope

This guide aims to identify the criteria for flowable, polymer modified, cementitious screeds (known hereafter as "flowable screeds"), when they are used as an underlayment for a resin floor finish.

When specifying the use of resin flooring systems, it is important to consider the substrate to which the system is being applied. Once applied, any thinner section resin flooring system will follow the profile of the underlying substrate. Therefore a major part of the preparation is to ensure the substrate is free of undulations, is sufficiently level to an agreed requirement (refer to Table 1 on page 3) and is sound enough to receive the chosen resin floor system.

Flowable screeds are frequently used for the cost-effective pre-levelling of existing substrates before applying resin flooring systems, although a resin scratch coat or bulked resin may be used instead to level over minor variations.

Flowable screeds can be applied by pump or conventional hand trowel method at typical depths of 5mm - 50mm.

1.2 Description

Flowable screeds are cement based powder compounds containing redispersible powder polymers. When mixed with a stated amount of water they yield a flowable compound used for smoothing and levelling fully prepared concrete substrates. The compressive strength, hardness, wear resistance, flexural and bond strengths of the screed are influenced by its mix design. For use with resin flooring systems, such screeds should be bonded.

These screeds fall into two categories:

Those in accordance with BS 8204 Part 3 (2004): Polymer modified cementitious levelling screeds and wearing surfaces: Code of Practice;

Those in accordance with BS 8204 Part 7 (2003): Pumpable self smoothing screeds: Code of Practice.

Both types are deemed suitable.

2. SELECTION CRITERIA

Before specifying or installing a flowable screed, a number of key factors should be determined in order to establish the most suitable specification. Designers and manufacturers should be involved to ensure compatibility between the screed and the resin finish.

2.1. Existing substrate

What is the make up of the existing base? Is it concrete, sand-cement screed, calcium sulphate, etc?

Thorough surface preparation is required before application of a flowable screed. Are there any specific site restrictions that may affect the preparation method, such as dust and noise restrictions which are often imposed in hospital and hygiene area refurbishment?

Are there any contaminants on the substrate which may hinder the bond of subsequent applications and therefore need to be removed?

Is the base sound, or is it weak and in need of consolidation? Are there any areas that need to be repaired before installation?

Are there expansion joints or structural joints in the base and how are these to be detailed within the screed?

2.2. DPM

Few flowable screeds are formulated to tolerate moisture in the substrate, so it is good practice to establish the moisture content of the substrate before laying a flowable screed.

It should to be established if there is an effective DPM in the existing construction, and whether this has been broken or bridged. If it is established that the DPM is not effective, then application of a surface DPM should be considered before the flowable screed is applied.

It is widely recognised that the surface hygrometer is the preferred and most accurate method for measuring moisture content (as specified in BS 8203 & BS 8204), but there are often practical difficulties with this method (e.g. leaving the hygrometers to equilibrate for several weeks on live building sites), so invasive methods using "in depth" hygrometers or a Vaisala probe are often more practical.

FeRFA offers detailed guidance in areas relating to DPMs. Please refer to the FeRFA Guides: "Guide to Installing Resin Flooring Systems onto Substrates with a high moisture content" and the relevant section of "Guide to the Specification and Application of Synthetic Resin Flooring".

2.3. Surface regularity

Before applying a resin floor, the surface regularity of the finished floor should be agreed. Once this has been determined, the specification may include a flowable screed capable of achieving the level of smoothness required.

The straightedge method for testing surface regularity given in BS 8402-1 is generally satisfactory for the majority of floor users and the designer should specify one of the classes of Surface Regularity: SR1, SR2 or SR3 as shown in Table 1 below.

Table 1: Classification of surface regularity for wearing surfaces of normal and high standard flooring

Class	Maximum permissible departure from a 2m straightedge laid in contact with the floor (mm)	Application
SR1	3	High standard: special floors
SR2	5	Normal standard: normal use in commercial and industrial buildings
SR3	10	Utility standard: other floors, where surface regularity is less critical

For specific details please refer to the relevant section of the FeRFA Guide to the Specification and Application of Synthetic Resin Flooring.

2.4. Depth of screed

The chosen flowable screed should be capable of achieving the required thickness. With a pumped flowable screed it is normal to achieve such thicknesses in one application, while several layers may be needed when applying by hand, depending on the thickness required. Priming between layers may be required if multi-layer applications are undertaken and in such instances the screed manufacturer's recommendations should be followed.

