TARMAC

QUICK DRYING FLOWING CEMENTIOUS SCREEDS

SOLUTION GUIDE

CONTENTS

Our approach to construction encompasses innovative sustainable products, sustainable systems and practical solutions.

We recognise the important role we have in promoting sustainable construction by optimising our products, their use and whole life performance. This document is one of a suite that identifies specific construction solutions that can help deliver a sustainable built environment. They explore the details of each system, its benefits, how it can be implemented and its sustainability performance.

This guide introduces 'Quick Drying Flowing Cementitious Screeds' which contribute to creating a sustainable built environment which is easy to build, efficient and long lasting.

Typical Applications

Any internal residential or commercial floor

INTRODUCTION

Screeds are a convenient solution to create smooth level floors ready for the application of final finishes. Applications range from new build projects where they are typically employed on top of concrete slabs or precast flooring systems to refurbishment and renovation projects renewing existing surfaces which are not fit for purpose.

An ever present demand on all projects is the maintaining, catching up or enhancement of programmes with the issue of curing and drying of screeds regularly overlooked. Typically it can be 2 to 3 weeks before follow on finishes can be applied to traditional sand cement screeds and in excess of 5 weeks for other flowing screed products. Quick drying flowing screeds offer the construction benefits of flowing screeds without the compromise of drying times and can, in certain cases, allow more rapid trafficking than traditional screeds.

CASE STUDY

TOBACCO WAREHOUSE
LONDON DOCK

The prestigious Annual Berkeley Homes Ball was to be held on 21 April 2016 in the basement of a listed 18th Century Tobacco Warehouse, resulting in the largest ever Topflow Screed C Belitex pour.

In order to host the ball and provide a suitable floor for the staging of the event significant remedial work was required to level out the existing uneven floor. The room was required to be ready to be handed over to the events company by 8 April with the contractor, Conneely Dry Lining, contacting Tarmac on 1 March, resulting in the need for a rapid turnaround. The solution was to utilise Topflow Screed C Belitex due to its improvements in construction and drying time.

The basement floor itself varied in condition resulting in different solutions utilised in different areas. Screed depth ranged from 30mm to 75mm dependent on the level of unevenness with the welfare completed at 30mm and the dining area and bar at a minimum of 40mm. Work on the welfare area was completed in under 4 hours with a placement rate of over 50m^2 per hour for the 200m^2 space. In the dining and bar area over 168m^3 of screed was placed covering a 420m^2 with work starting in the morning and completed by early afternoon. In both cases the screed had dried and gained enough strength to take foot traffic in under 24 hours allowing follow on works to commence. The result was only possible due to the use of the quick drying flowing screed Topflow Screed A Belitex and its unique ability to seal in moisture after 14 days[1].

Tobacco Warehouse

LOCATION	LONDON DOCK, SHADWELL
CLIENT	CONNEELY DRY LINNING
MAIN CONTRACTOR	BERKELY HOMES
PROJECT DATE	2016

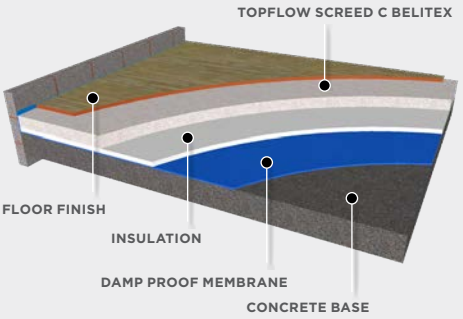
TECHNICAL DESCRIPTION

Topflow Screed C Belitex is a flowing, quick drying, self-compacting cementitious screed encompassing characteristics of traditional cementitious and anhydrite screeds.

It is designed to provide a smooth level surface in commercial and domestic buildings prior to the application of final floor finishes and is suitable for use with underfloor heating.

