

Environmental Health & Safety Report

Flowcrete manufactures seamless thermosetting plastic based floor and wall solutions, which are to be found in sensitive environments where hygiene is paramount such as operating theatres, food processing areas as well as the pharmaceutical and electronics industries. Flowcrete systems can also be found in other types of industrial buildings and commercial environments such as retail centres, stadia, schools, airports and hotels.

Summary

The use of thermosetting plastics as a surface coating to protect concrete has several advantages. By contacting Flowcrete or one of Flowcrete's approved licensees, it is possible to achieve surfaces with the following characteristics:

- Long service-life
- Hygienic advantages
- High wearing strength
- High mechanical and chemical strength
- Low maintenance costs
- Antistatic characteristics, etc.

Surfaces are installed by well-trained personnel authorised by Flowcrete, who are familiar with our products. This guarantees a high level of quality and ensures selection of a preferred functional and aesthetic solution can be made with complete confidence.

General

Thermosetting plastics can be custom designed for a wide range of purposes to meet a very wide range of requirements. The excellent characteristics of hardened products are largely responsible for this, for example:

- Excellent adhesive capacity
- Rapid installation
- High strength
- Good resistance to chemicals
- Good electrical insulation capacity

Suitable Applications

Thermosetting plastics have been used for a long time in different applications and in a large number of products we come into daily contact with:

- Household products
- Sports products
- Home electronics



- Computers
- Medical applications
- Aircraft
- Paint
- Flooring
- Filler and jointing materials, etc.

Examples of epoxy resin applications include the lining of tin cans and in composite materials in combination with, for example, glass fibre.

Thermosetting Plastics - Protection for Concrete

In the construction industry it is possible to achieve significant advantages through the use of thermosetting plastic products as surface coatings. These coatings are executed to a high quality standard and allow adaptation of functionality and aesthetic appearance to meet client requirements. Thermosetting plastic coatings can be applied in very thin layers (100 µm) up to several centimetres in thickness.

In accordance with the fundamental principles of product selection - that the most environmentally-friendly alternative should always be preferred - public authorities in co-operation with international trade organisations have established guidelines for what this implies in terms of surface protection.

There are therefore good reasons for using thermosetting plastics as surface coatings in environments subject to a number of special requirements:



- Material strength
- Hygiene
- Water and chemical resistance
- Minimum maintenance
- Good sealing, low porosity, etc.

Flowcrete's floor and wall systems are developed to protect surfaces subject to demanding technical specifications, and where the finished surface should provide both added value as well as environmental and economic benefits in comparison with other alternatives.

The Chemistry of Thermosetting Plastics

Thermosetting plastics cannot be melted without destroying the transverse structure and are for that very reason called thermosetting plastics, as opposed to thermoplastics which can be melted and shaped to form another structure. The group of thermosetting plastics includes epoxy plastics, unsaturated polyester plastics, polyurethane, acrylic plastics, cyanoacrylate plastics, phenol plastics and amino plastics.

The Chemistry of Epoxy

Epoxy plastics belong to a group of substances called polymers. They are manufactured from two components: a base component consisting of epoxy resin, and a hardener component consisting of different types of amines.

In addition there are also various additives in the base component and hardener, such as reactive thinners, pigments, fillers and other additives. These additives modify the epoxy plastic to suit the application in question. When the base and hardener are mixed there is a chemical reaction which forms a transverse structure: epoxy plastic.

The Chemistry of Polyurethane

Polyurethane plastics can be both single and two-component products. Single-component products consist of an isocyanate that is moisture-hardening, which means that it absorbs moisture from the air

resulting in it hardening, whereas two-component products are mixed together from a base component, which is generally a naturally modified vegetable oil, and the hardener, which is an isocyanate.

The Chemistry of Acrylics

Acrylic products used for flooring often contain methylmetacrylate as a binding agent. Once the hardener is added – a peroxide – the acrylate's double bonds are unlocked and a polymer is formed. The advantage of these products is that they harden rapidly and the floor is ready for use after just a few hours.

The Chemistry of Vinyl Ester

Vinyl ester hardens with a reactive monomer, generally with the help of an organic peroxide. The reactive monomer is styrene. For hardening to occur at room temperature an accelerator in the form of, e.g., cobalt salts, is added.

Environmental Impact of Substances Contained in Unhardened Thermosetting Plastic

The greatest health risk when working with unhardened products, such as epoxy resin, acrylate plastic components, solvents and certain hardeners, is the emergence of skin allergies and allergic reactions.

These can develop through direct contact with liquid products. Many of the hardeners are also aggressive on direct contact with the skin or eyes.

In the case of polyurethane products and solvents, in addition to the health risks alluded to above, there is also a risk of incurring irritation to the respiratory passages and other mucous membranes, which is why breathing protection is required when working with some of these products.

Liquid low-molecular epoxy resins, some reactive thinners, and various types of amines in the hardener component are not straightforwardly biodegradable.

They can accumulate in the environment, and some are poisonous to organisms living in water. Low-molecular epoxy resins are classified as environmentally hazardous in accordance with the EU's classification regulations.

For more detailed information on the risks to health and the environment from the components involved, please refer to our safety datasheets for the respective products.

Environmental Impact of Finish Floor Coatings

The finished floor systems do not constitute any danger in terms of health or the environment. High strength and resistance to wear ensure a long service-life and reduce the need for repairs and maintenance.

The seamless surface results in significant hygienic and environmental benefits since it is easy to clean and only requires limited use of chemicals.