2.5. Screed strength

Typically, flowable screed manufacturers' technical data gives the flexural, compressive and bond strength, and quotes the strength buildup increasing over a period of 28 days in accordance with BS EN 13892-2: Methods of test for screed materials. The flowable screed must be strong enough to withstand any stresses and strains which occur during the curing and hardening of the resin system.

For specific details please refer to relevant section of the FeRFA Guide to the Specification and Application of Synthetic Resin Flooring.

2.6. Time before overlaying

Flowable screeds can typically be overlaid with resin flooring systems when they have reached a compressive strength of 25N/mm^2 and a moisture content below 75% RH. The time taken to reach these values is affected by the site conditions, but under the same conditions will be considerably shorter than with a conventional sand-cement screed.

3. APPLICATION OF FLOWABLE SCREED

3.1. Pumped

Flowable screeds are typically mixed on site in a continuous two stage mixer pump. Materials are added to the mixer using the water addition and mixing time specified by the manufacturer. The mixed material is pumped along a flexible hose to the working area where it is delivered on to the prepared substrate as a lump free homogenous fluid screed and allowed to build to the required thickness. The screed should be laid to retain a wet edge to maintain the level and uniformity of the finish. Immediately after laying, use a spike roller or dappler to aid air release.

3.2. Paddle mixed

For smaller areas that do not justify the use of a pump, the full contents of a bag of screed are mixed with a set quantity of water, pre-measured into a mixing bucket, using a slow speed mixer and paddle. After mixing for a set period in accordance with the manufacturer's instructions, the mixed material is applied to the prepared substrate using a flat edged trowel to help it to flow out.

In both types of application, accurate thickness levels can be achieved by fixing setting pins into the substrate with heads set to the required screed depth. Alternatively dipsticks and pin-rakes can be used. Use a spike roller or dappler to aid air release immediately after laying.

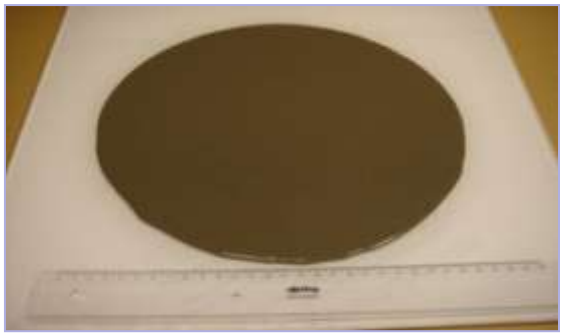
3.3. Site quality control

The consistency of the mixed material is monitored at regular intervals throughout the pumping application by a simple flow test. This involves placing a calibrated open ended cylinder vertically on to the centre of a smooth surface such as a glass plate. The cylinder is filled with material taken from the discharge end of the hose. The cylinder is lifted to free the material on to the glass plate where it creates a flow circle. Once flow ceases the circle diameter is measured in two directions and compared against the manufacturer's specification. The water addition to the pump can then be adjusted if necessary to give the correct flow.

The flow for paddle mixed material can be monitored in the same way.

Note: Flow requirements will vary between manufacturers.

Apparatus



Flow measurement

3.4. Joints

Construction joints in the base concrete should always be mirrored through the flowable screed. Joints can be pre-formed to provide a neat vertical edge; alternatively they can be formed by saw cuts in the hardened screed. Saw cutting should be carried out within a few days of application to prevent random cracking.

Day joints are formed in the screed to divide up areas of work but are not intended to accommodate movement. These joints are formed to leave neat vertical edges on the screed. When screeding continues these edges are primed to achieve a good bond. It is good practice to coincide daywork joints in the screed with construction joints in the substrate wherever possible.

Expansion joint width should be the same width as in the base concrete. Proprietary sealants or jointing strips should be used to fill these joints. Guidance should always be sought from the screed and joint manufacturers.

4. PREPARATION OF FLOWABLE SCREED TO RECEIVE A RESIN FLOORING SYSTEM

4.1 Surface preparation

When the flowable screed is dry and strong enough to be prepared, grind the surface and remove all residues to leave a dry and dust free open textured surface.