Its utilisation is limited to applications where it will only be subjected to pedestrian traffic, it can receive foot traffic after 48 hours and is suitable for unbonded or floating applications. Topflow Screed C Belitex can be laid thinner than traditional sand cement screeds, offering a self-compacting, self-curing solution that reduces construction time and material use. Floor coverings can be laid within 14 to 21 days and due to low shrinkage construction joints can be reduced offering increased flexibility in final surface coverings.

FLOATING



UNBONDED

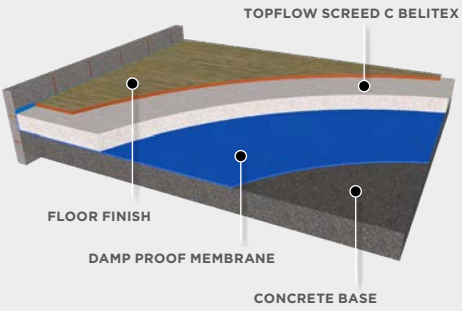


TABLE 1

FLOWING VS TRADITIONAL SCREED PERFORMANCE COMPARISON

PERFORMANCE	TOPFLOW SCREED C BELITEX	TOPFLOW SCREED A (ANHYDRITE)	TRADITIONAL SAND CEMENT
FLOW/SLUMP RANGE	250-280mm	230-280 mm	
FLUIDITY / OPEN LIFE	2 hrs	2 hrs	
COMPRESSIVE STRENGTH (28 DAYS)	20 N/mm^2	25 N/mm^2	20 N/mm^2
FLEXURAL STRENGTH (28 DAYS)	4 N/mm^2	4 N/mm^2	2 N/mm^2
DRYING SHRINKAGE (28 DAYS)	200µm/m	200µm/m	
THERMAL CONDUCTIVITY	1.7 w/mK	2.0 w/mK	1.1 w/mK
PLACEMENT RATE	120 m^2/hr	200 m^2/hr	100-150 m^2/day
FLOOR COVERING	14 - 21 days	Nominal 50mm - 60 days	1mm per day

SYSTEM PERFORMANCE

PROGRAMME ENHANCEMENT

In comparison to conventional sand cement screeds and anhydrite screeds Topflow Screed C Belitex delivers reliability and improvements to construction programmes. Drying times exceed those expected from conventional sand cement screeds as moisture is sealed after 14 days[1]. This minimises further moisture loss and shrinkage removes the risk of damage to subsequent floor finishes if they are applied prior to complete drying.

Topflow Screed C Belitex provides many of the benefits associated with anhydrite screeds, but without the extended drying times which mitigates the risk of programme disruption. In both cases the utilisation of this solution enables follow on trades to commence sooner with reduced risk.

FAST TRACKING OF CONSTRUCTION

Self-compacting screeds can signifi antly improve construction speeds as they employ a simplified placement methodology, can be delivered on demand and without the requirement for onsite mixing or space for storage.

The flowing nature of self-compacting screeds mean that they require less manual manipulation in placement, with time intensive activities of screeding and tamping associated with a conventional screeds avoided. These properties enable up to 120m^2 to be placed per hour compared to 100 to 150m^2 per day for sand and cement screeds. Combined with the assurances that can be provided on programme delivery opportunities can be exploited to reduce project times and associated overheads.

MATERIAL EFFICIENCY

Topflow Screed C Belitex can be laid thinner than conventional sand and cement screeds enabling a reduction in material quantities and those materials used to go further, minimising demands on resources. The need for a self-levelling compound associated with conventional screed is removed due to the SR2 quality finish that can be achieved minimising additional materials and resource depletion.

HOMOGENEITY

The flowing nature of a self-compacting screed enables it achieve full compaction without the need for external energy input guaranteeing homogeneity and offering improvements in quality and longevity[2]. The quality of conventional sand and cement screeds are dependent on the skill and physical strength of the operative carrying out placement and it is inherently difficult to determine level and quality of compaction. Inadequate and poor compaction can result in defects that require additional remedial activities and if undetected can have a detrimental effect on lifespan.