Environmental Benefits of Flowcrete Systems

- Our floor and wall solutions are in principle seamless and have a high degree of strength. This means that the surfaces are very easy to clean, and, if our cleaning recommendations are followed, a good working environment can be retained with the minimum use of cleaning chemicals.
- The surfaces have a long service-life and are easy to maintain and repair.
- The production and installation work is executed with a high degree of utilisation of the material, resulting in a minimum of wastage.
- All our approved licensees receive ongoing training in the handling of thermosetting plastics and dealing with the attendant packaging and waste.
- During repairs/renovation the existing surface provides an excellent substrate for the new layer, and can therefore be reused during the service-life of the building – which ensures long term environmental benefits.
- When the building is finally demolished the thermosetting plastic coating can be used together with the concrete as hardcore material.
- A number of Flowcrete coatings are fire safety approved (see system datasheet for more information).
- Transportation of the products is included in Flowcrete Sweden AB's logistics programme in terms of the optimisation of resource management.

Further information on Flowcrete Systems can be obtained from our technical datasheets for the respective products.

Waste Handling

Residual unhardened material constitutes hazardous waste and must be handled in accordance with the appropriate national legislation. Unhardened material must not be released in the sewage disposal system or watercourses.

The hardened product is not to be considered as hazardous waste, however, and can either be incinerated in an approved plant, used as hardcore, or deposited in a landfill. Incineration enables energy to be recovered from the material.

Packaging

At Flowcrete we believe that all companies selling packaged products are liable to take responsibility for collecting and recycling the packaging materials which they bring onto the market.

We have begun to push bulk supply of materials in favour of full pack systems. This means that wherever possible we supply our goods in reusable UN certified 1000 litre intermediate bulk containers (IBC's) and 200 litre drum containers. Through the introduction of IBC's to our despatch processes we have managed to reduce our consumption of transportation fuel for



every litre of material sold. We currently offer our UK based clients an IBC Collection Service through the Schutz system to make bulk sales more appealing.

In Sweden, five materials-handling companies have been formed to facilitate simple handling and recycling. The collection system is financed by packaging charges paid to the materials-handling companies' joint subsidiary REPA. Flowcrete Sweden AB is affiliated with REPA. We pay packaging charges and thereby fulfil our producer liability for recycling of our packaging materials.

Information on Flowcrete Quality

Flowcrete is certified to ISO 9001. In addition, Flowcrete Sweden AB is certified in accordance with ISO 9001 and ISO 14001.

Environmental Health and Safety Aspects

In terms of health and the environment, the sensitive stages relate to the manufacturing of the components and the installation phase of the thermosetting plastic coating. For this reason these stages are conducted by our own personnel and our authorised contractors and partners. They are all trained in the handling of thermosetting plastics and follow the regulations and general recommendations as set by local legal authorities and Flowcrete. The impact on the environment and health is therefore minimised, and there are only a small number of people exposed to the risks involved in production and installation of thermosetting plastic coatings.

Once a Flowcrete floor and wall system has been installed, there are a large number of people able to benefit from an improved working environment, both in terms of hygiene and comfort.

In order to give the greatest possible consideration to the environment and health, Flowcrete has implemented the following procedures:

- Flowcrete guarantees the safe manufacturing of its products, both in terms of qualitative characteristics and the impact on the environment during production and transportation.
- We have trained and approved specially selected contractors, so that they meet the requirements on installation work set out by the Flowcrete Group.
- We conduct inspections at the workplaces to ensure that our instructions are followed and that the quality is of the required level.

Quality Policy

Flowcrete is a company of global standing supplying flooring that is both suited to its purpose and inspirational for users.

It is Flowcrete's policy to:

- Supply products and service provisions that meet all our customers' expectations.
- Attain recognition as an organisation of high quality in terms of its personnel, products and

service.

- Ensure customer satisfaction through the continued development, improvement and assessment of the products and the service we provide ensure that all our employees have clear and attainable goals, are well trained and motivated to do their best to meet the needs of the company
- Provide the preconditions to set and revise goals and objectives
- Maintain a quality management system based on ISO 9001:2000 and regularly evaluate its functioning

In its relevant areas, the above represents a commitment on the part of all employees within our company. This means that everyone has a responsibility to ensure our customers get the quality they expect of our products and services.

EHS Policy

Flowcrete is a company of global standing supplying flooring that is both suited to its purpose and inspirational for users.

Flowcrete is continually prioritising and improving environment, health and safety, so as to prevent serious accidents and achieve durable sustainable development.

Important aspects relating to environment, health and safety are the handling of chemicals during manufacture and the application of seamless surface systems.

Flowcrete strives for:

- A safe and healthy working environment where the priority is the physical and psychological health of its employees.
- Continuous improvement of processes, products and transportation so as to be able to prevent risks, near-accidents and accidents, and minimise the impact on the environment. The emphasis is on an eco-cycle mindset and economy in the use of natural resources. The general public and official agencies are kept informed of hazards, preventive measures and disaster planning.
- Effective management systems for environment, health and safety, with clear-cut delegation and job descriptions. The operations of the company must be run with a high degree of safety in a good internal and external environment, and this is achieved by making continuous improvements via new goals and objectives and action programmes, as well as thorough follow-up.
- Good safety margins with regard to applicable legislation and other requirements that relate to the company.
- Training all users in safe handling of our seamless surface systems.
- The same documented requirements for suppliers and contractors relating to environment, health and safety as for the company as a whole.