

FeRFA GUIDE TO PREPARING SUBSTRATES TO RECEIVE RESIN FLOORING AND FINISHING OF RESIN TERRAZZO SYSTEMS



FeRFA Guidance Note No. 11



CONTENTS

1.	INTRODUCTION.....	3
2.	DESCRIPTION.....	3
3.	SELECTION CRITERIA.....	3
	Shotblasting	3
	Grinding	4
	Planing/Scabbling.....	5
	Multi-Stripping	6
	Surface Drying.....	6
	Removal of Oil Contamination.....	6
4.	SUMMARY OF PREPARATION METHOD BY RESIN PRODUCT TYPE	7
5.	STANDARDS	7
6.	GLOSSARY OF TERMS	8
7.	FeRFA PUBLICATIONS.....	8

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.

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.

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ISBN: 0 9538020 7 8

Edition: 1st : August 2011

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1. INTRODUCTION

This guide aims to outline the principles of surface preparation to prepare a substrate to receive a resin flooring system, together with the finishing methods used to grind and finish resin terrazzo. Whilst outline information on the methods and equipment used to prepare surfaces is included within this guide, it is recommended that advice is sought from specialist surface preparation companies.

2. DESCRIPTION

Surface preparation is a treatment process by which a background surface/substrate is required to be sound, clean, level and free from contaminants in readiness for application of the specified product. The process involves the cleaning of residues and texturing the surface in readiness to receive a resin flooring system. Any residues left on the surface from old coatings, or an uneven surface, will affect the adhesion, durability and aesthetics of the resin flooring system being applied. The correct method of surface preparation is vital to ensure the efficacy of resin floors.

In accordance with BS8204-6, surface preparation by acid etching of the concrete should not be used because of the associated health and safety implications and because the concrete surface is left saturated with water and calcareous salts which may ultimately lead to debonding or osmotic blistering of the resin flooring system.

There are four key surface preparation principles used in resin flooring applications: Shotblasting, Planing/Scabbling, Grinding and Multi-Stripping.

3. SELECTION CRITERIA

Shotblasting

The method of shotblasting involves steel abrasive (shot) being propelled at high velocity by a rotating wheel within the machine body, and then onto the designated surface to produce the desired profile. The debris is collected in a vacuum unit for disposal, and the shot is recycled for continued use.

You would select shotblasting to:

- Produce a profile for the application of resin flooring
- texture and clean concrete, asphalt or tiled surfaces
- remove paints and sealants.
- create adhesion for the application of a wide range of surface finishes
- key bridge decks and roads for surface dressing and waterproof systems.
- prepare steel (Commercial and Swedish Standard SA2 ½)
- remove laitance from concrete floors
- texture and remove glaze from power floated concrete
- re-texture and re-instate slip resistant properties

The type and size of the machine selected will determine production rates achievable and degree of profiling required for the specified material to be applied.

Surfaces suitable for shotblasting include:

- any hard composition surface that does not exhibit multiple layers of materials or contaminants. i.e. Concrete, Steel, Terrazzo.
- asphalt surfaces – Note:- with all bituminous compounds, heat and size of the area must be considered. This is not a surface which is considered as a suitable substrate for a resin flooring system.

Examples:

- Texturing and removal of glaze from power floated concrete



BEFORE

AFTER

Key considerations:

Due to the nature of the operation, Shotblasting will produce a lining effect commonly known as tramlining. This can be minimised with operator experience but may be visible even following application of FeRFA resin flooring Types 1-3. Shotblasting will also highlight surface defects in the surface being prepared, and again these defects may be visible in thinner resin coatings. This is particularly important to note when applying to old concrete substrates. Shotblasting cannot be applied to wet or damp substrate conditions, and for optimum results, requires a smooth even surface.

Shotblasting will not effectively remove:

- Soft composition screeds
- Sticky/bituminous materials
- Materials in excess of 500 µm thickness (FeRFA Type 3 and above)

Grinding

The grinding process is provided by diamond, tungsten or resin bonded discs or plates which are secured to single or multiple heads and rotate in a circular motion. Selection of the correct diamond or resin bonded plate is essential to achieve the correct combination for smoothing, preparing, polishing or cleaning. Grinding machines are designed for wet or dry operation and to tackle a wide variety of applications from fast grinding on uneven or tough surfaces to producing highly polished finishes, such as resin terrazzos. The type and size of the machine selected will determine achievable production rates in terms of area, speed and the degree of profiling required for the specified material to be applied. All grinding machines should be designed to be used with dust extraction.