EFFECTIVENESS OF UNDERFLOOR HEATING

Underfloor heating solutions offer improvements in the thermal comfort of building occupants compared to traditional heating systems whilst utilising lower energy supply systems[3,4].

The increased thermal conductivity of Topflow Screed C Belitex (1.7 W/mK compared to 1.1 W/mK for sand cement screeds) and reduced cover requirements for pipework enables and the system to react faster to occupant demands and the maintaining of thermal comfort[5].

Guaranteed homogeneity increases the effectiveness as any air pockets can act as barriers to slow heat transfer (air thermal conductivity is 0.024 W/mK), delivering benefits in operational efficiency[6,7].

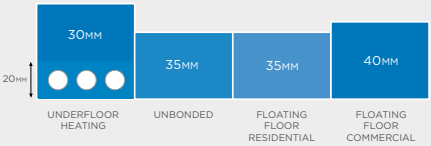
LOW SHRINKAGE

A lower shrinkage than conventional sand and cement screeds enables areas of up to 250m^2 to be constructed without the requirement for jointing. This offers reductions in joint maintenance requirements, an increased flexibility in floor covering options but also reduces on site activities and materials required to create joints.

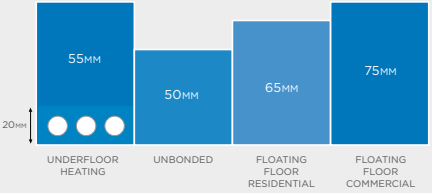
HEALTH AND SAFETY/ SIMPLIFIED CONSTRUCTION

The selection of a flowing screed over a conventional sand and cement screed simplifies the construction process removing the screeding and compaction processes[8]. These traditional activities are labour intensive and can be undertaken for an extended periods of time, with flowing screeds a simplified less intensive finishing process is employed undertaken in a more natural stance.

TOPFLOW SCREED C BELITEX
SCREED THICKNESS



SAND/CEMENT
SCREED THICKNESS



ONSITE APPLICATION

As a flowing screed the installation of Topflow Screed C Belitex requires a significant change from traditional sand cement screeds methods. There are a number of key criteria which are required to be followed to ensure that the screed is successfully installed and to provide a durable and long lasting solution.

TABLE 2

FLOWING VS TRADITIONAL SCREED PERFORMANCE COMPARISON

PRE-INSTALLATION	
SITE CONDITIONS	Topflow Screed C Belitex must only be installed in a weather tight environment. Installation should only be carried out once all windows and doors are in place or with each opening sealed with polythene. Internal temperatures should be kept above 5°C during installation and for 48 hours after installation.
JOINTING	Whilst possessing low shrinkage characteristics there still remains a critical need for effective joint control to ensure longevity and quality. Around the perimeter and any embedded items expansion joints should be used. At all openings crack inducers should be used to avoid uncontrolled cracking.
CONTAMINATION	The floor itself and all tools and equipment to be used for installation should free and clean from other cementitious or anhydrite based products. Contamination by these substances can lead to rapid setting and negative effects on shrinkage characteristics.
INSTALLATION	
PUMP PRIMING	Priming of the pump should never be carried out with a cementitious slurry as this can lead to a flash set. A 50/50 mix of Topflow Screed C Belitex and water should be used, captured and discarded prior to the commencement of installation.
ACTIVATION AND DAPPLING	Prior to the application of the activator the screed should have a single pass with the dapple bar. Activator should be applied to the screed at a rate of no less than 1 litre per 20m^2. A final pass with the dapple brush to full depth should then be applied with care taken to not over finish the screed or refinish as this can have negative effects on final levels.
POST-INSTALLATION	
SITE CONDITIONS	Once placed and finished the room is required to be sealed for a minimum of 24 hours (48 hours in winter). After this period doors and windows can be opened to provide ventilation to assist in the drying process but should be closed overnight.
SURFACE COVERINGS	The screed will be ready to accept ceramic floor coverings after 14 days and when its relative humidity is 75% or less. All other surface coverings can be applied after 21 days.

