

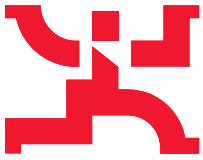


# Fosroc Solutions for Flooring

[www.fosroc.com](http://www.fosroc.com)



*constructive solutions*



## Company Profile

Since the company's beginnings over 80 years ago, Fosroc has developed into an international leader in delivering Constructive Solutions for projects across a broad range of market segments including transport, utilities, industrial and general buildings.

Fosroc's commitment to customer service and technical support is second to none. We work closely with architects, structural engineers, contractors and owners to best understand their requirements. Together we can develop a bespoke solution for a construction project, adding value and becoming more than just a materials supplier, but a solution provider.

Fosroc has an extensive network of offices and manufacturing locations across Europe, Middle East, India, North and South Asia, and is further represented in other regions across the world by distributor and licensee partners.

Selecting from the full portfolio of Fosroc products and services and integrating expert technical support, world class customer service and innovation, Fosroc goes beyond just product selling to ensure that we partner with our customers to deliver complete constructive solutions.

Fosroc's product range is as follows:-

- |                       |                      |
|-----------------------|----------------------|
| ■ Admixtures          | ■ Grouts & Anchors   |
| ■ Adhesives           | ■ Joint Sealants     |
| ■ Protective Coatings | ■ Surface Treatments |
| ■ Concrete Repairs    | ■ Grinding Aids      |
| ■ Industrial Flooring | ■ Waterproofing      |

### Fosroc Support

Our experienced staff will assist you with high level support in:

- CAD Details
- Project Specifications
- Site Support & Training

# Global leaders in delivering Constructive Solutions



ISO 9001 / ISO 14001  
OHSAS 18001  
BUREAU VERITAS  
Certification





# Industrial Flooring

The industrial floor is literally the basis of the production process and therefore plays a major role in the maintenance of buildings, working conditions and hygiene. Production techniques are constantly becoming more advanced, and floor treatments increasingly have to meet very specific requirements. Floors for non-industrial applications such as public buildings, hospitals and commercial developments also have to meet set requirements.

**The correct floor treatment can only be chosen after an analysis of:**

- **the properties of the substrate**
- **abrasion and other factors the floor has to resist, and**
- **the industry or environment in which the floor is to be used.**

**Only then will the floor treatment function to the user's satisfaction.**

This brochure provides a survey of the requirements most frequently met in industry and the service sector and is intended to assist with the choice of the most suitable floor treatment. Various floor types are discussed, together with the properties necessary to meet particular requirements and the preparation of the substrate.

A damaged floor, or one which is installed incorrectly can reduce efficiency, cause personal injury and lead to unpleasant and unhygienic working conditions. The high cost of reinstalling a floor, in terms of disruption, inconvenience and loss of production, makes it important to get the right floor 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.

Combining years of experience of flooring systems throughout the world with the market leading products, Fosroc offer a complete flooring solution from design to installation. Fosroc Application Teams work closely with our network of Approved Applicators to ensure that projects are completed on time and within budget.

Further information on Fosroc floor systems is available in the product information data sheets and our technical advisors are always ready to provide detailed advice.



constructive solutions

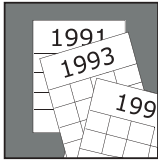
## General Guidelines

The successful protection of an industrial floor depends on three steps:

- Selection of the most suitable material
- Accurate and detailed specification
- Installation by an experienced and competent applicator

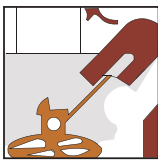
## Material Selection

Selection of the correct material can only be done when the demands placed on the floor are known and detailed. Use the list of requirements below to detail what the floor will be subjected to, avoiding costly omissions or errors.



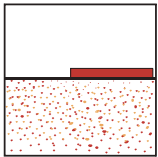
### Design life

What is the life of the plant, 2 or 20 years. The floor finish must be selected and specified to meet the required life expectancy or the intended maintenance free period.



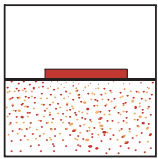
### Application

At which stage of the construction processes will the floor system be applied? Will the main fabric of the building be in place? The answers to these questions may determine how the floor system is to be applied? There are two main methods in use; monolithic and granolithic.



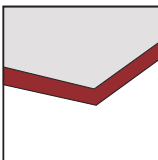
### Monolithic

This is where the system is applied as a dry shake procedure and then trowelled into the surface to form an integral part of the concrete slab. These dry shake products can only be applied immediately after the concrete slab has been poured and cannot be applied on to existing surfaces.



