



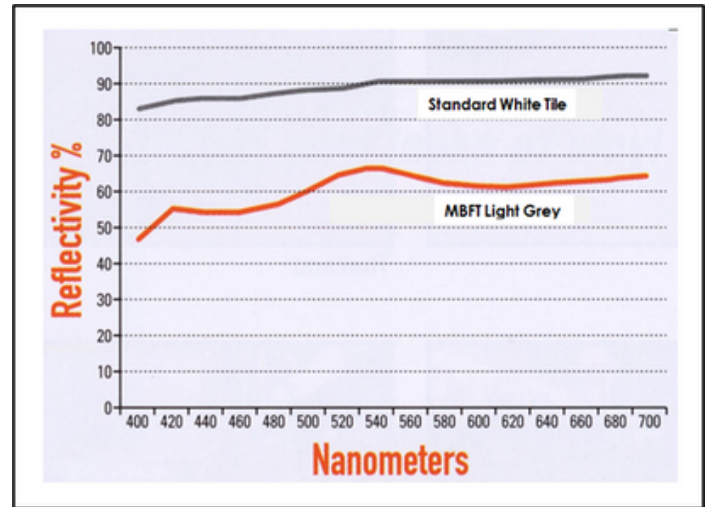
# REFLECTIONS ON CONCRETE FLOORS

The obvious choice for excellence

# Information for Architects and Engineers about fine quality Concrete Floors

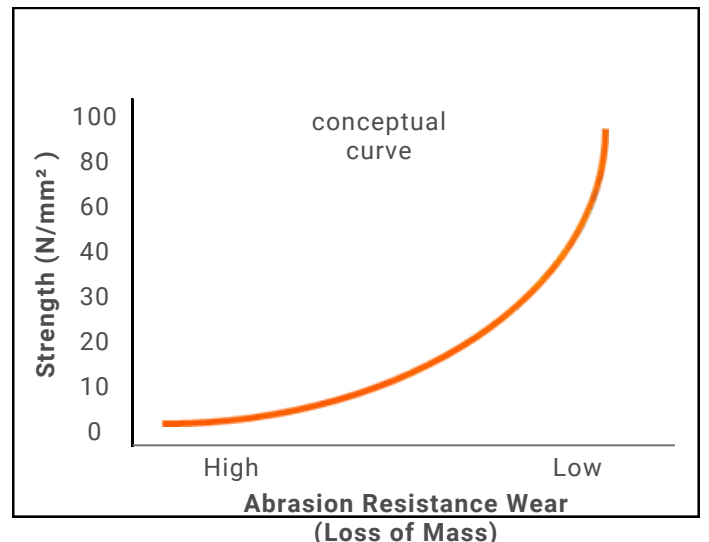
## Architectural considerations

For Architects it is the maximization of human comfort. The Texas Institute of Illumination Engineers has identified that plain concrete absorbs 60 to 70 percent of the light that strikes it. Conversely, light reflective floors can provide the level of lumens required for a comfortable working environment with lower energy light sources. Architects also like the decorative flexibility of alternative tints.



## What Engineers want

For Engineers durability and energy saving are primary objectives for their clients' satisfaction. Concrete surface beds do not achieve their design strength in the top few millimeters due to bleed water destroying water/cement ratios and therefore durability. The old fashioned "granolithic" two course system has been replaced by monolithic dry-shake hardeners. Samson dry-shake hardeners are uniquely formulated to easily combine with bleed water. This provides surface water/cement ratio which give a 60MPa surface applied to a 30MPa or 25MPa design strength concrete. See conceptual abrasion resistance curve.



Samson floor treatments combine to provide the triple benefits of high strength, colour, reflectivity and ease of cleaning.



MAKRO England



Air flight simulator,  
Singapore

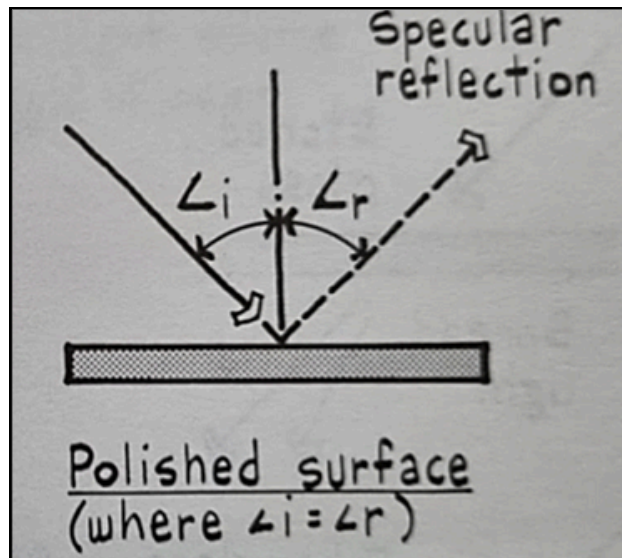
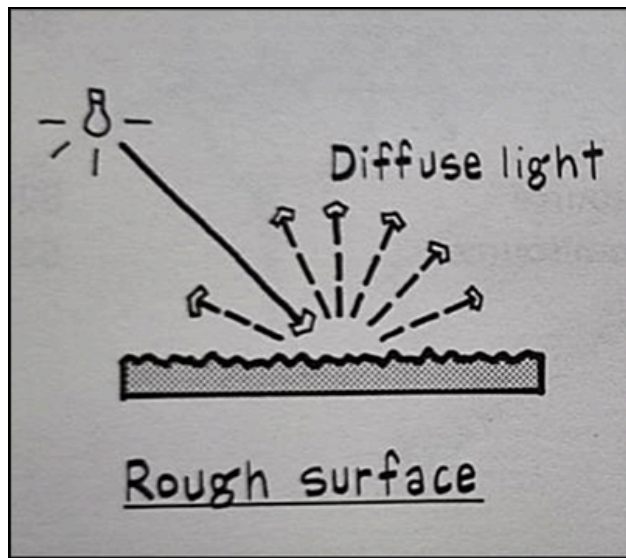