4.2 Priming

The surface of a flowable screed is generally denser than a concrete floor slab, so a lower viscosity primer than usual may be needed – refer to the manufacturer's recommendations.

5. FERFA CLASSIFICATION OF RESIN FLOORING SYSTEMS

Type	Name	Description	Duty	Typical thickness
1	Floor seal	Applied in two or more coats. Generally solvent or water borne	LD	Up to 150 µm
2	Floor coating	Applied in two or more coats. Generally solvent free.	LD/MD	150 um to 300 µm
3	High build Floor coating	Applied in two or more coats. Generally solvent free.	MD	300 um to 1000 µm
4	Multi-layer Flooring	Aggregate dressed systems based on multiple layers of floor coatings or flow-applied floorings, often described as 'sandwich' systems.	MD/HD	> 2 mm
5	Flow applied Flooring	Often referred to as 'self-smoothing' or 'self-levelling' flooring and having a smooth surface.	MD/HD	2 mm to 3 mm
6	Resin screed flooring	Trowel-finished, heavily filled systems, generally incorporating a surface seal coat to minimize porosity.	MD/HD	> 4 mm
7	Heavy Duty Flowable flooring	Having a smooth surface.	HD/VHD	4 mm to 6 mm
8	Heavy Duty resin flooring	Trowel-finished, aggregate filled systems effectively impervious throughout their thickness.	VHD	> 6 mm

Light duty	(LD)	light foot traffic, occasional rubber tyred vehicles
Medium duty	(MD)	regular foot traffic, frequent fork lift truck traffic, occasional hard plastic-wheeled trolleys
Heavy duty	(HD)	constant fork lift truck traffic, hard plastic wheeled trolleys, some impact
Very heavy duty	(VHD)	severe heavily loaded traffic and impact

6. GLOSSARY OF TERMS

DPM	Damp Proof Membrane. An impervious material used within the construction of ground bearing floors to stop moisture or prevent damp.
Flooring	uppermost fixed level of a floor that is designed to provide a wearing surface
Flowable screeds	cement based powder compounds containing polymers which are mixed with water to produce a flowable compound
Joint	formed discontinuity in either the whole or part of the thickness of a screed or slab.
Levelling screed	screed finished to obtain a defined level and to receive final flooring
Screed	layer of material laid in situ, directly onto a base, to obtain one or more of the following purposes: - to obtain a defined level - to carry the final flooring - to provide a wearing surface
Substrate	building element that provides support for a screed or flooring
Surface regularity	deviation in height of the surface of a flooring layer over short distances in a local area

7. STANDARDS AND PUBLICATIONS

BS 8203 : Code of practice for installation of resilient floor coverings

BS 8204 Parts 1, 3, 6 and 7

BS EN 13892-2: Methods of test for screed materials

FERFA PUBLICATIONS

All the FeRFA publications listed below are freely downloadable from FeRFA's web site at www.ferfa.org.uk.

- Guide to the Specification and Application of Synthetic Resin Flooring (RIBA CPD Approved)
- Guide to the Selection of Synthetic Resin Flooring
- Osmosis in Resin Flooring (TGN 01)
- Chemical Resistance of Resin flooring (TGN 02)
- Static Controlled Flooring (TGN 03)
- Guide to Installing Resin Flooring Systems onto Substrates with a high moisture content (TGN 04)
- Guide to Cleaning Resin Floors (TGN 05)
- Assessing the Slip Resistance of Resin Floors (TGN 06)
- Guide to Personal Protective Equipment for use with In Situ Resin Floors and Surface Preparation (TGN 07)
- Guide to Seamless Resin Terrazzo (TGN 08)
- Guide to flowable polymer screeds as underlayments for resin floor finishes
- Guide to PPE for use with in situ resin floors and floor preparation *(downloadable in A4 format or as a printed FREE pocket guide)*

FeRFA

FeRFA, the Resin Flooring Association, represents the major product manufacturers, specialist contractors and surface preparation companies, raw material suppliers and specialist service providers within the UK Resin Flooring Industry. Established in 1969, FeRFA now represents over 90 UK based companies. The Association has established Codes of Practice for full members. It takes an active role in promoting resin flooring and in developing both national and international standards.

All FeRFA publications are freely downloadable from the website at www.ferfa.org.uk
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