### Granolithic

This is where the system is applied as a screed or topping to an existing concrete slab and it is common practice that a bonding agent is used to maximise the level of bond.



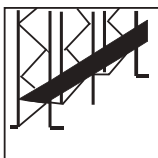
### Thickness

Consideration should be given to the thickness of the intended floor finish, this is particularly true in existing premises where an increase in the floor thickness may cause problems with door thresholds etc. In new works, allowances should be made for the thickness of the finish.



### Surface Preparation

Surface preparation is imperative and cannot be avoided. The common methods for concrete are: captive blasting, grinding etc. The method chosen must reflect the value and risk of failure of repairs, budgets and effect on final system. If surface preparation is compromised, all of the subsequent effort is in jeopardy.



### Structural Loading

The static and the dynamic loadings imposed during construction, production, refitting and maintenance should be considered.



### Traffic and Mechanical wear

The physical requirements for resistance to impact and abrasion caused by traffic should be given consideration. Often wear is concentrated in localised areas. Consideration should be given to the frequency, type and location of wear.



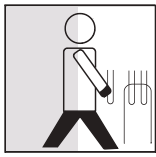
### Chemical Spillage

List all the chemicals that may be spilled in the area, noting their spillage concentration, temperature and the possibility of mixtures occurring on the floor. Note also the actions that may be taken if a spill does occur.



## Slip Resistance

The degree of slip resistance required should be in accordance to the service conditions.



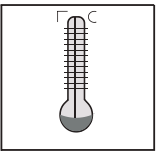
## Hygiene

Many modern industries eg. pharmaceutical, cosmetic, food, beverage, chemical etc. now have similar and very demanding hygiene requirements. These progressive industries need clean room conditions - floors that must be totally dust-free without cracks or angled corners and easily cleanable yet satisfy other individual requirements such as specific levels of chemical and mechanical resistance.



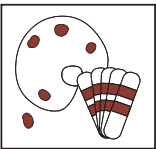
## Crack-bridging ability

This is related to structural loading particularly dynamic loading. What effects do plant vibration and traffic have on the floor. How important is it that cracks do not appear in specific areas of the project - mezzanines, first floor production areas for example.



## Temperature

As thermal shock may be a major cause of premature floor failure, it is important to consider not only the temperature of the operating machinery, the products and the processes but also the temperature of adjacent areas.



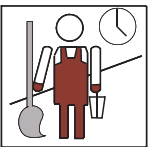
## Colour / Aesthetics

An attractive and pleasant environment can assist in increasing productivity and improving industrial relations, although lighting can also play a part in this. Colour allows easy and rapid identification of danger areas, trucking aisles, wet areas or chemical exposure risks.



## Ease of cleaning

A flooring system, which is installed without prior consultation on 'in-service' cleaning procedures can pose problems. Whether machines, high-pressure steam lances or traditional mops and brushes are to be used on the surface, ease of cleaning should always form an integral part of the flooring selection process.



## Cleaning

In many modern industries particularly those with high hygiene requirement the cleaning chemicals used, are in many cases more aggressive than the industrial process itself. It is therefore important to establish the end user's cleaning regime, the frequency, the chemicals used and their concentration. It may be advisable to consider some form of sacrificial polish or sealer in some situations to aid cleaning and durability whilst maintaining aesthetics.



## Drainage

The type of floor drainage contemplated should be considered in conjunction with the floor finish particularly as the connection and abutment of two dissimilar building materials may allow cracking and leaking.



## Conductive - Anti Static

There is an increasing demand by many industries for conductive or anti-static floors. These are used either to prevent electrical interference with sensitive electronic equipment, or to avoid a build up of static electricity, which could cause a spark discharge and create the risk of an explosion.



## Repair and Maintenance

As part of the normal wear and tear at any production plant some damage to the floor is inevitable. Allowance for this should be made at the time of installation. This is particularly true where special colours have been made to order or a particular finish was required, which may be difficult to reproduce at a later date to exactly match the existing.



## Impact

The occurrence and frequency of impact damage to the floor should be ascertained. Consideration should also be given to the height from which an object may fall. Resistance should be designed into the final floor and where this is not possible then localised protection should be considered.