You would select grinding to:

- smooth and clean concrete, asphalt, stone and terrazzo
- remove paint and coatings, thin adhesives, latex and levelling compounds
- polish terrazzo, granite, marble and concrete surfaces
- remove elastomeric systems

Surfaces suitable for grinding:

Grinding can be applied effectively to concrete, stone, resin terrazzo and asphalt.

Grinding Accessories:

- Metal bonded discs/plates for general grinding operations
- Resin bonded diamond accessories for polishing operations
- Polycrystalline Diamond discs (PCD) for removal of adhesives and elastomeric systems

Key considerations for grinding:

Grinding an uneven surface will skim across the high spots (peaks) and not touch the lower ones (troughs) unless the surface is reduced to the lowest composition first. Certain types of machines may produce a swirling effect on the surface which may be evident when applying FeRFA Type 1-3 resin systems to the prepared substrate. For more information on the grinding and polishing of resin terrazzo, refer to FeRFA Guidance Note No 7 "FeRFA Guide to Resin Terrazzo".

Examples:



SMOOTHING CONCRETE



PAINT REMOVAL

Planing/Scabbling

The Planing/Scabbling operation is based on a drum rotating at high speed within the body of the machine. The profile (cut / texture) is created by the accessories fitted to the drum known as flails or for ride-on models, picks.

You would select planing/scabbling to:

- remove materials in excess of 1mm in thickness i.e. latex, screeds, adhesives, contaminants and multiple layers of old coatings
- reduce tamped surfaces
- reduce levels
- create a textured surface

Planing/scabbling tends to create a more profiled floor than other surface preparation techniques and this should be considered in line with the final resin finish required. It may be necessary to employ another preparation method following planing/scabbling to reduce the degree of surface profile.

There are numerous surfaces suitable for planing/scabbling:

- Planing/scabbling is often specified for removal of high build coatings, thermoplastic compositions, surface contaminants in excess of 1mm, latex and polymer screeds.

Accessories:

There are different shapes and sizes of flails and picks available for specific tasks and they can be arranged on the drum for light cleaning applications through to heavy duty grooving.

- Milling Flails - for removal of thermoplastic line markings and bitumous and rubber deposits
- TCT Flails - for cleaning and texturing concrete/asphalt and stone surfaces
- Beam Flails - for cleaning without damage to concrete and painted surfaces
- Star Flails - for displacement of ice deposits
- Picks – for reducing concrete and designed to fit ride-on machines

Examples:



MILLING FLAIL PROFILE



PICK PROFILE

Key considerations for planing:

Hard compositions may create a problem for smaller planing machines as there is not enough weight to cut into the surface. The profile achieved by the operation must always be considered for the specified product to be applied.

The composition and thickness of the substrate, the accessories selected and the profile and depth of cut attainable from the model and type of machine selected, will determine the results achieved.

Walk behind planing models have a medium vibration level, which means that they can be used between 2-8 hours in any given time period.

Multi-Stripping

In the multi-stripping operation, the blade or pick combinations are attached to the front of the machine to affect the removal process. The weight and position of the blade/pick determines the removal level of the selected surface. The operator will position the machine to cut or lift the material as the machine drives forward. A secondary surface preparation process (shotblasting, grinding, planning/scabbling) may be required following multi-stripping.

You would select multi-stripping to:

- remove floor coverings, self levellers, ceramic and stone tiles, vinyl, carpets and laminate flooring
- remove latex, screeds and epoxy resin, thermoplastic lines, adhesive and bituminous materials
- remove flexible car park decking systems or membranes

Surfaces suitable for multi-stripping:

- A wide range of floor coverings can be removed with minimal effort using the multi stripping method.

Accessories:

- Flexible steel cutting blades (various shapes and sizes).
 - Flat blades - for removal of tiles and screeds
 - Curved blades - for removal of sheet material, carpets and vinyl. Blade cuts as it strips
- Heavy duty cast picks – for removal of hard ceramic and quarry tiles

Key considerations for multi-stripping:

The type of material to be removed, including its composition and thickness, and whether it comprises of a single layer or multiple layers.

The power requirements of the machine specified to undertake the process and the working environment and access to areas where multi-stripping is to take place.

Surface Drying

This process is used to 'dry' the background surface/substrate or to heat the background surface/substrate in preparation to receive the specified resin flooring system. Specialist drying machines produce hot air which is applied to the surface/substrate. The process does not draw out surface contaminants, traditionally associated with 'Hot Compressed Air Treatments' which produce gas and air under pressure, and have environmental and safety issues.

