Screed

The key to quality floor finish

The lifespan and functionality of flooring, whether the material used is ceramic, stone, textile, resilient or wood, are highly dependent on the characteristics of the substrate on which it is installed. These properties must be defined according to various factors, such as the final use of the flooring- the floor loading and traffic, environmental conditions, the type of floor finish, the condition of the subfloor compressibility of the underlying layers and any deflections in the concrete floor slab.

A screed is a key to the quality flooring, and it has to guarantee that it will be a substrate adequate for a specific flooring and that it's durability is not affected by various conditions e.g., interior or exterior floor, commercial or industrial flooring, etc.

When choosing which product to use to make the screed- a special binder, pre-blended, pumped or traditional site-prepared mortar, it is necessary to take into consideration site conditions (internal or external, the thickness to be laid, etc.), the type of floor finishing, the time required to set and the time required before installation of finishing floor.

Screed Characteristics

A screed is usually a strong cementitious material laid on the subfloor to provide the levelled and smooth surface for the final finish. It is also used when installing the underfloor heating. Screed mix is made from a 1:3 to 1:4 ratio of cement to sharp sand. The architect or structural engineer has to specify the thickness and the type of the screed. It will influence the method of application and type of screed. The thickness of screed must be increased accordingly to the floor load and traffic levels. Optimal screed thickness is of 60-75mm. The screed may be reinforced with the fibre or plastic particles if floor loading requires that. Moreover to distribute loads and prevent cracking the reinforcement mesh can be inserted at the mid-point of the screed.

The most common, simple mix of cement and sharp sand is efficient for basic requirements, but there is a range of new compounds suitable for more demanding applications. The special compounds can be laid on substrates other than concrete or to create strong screeds that are less than 20mm thick- mostly compounds which consist of latex or epoxy. Moreover, there are available ready-mixed screeds delivered by a lorry with added retardants to delay the set. Lastly, there are pumped screeds that contain gypsum (mostly a calcium sulphate or an anhydrite compounds) that can be pumped into place to achieve very level finish, more susceptible to water damage. Pumped screeds cost more per cubic metre than a cement mix, but they are much faster to lay and achieve the thickness of 35- 50mm, whereas a traditional screed needs to be at least 65mm deep. Such applications are always done by specialists and have to dry out completely. The actual pumping process is very fast.

Screeds classification

We can distinguish between unbonded and bonded screeds. An unbonded screed is laid by using a separation between screed and subfloor in the form of PVC sheets or polyethene, which act as a vapour barrier and prevent deformations. An unbounded screed of less than 50mm must be designed using a specific mix to ensure it is strong enough. To allow foot traffic, it must be at least 35mm thick. The most common are unbonded screeds, 60 to 75mm thick which can be laid any time after the slab has been constructed. The subfloor is covered firstly with damp proof membrane and insulation, and then screed is laid. Each area of a screed should be kept possibly rectilinear, and movement joints need to be incorporated at all changes of level, structural elements and fixed points. Movement joints control cracking.

Bonded screeds are used when there is not enough space (less than 35mm) to lay the unbonded screed. Such screeds bond to the underlying subfloor and are usually thinner. Sometimes a chemical agent is applied before laying a screed to ensure a proper bond.

Moreover, there are floating screeds and heated screeds. A “floating” screed is an unbonded screed laid on a layer of thermal insulation (expanded polystyrene or polyurethane panels) or soundproofing. The minimum thickness of floating screed is 40-50mm. It is required for soundproofing systems, for instance, to reduce the noise of footsteps.

A heated screed is a floating screed with the underfloor heating system in it. The thickness of screed above the UFH system should be at least 25 mm with a reinforcement mesh inserted in the screed. Usually, the thickness of the screed above UFH system pipes should be as thin as possible to allow for quick heating up and cooling down of the floor. However, it is recommended to check the manufacturer guidance on the required screed thickness. The size of the mesh will depend on the total thickness and loads.There are special compounds screeds designated for the UFH systems to prevent cracks due to temperature changes.

A screed has to dry slowly. The setting process of the screed should be approximately a day for millimetre depth, so roughly 70 days is the standard time recommended. The plasticisers allow waiting times to be reduced compared with the times required for screeds made using traditional materials. However, it is still quite a long time. Binders are required, therefore, which allow mortar with long workability times and which are easy to apply to be used for the substrate, while at the same time allow floor coverings to be installed after just a few days. In the case of the underfloor heating, it is recommended not to use it for a month, then putting the heating on at its lowest setting, turning it up by 3°C per day until the working temperature is reached.

Most screeds can achieve a high-quality finish. BS 8204-1:2002 is the code of practice for cement-based screeds, and it defines surface regularity standards. The standard of screed is dependant on the finish floor material. Standard quality is enough for ceramics or stone using thin-bed adhesive. For thinner materials such as vinyl, an even and blemish-free finish is needed. The self-levelling floor is the perfect solution to achieve the perfectly even surface.

Laying floor screed

A defect free screed can be achieved if appropriate measures are taken. First of all, it is important to choose an adequate aggregate. If it is too fine, more mixing water will be required, and surface porosity of the screed will be reduced. As a result, drying times for the mortar will be longer, and there is a higher risk of shrinkage cracks. Secondly, the levelling strips should be made from the same binder as for the screed. If screed lying has been interrupted for more than 1hour or if the levelling strips have hardened, cold joints must be made by applying bonding slurry. In cases where pipes are in the screed, all should be covered with the at least 2.5cm thick layer of mortar. The reinforcing with mesh is also recommended. Finish the surface by levelling using float or another tool. Check joints approximately every 16-25m2 can be done when screed is still wet. The residual moisture can be checked with the special tool if the setting process is completed. Any cracks which occur after screed is set can be fixed with special sealers before installing the flooring.

Screed defects

Cracks - the most common defects mostly caused by too much water in the mix, too fine aggregates used, too much binder in the mix, no movement joints or second pours without applying bonding slurry beforehand between the hardened screed and the new, fresh mortar.

Cracks around pipework - caused by not enough layer of the screed (less than 2.5cm) over pipes and when the reinforcement mesh has not been positioned correctly.

Dust - caused when too much water was added to the mix, there was excessive tamping or excessive watering of the surface at the final step.

Crumbles - crumbles on the screed surface occurred when the water evaporated too quickly due to high temperature. Other causes of a soft surface are incorrect mixing and compacting, a sudden drop in temperature below 0°C before the screed has set or due to rain.

Moisture or standing water - this defect is caused by too much water in the mix, too fine aggregates, no vapour barrier under the screed, excessive watering of the surface.

Damp - occurs if the vapour barrier was not installed correctly.