SUSTAINABILITY

Utilising a quick drying flowing cementitious screed solution offers environmental improvements to be made in all internal flooring applications when used in place of traditional solutions.

Material Efficiency

Topflow Screed C Belitex can be laid thinner than traditional sand cement screeds which enables less material to go further improving the material efficency of the solution.

Resource Depletion

The use of finite resources is a key issue when considering the selection of construction materials and solutions. Topflow Screed C Belitex in providing a high quality finish reduces the demand on additional products to provide a final flat finish to accept final floor coverings, reducing finite material demand.


TOPFLOW
SCREED C BEJITEX

RECYCLING

The concrete industry has taken significant steps to improve its performance in terms of material reuse, reducing the depletion of abiotic resources, increasing energy efficiency and reducing carbon emissions. Significant improvements have already been achieved compared to the industry's 1990 baseline[9].

With respect to material reuse and the depletion of abiotic resources, concrete readily utilises recycled and secondary materials along with cement replacements. This has enabled the industry to be a net user of waste, using 107 times more waste than it generates[9], and concrete itself is also highly recyclable[10].

BES 6001*

Tarmac has achieved an 'Excellent' rating for all its production sites and products. The independent third-party scheme assesses responsible sourcing polices and practices throughout the supply chain[11].

BES 6001
Responsible Sourcing
www.greenbooklive.com

ISO 14001

Tarmac is fully accredited with ISO 14001, having implemented Environmental Management Systems throughout our business, maintaining our commitment to reducing our environmental impact[12].

BREEAM

Tarmac products can support and demonstrate their sustainable credentials by contributing to the awarding of credits in the BREEAM scheme, the following table details key areas where credits can be awarded[13].

CREDIT	SUPPORT
Man 03: Responsible Construction Practices	Tarmac's Carbon Calculator has the capability to determine and provide data relating to the CO_2 arising from the delivery transport.
Mat 03: Responsible sourcing of materials	Ready-mixed products are primarily constituted of locally available materials. All ready-mixed productsproduced by Tarmac are BES 6001 "Excellent" accredited.
Mat 01: Life Cycle Impacts	We have a range of products and solutions which match or can be tailored to match and satisfy specifications linked in the Green Guide. We are also able to provide EPD to support the awarding of further credits.

Tarmac concrete products offer the ability to conform with a wide-ranging number of assessment criteria in both BREEAM and CEEQUAL. For more information contact Tarmac sustainability team.

Our BES 6001 certificate number for our readymix concrete products is BES 559207.


PEOPLE
Safety and health
Our people
Community involvement


PLANET
Climate change
Environmental stewardship
Resource efficiency


PERFORMANCE
Economic value
Governance and ethics
Communication


SOLUTIONS
Sustainable supply chain
Innovation and quality
Sustainable construction

OUR SUSTAINABILITY STRATEGY

Sustainability is about securing long-term success for our business, customers and communities by improving the environmental, social and economic performance of our products and solutions through their life-cycle. This means considering not only the goods we purchase, our operations and logistics but also the performance of our products in use and their reuse and recycling at the end of their life. By doing this, we can understand and take action to minimise any negative aspects, while maximising the many positive sustainability benefits our business and products bring.

Using this 'whole life' thinking we have engaged with our stakeholders to develop our sustainability strategy. The strategy defines the main sustainability themes and our key priorities, those issues which are most important to our business and our stakeholders. It sets out our commitments to transform our business under four main themes: **People, Planet, Performance and Solutions**.

Building on progress already made, we have set ambitious 2020 milestone targets for each of our key priorities. These ambitious targets have been set to take us beyond incremental improvement programmes to business transforming solutions.

FOUR THEMES

Twelve key priorities

Twelve commitments

Twelve 2020 milestones

Forty four other performance targets

Our 2020 milestones are supported by a range of other performance targets. This hierarchy helps make it easier to build understanding, drive improvement and enables us to report progress in a meaningful and measurable way.

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