# Selection criteria

poor ..... ▶ outstanding  
 0 1-2 1-2\* 3-4 5-6



average thickness in mm(dft)



foot traffic in days\*\* @20°C



abrasion resistance



chemical resistance



impact resistance



elasticity



uv rays resistance

## floor type

### floor coatings

water based epoxy	0.1-0.2	2	2	0-6	1	0	1
epoxy containing solvent	0.2-0.3	1	2	0-6	1	0	1
dual-component polyurethane	0.2-0.3	1	2	0-6	1	0	5
solvent-free epoxy	0.4-0.7	2	3	0-6	2	0	1

### floor underlays

epoxy-hard	0.5-5	1	5	0-6	2	0	1
epoxy-hard	3-10	1	5	0-6	3	0	1
epoxy-hard	10-50	1	5	0-6	5	0	1
epoxy-hard	25-100	1	5	0-6	5	0	1

### self-flowing floors

epoxy-hard	0-6	1	3	0-4	3	0	1
epoxy-hard	2-3	2	4	0-4	4	0	1
epoxy-hard	5	2	5	0-4	5	0	1
epoxy-water based urethane	3-4	2	4	0-6	4	0	1
urethane	2-3	1	4	0-6	4	6	1*

### decorative floors

self-flowing decorative	2	2	3	0-4	3	0	1
terrazzo trowel	6	5	5	0-4	5	0	1

### conductive floors

self-flowing - hard-epoxy	2	2	4	0-4	4	0	1
floor coating - polyurethane	0.2-0.3	2	2	0-4	1	0	5

### cementitious floor systems

cementitious floor finishing	5-40	2	4	0-3	5	2	6
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### abrasion layers

tar-epoxy, lightweight	3-4***	1	6	0-6	5	5	6
polyurethane, lightweight	3-4***	1	6	0-6	5	5	6

### trowel floors

epoxy mortar	7	1	5	0-6	5	0	1
urethane mortar	7	1	5	0-6	5	0	1

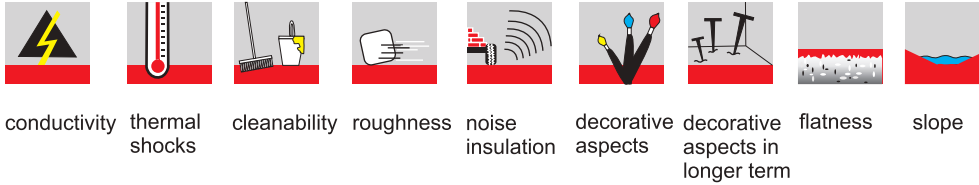
### floor repairs

cementitious, fast setting	na	3	4	0-3	5	1	6
cementitious	na	3	4	0-3	5	1	6

### floor sealers

epoxy floor sealer	0.1-0.2	2	2	0-6	1	0	3
PU Sealer	0.1	2	2	0-6	1	0	3
block sealer	0.1	2	2	0-6	1	0	3

▼ food grade available



## Flooring system

### floor coatings

0	2	4	2*	0	2	2	0	6	Nitoflor FC550, Nitoflor FC130
0	2	5	2*	0	2	2	0	6	Nitoflor FC140, Nitoflor FC145
0	2	5	3	0	2	3	0	2	Nitoflor FC 400 UH
0	2	5	2*	2	2*	2	1	0	Nitoflor FC150 <sup>▽</sup>

### floor underlays

0	2	5	2	0	1	1	2	5	Nitoflor EU5
0	2	2	2	0	1	1	2	5	Nitoflor EU10
0	4	2	4	0	1	1	2	5	Nitoflor EU50
0	4	2	4	0	1	1	2	5	Nitoflor EU100

### self-flowing floors

0	3	5	2*	2	2*	2*	2	0	Nitoflor SL1000 <sup>▽</sup>
0	3	5	2*	2	2*	2*	2	0	Nitoflor SL2000 <sup>▽</sup> /Nitoflor SL3000 <sup>▽</sup>
0	4	5	2*	2	2*	2*	4	0	Nitoflor SL4000 <sup>▽</sup>
0	3	4	4	2	1	3	3	0	Nitoflor SL2050
0	3	5	3	4	2*	2*	2	0	Nitoflor SL 6000 UB

### decorative floors

0	3	5	2	2	4	2	2	0	Nitoflor SL range <sup>▽</sup>
0	5	5	2	2	6	5	4	2	Nitoflor ET10000

### conductive floors

6	3	5	4	2	2*	2*	2	0	Nitoflor Conductive / Dissipative
6	2	5	3	2	2	3	0	0	Nitoflor LVBG