Removal of Oil Contamination

Floors within many industrial environments are exposed to oils, hydraulic fluids, fats and grease that over time can soak deep into the substrate. Mechanical surface preparation alone may not fully remove these contaminants, which will either remain visible or they can be invisible but drawn up to the surface by capillary action when the substrate is coated. When there is clear evidence that mechanical surface preparation has not fully removed the contaminant or concerns exist about invisible deep contamination, it is often prudent to use a good quality industrial degreaser / oil remover to help breakdown the contamination. These products should be applied in line with manufacturer instructions, but the key is to always allow sufficient time for the product to break down the contamination. The treated area should then be washed down and potentially cleaned again using a PH neutral industrial cleaner to remove all residues.

Should evidence of contamination or concerns remain, advice should be sort from the resin system manufacturer regarding an appropriate primer / priming method.

4. SUMMARY OF PREPARATION METHOD BY RESIN PRODUCT TYPE

TYPE	NAME	DESCRIPTION	TYPICAL THICKNESS	PREPARATION METHOD
1	Floor seal	Applied in two or more coats. Generally solvent or water borne.	up to 150 µm	Shotblasting Grinding
2	Floor coating	Applied in two or more coats. Generally solvent free.	150 µm to 300 µm	Shotblasting Grinding
3	High build Floor coating	Applied in two or more coats. Generally solvent free.	300 µm to 1000 µm	Shotblasting Grinding
4	Multi-layer flooring	Aggregate dressed systems based on multiple layers of floor coatings or flow-applied floorings, often described as 'sandwich' systems.	> 2 mm	Shotblasting Grinding Planing
5	Flow applied flooring	Often referred to as 'self-smoothing' or 'self-levelling' flooring and having a smooth surface.	2 mm to 3 mm	Shotblasting Grinding Planing/Scabbling Multi-Stripping
6	Resin screed flooring	Trowel-finished, heavily filled systems, generally incorporating a surface seal coat to minimize porosity.	> 4 mm	Shotblasting Grinding Planing/Scabbling Multi-Stripping
7	Heavy duty flowable flooring	Having a smooth surface.	4 mm to 6 mm	Shotblasting Grinding Planing/Scabbling Multi-Stripping
8	Heavy duty Resin flooring	Trowel-finished, aggregate filled systems effectively impervious throughout their thickness.	> 6 mm	Shotblasting Grinding Planing/Scabbling Multi-Stripping

5. STANDARDS

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

6. GLOSSARY OF TERMS

Blades	Steel cutting or slicing types attached to front of multistripping machine
Captive Blasting	Term used to identify the process which is affected within the body of the shotblasting machine.
Debris	Waste produced as a by product of the cleaning, texturing or removal process selected eg dust and tiles.
Diamond	Diamond accessories metal or resin bonded which are attached to machines and hand tools to effect the grinding or polishing process.
Dust Extraction	A vacuum or Filtration unit which collects the dust created by the preparation process.
Flails	The accessory fitted to the drum of a planing machine (commonly types are TCT, Milling or Beam).
Heads	The plates or disc that rotates on a grinding machine.
Material	Substance being removed or applied to the substrate i.e. Coating, Screeds.
Shot	Also known as steel abrasive. Steel ball bearings identified by grade (i.e. 460, 550) which is propelled at high velocity (inside the shotblast machine) to create the desired surface profile.
Substrate	The underlying material/background surface to which a finish is applied
Surface Profile	Identifies the type of finish created by the selected method of preparation eg smooth, grooved, highly textured.

7. 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
- Assessing the Slip Resistance of Resin Floors (TGN 01)
- Osmosis in Resin Flooring (TGN 02)
- Chemical Resistance of Resin flooring (TGN 03)
- Static Controlled Flooring (TGN 04)
- Guide to Installing Resin Flooring Systems onto Substrates with a high moisture content (TGN 05)
- Guide to Cleaning Resin Floors (TGN 06)
- Guide to Seamless Resin Terrazzo (TGN 07)
- Guide to Flowable Polymer Screeds as underlayments for resin floor finishes (TGN08)
- Guide to the selection of deck waterproofing and wearing surfaces for car parks (TGN09)
- FerFA Environmental Guide (TGN10)
- FerFA Guide to Preparing Substrates to receive resin flooring and finishing of resin terrazzo systems
- Guide to Personal Protective Equipment for use with In Situ Resin Floors and Surface Preparation