### self-levelling floors

3	2	3*	3	2	2*	6	3	2	Cemtop 200/Cemtop 400SD/Cemtop HD
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### abrasion layers

0	3	3	6	3	2	6	3	3	Cicol ET Slurry
0	3	3	6	2	2	6	3	3	Trafficguard UR150, UR, Cicol NT Slurry

### trowel floors

0	4	3*	4*	2	2	4	5	6	Nitoflor TF5000 <sup>▽</sup> /TF10000/TSR5000
0	4	3*	4*	2	2	4	5	6	Nitoflor TF 120 UB/ Nitoflor TF 100 UH

### floor repairs

3	4	3	3	2	1	6	4	6	Patchroc
3	4	3	3	2	1	6	4	6	Paveroc

### floor sealers

0	4	5	2	0	2	2	2	4	Nitoflor Sealer CE
0	4	5	2	0	2	2	0	2	Nitoflor Sealer AP
0	4	5	2	0	2	2	0	2	Nitoflor Block Sealer

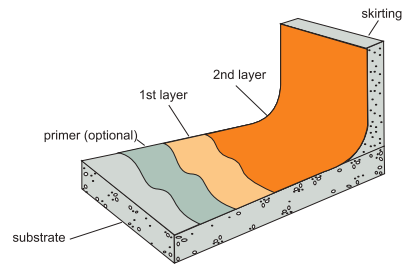
\* may be improved by combining systems \*\* excluding pre-treatment of substrate and waiting period before use \*\*\* before scattering



## Floor coatings

### LAYER THICKNESS < 1 mm

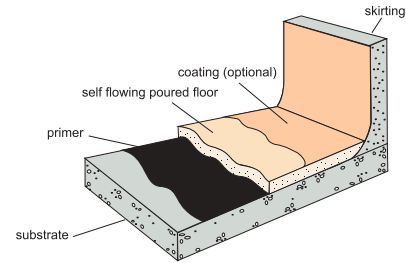
Floor coatings usually consists of two components. They are formulated on the basis of epoxy resin or polyurethane, on a water base, with or without solvent. Once mixed they are applied with a roller in two layers with a layer thickness of 0.2 - 0.5 mm. The relevant formulation determines the mechanical and chemical resistance and whether the finish is matt or gloss. With specific coatings it is necessary to apply a primer first in order to seal the pores of the substrate and to improve adhesion.



## Self-flowing poured floors

### LAYER THICKNESS 1 - 5 mm

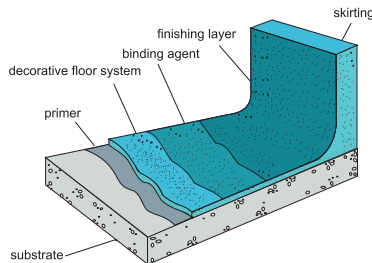
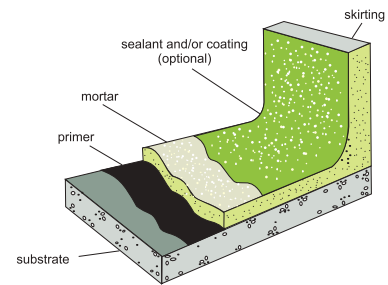
Self-flowing poured floors owe their name to the fact that, once their components have been mixed, they have the property of flowing to form a level floor. These floor systems consist of a mixture of epoxy or polyurethane resins, hardeners, graded inert fillers and possibly a colouring paste. The high resin content gives them a fairly glossy appearance. They are applied with a trowel or a toothed spreader and are then rolled with a nylon needle roller to allow trapped air to escape. In general, major unevenness in the substrate is not leveled out by self-flowing floor treatments, and so it is not possible to achieve a smooth surface in such a case. It is important to apply a primer first to seal pores in the substrate.



## Trowel floors

### LAYER THICKNESS 5 - 12 mm

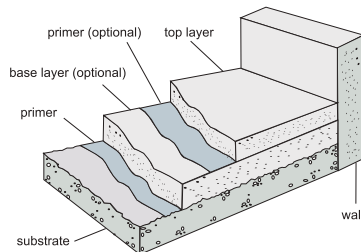
Trowel floors (wearing courses) are floor systems based on epoxy, polyurethane or methacrylic resins supplemented with graded inert materials. They are available both in a colour less version and pigmented. Due to the fact that trowel floors contain a high proportion of filler (the ratio of resin to filler varies from 1:7 to 1:11) this floor system is mechanically very strong. The mortar is applied over the primer layer either by hand or by machine. A trowel floor surface is matt in appearance; it may be sealed to obtain an easily-cleaned floor finish and increase its chemical resistance. The most appropriate mortar and sealant is selected depending on the requirements to be met.



## Decorative floor treatments

### LAYER THICKNESS 2 - 3 mm

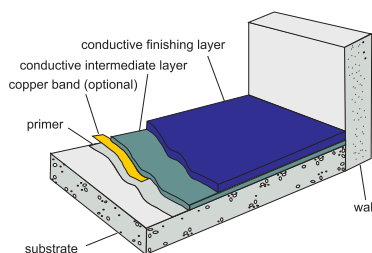
Most decorative floor treatments consist of a mixture of colourless epoxy or methacrylic resins and pigmented graded inert fillers. The resin, coloured with pigmented minerals, is applied over a slightly sanded-down primer. Two layers of binding agent seal off the surface and give the floor a structured appearance. A finishing layer may be applied to make the floor treatment more resistant to abrasion and scratching. Decorative systems can also be achieved by applying a mortar with a binding agent consisting of pigmented epoxy resins and marble flakes. Polishing of the surface then provides a smooth satinized appearance (final layer thickness 7-8 mm).



## Cementitious floor systems

### LAYER THICKNESS 5 - 40 mm

These systems have until now been used as an underlay for e.g. carpeting and linoleum. However new developments have resulted in cementitious floor systems of great mechanical strength, so that they are suitable for industrial applications. The great advantage of this floor system is that it can be laid quickly and easily using a pump. The layer thickness varies between 5 - 40 mm. Subsequent rolling with a needle roller ensures that trapped air is released and this creates a level, smooth floor even if the substrate is uneven. Cementitious floor systems are suitable for the renovation of industrial floor surfaces where existing floor systems cannot be removed.



## Conductive floor systems

### LAYER THICKNESS 2 - 3 mm

Conductive and dissipative floor systems ensure the controlled discharge of static electricity. Depending on the system chosen, surface resistance is between  $5 \times 10^4$  and  $1 \times 10^9$  Ohms. They are employed in places where protection against the consequences of static electricity is required. The system consists of a primer, a highly-conductive intermediate layer and a coating or a self-flowing or decorative finishing layer with controlled electrical properties.



## Properties of the substrate

The functioning and resistant qualities of a floor treatment are partly dependant on the properties of the substance. It is therefore important to be familiar with the specific features of the different industrial substrates. In this brochure we leave aside traditional substrates such as concrete slabs, with or without a finishing layer. Floor treatments may also be laid over tiles, wood, steel and bituminous covering. In these situations we advise you to consult the relevant supplier or manufacturer since they are in a position to suggest appropriate solutions.

### Compressive strength

If a substrate does not have enough resistance, shocks and impacts can lead to the floor treatment coming loose as a result of damage to the substrate. As a rule a substrate must have a compressive strength of at least 25 MPa. If this is not the case, special solutions will have to be looked for in an industrial environment.

### Moisture

Most floor treatments are not water vapour permeable and act as a barrier to rising damp. This pressure results in the systematic destruction of the treatment. It is therefore necessary to protect the substrate against rising damp. If moisture is present in the substrate and cannot be prevented, then a system must be chosen that is water vapor permeable (cementitious system or a water-based coating).

Schmidt hammer test



Measurement of moisture %



Impact resistance test



Pull-off test



## Surface preparation

To ensure proper adhesion of a floor treatment to the substrate, it is necessary for the substrate to be sound, dry and clean. Existing substrates are often contaminated with oil or chemicals and a new substrate always has a laticence over its surface. Whatever the state of the substrate, proper surface preparation is required to obtain proper adhesion between the substrate and the floor treatment. There are various methods of surface preparation. Those most frequently used include:

### Gritblasting

This is the most usual method. It consists of pressure-spraying the substrate with metal particles which are then sucked up again in a closed circuit. This system has been developed to meet the growing demand for a dust proof surface preparation.

### Milling

Milling is carried out using a machine with rotating discs which cleans the substrate. This system is very effective, particularly for treating old substrates in poor condition. The milling machine can be fitted with an extractor to reduce the dust problem.

### Polishing

Polishing with a polishing disc is only done to remove the laticence from new concrete floors. This method is less suitable for large surfaces since it takes a long time.

## Flatness and roughness of the substrate

The condition of the substrate is very important in the selection of surface preparation. If the substrate is not level or if the floor has to be made with a slope, then a system has to be chosen that has enough layer thickness to meet the requirements. If the substrate is too rough for the floor treatment selected then a scrape layer must be laid first. This scrape layer usually consists of a resin with the same properties as the final treatment, for instance an epoxy scrape layer for an epoxy treatment.



## Joins and skirtings

### Joins

In normal circumstances a concrete floor is provided with joints. The joints allow for movements in the floor and must be continued into the treatment. They are filled with a joint filler. Expansion joints absorb movements which arise as a consequence of temperature differences in the floor fields. Insulation joints divide the floor into separate sections. Constructional joints or non-moving joints do not need to be continued into the final treatment.

### Skirtings

Skirtings are required in damp environments, particularly in the food industry. These skirtings can be created by various methods. The traditional method is to make skirtings with a mortar with the same properties as the final treatment. If a pigmented mortar is used, the plinth is finished with a coating in the required colour. Where a decorative treatment is employed the skirtings are made using coloured fillers and finished with colourless resin.

## Specific Applications

### Public Buildings

Public buildings such as hospitals, museums, office blocks hotels and prisons call for a hard-wearing floor treatment but it is not just to be hard-wearing; comfort and colour are at least as important. Nitoflor floor systems for public buildings can be supplied in a wide range of colours and are also easy to clean, since hygiene is a prime requirement in public buildings.



### Aviation Industry

More and more companies are becoming aware of the financial consequences of static electricity. A build-up of static electricity can result in damage to computers and electronic products at the production or quality control stage. Employees safety is also a factor. In some industries, for example in the bulk storage of grain, inadequate control of static electricity can have catastrophic consequences. For this reason the need for a conductive floor treatment should be taken into account in the design of production or processing areas. Fosroc has developed both conductive and a dissipative floor system conforming to the BS 2050 and DIN 51953 standards. Nitoflor SL conductive and Nitoflor SL dissipative floor systems conduct of static electricity in a controlled way. They have now been employed for years in production and storage areas, in quality control rooms and in laboratories.

### Food Industry

Hygiene is the key word for products for use in the food industry. It is of fundamental importance that a floor can be cleaned thoroughly and easily. The most commonly met requirements are impermeability to water, an anti-slip surface, resistance to animal fats and vegetable oils and suitability for steam cleaning. Another major condition is that, both at the time of laying and while in use, the floor should not effect the smell and taste of the foodstuffs. The Nitoflor floor systems which have been specially developed for the food industry meet all these criteria.



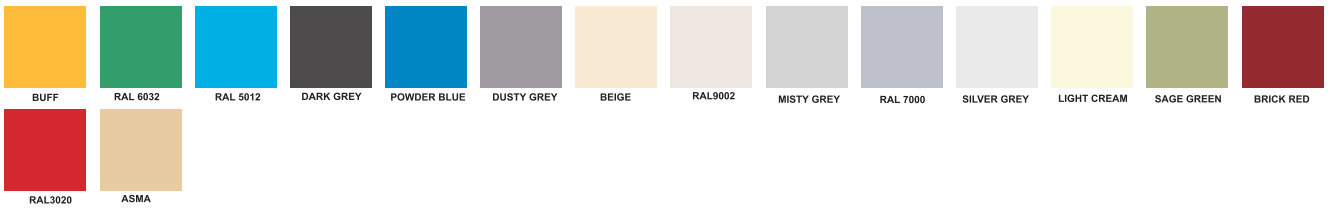


# Fosroc Flooring Systems applied at various sites:-



## FLOORING COLOUR RANGE

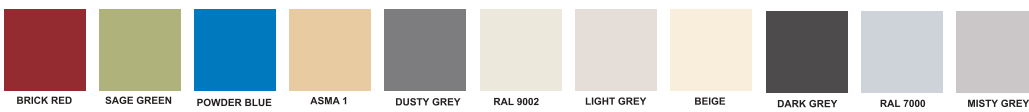
### FLOOR COATINGS



### SELF LEVELLING EPOXY FLOORING



### EPOXY FLOOR SCREED



### TRAFFICGUARD SYSTEM AND DEKGUARD PU



Note: all the colours are for reference only, refer to applied samples for actual colours.

Fosroc offers a full range of construction chemical solutions, helping to protect structures throughout the world. Please refer to our brochures, which include:



Details of your local Fosroc office can be found at [www.fosroc.com](http://www.fosroc.com)

**Important Note**

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation, specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products, whether or not in accordance with any advice, specification, recommendation or information given by it.



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