Factory floor,  
Modderfontein



## Measuring reflectivity

Colour analysis computers are capable of measuring the nano meter wave-lengths of the spectrum of light reflected from a concrete surface. The graphic representation below shows the light reflectivity of Samson MBFT dry-shake applied to a concrete floor.



## Effect of various light sources

Lighting may be sodium high-density, halides, mercury vapour or L.E.D and each of these sources will show a different spectrum and level of reflectance dependent on the shade of floor that it strikes. Samson can advise on optimal selection of floor colours.

## Examples of Samson system success

The international "warehouse" wholesalers IKEA adopted Samson light reflective floor hardeners for their project at Damansara Mutiara in Kuala Lumpur, Malaysia. The light levels provided in the car park gave a welcoming arrival experience which IKEA considered part of their marketing image. Makro has utilized the Samson system internationally in over 55 stores.



CHINA



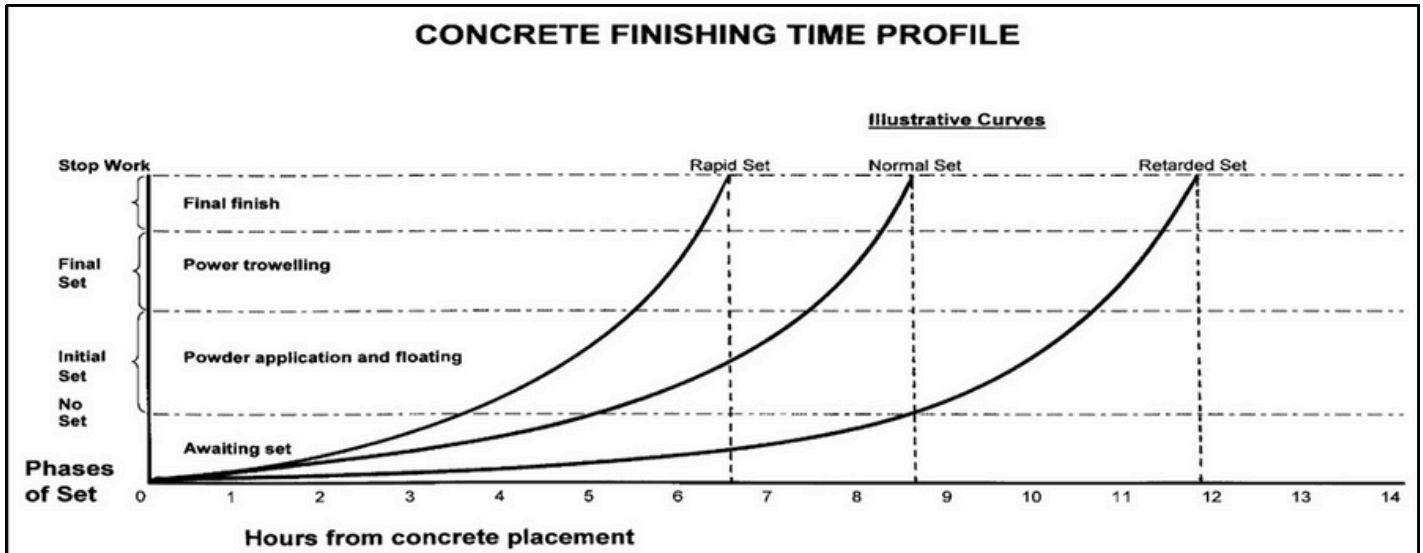
B&Q TAIWAN



Technologies cc

## The Samson system

The Samson system is comprised of the selected dry-shake hardener starting at the initial set and finishing at the final set phases of the concrete. (See graphic example of installation phases below). Samson MBFT is uniquely formulated with wetting aides and components which lower the surface friction co-efficient between the generated pastes and selected spring steel blades fitted to a six blade finishing power float to produce fine quality floors.



6-blade Powerfloat for finishing MBFT floors

Following the final finish a chemically reactive liquid densifying and curing agent, is applied and after agitation by brush the inactive residue is washed off with water. Subsequently, regular washing with normal rotary cleaning machines and even diamond impregnated pads will give a satin gloss to the floor which enhances its reflectivity.





## Sample specification

TENDER BOQ				
Item	Bill description	Unit	Bill quantity	Amount
1.1.	<p>Apply to all indicated concrete surfaces <b>SAMSON (insert selected dry-shake; insert selected colour or plain)</b> dry-shake floor hardener, added at <b>(insert selected application rate /m²)</b>.  <b>SAMSON HC Densifier</b> to be applied at the appropriate time and <i>washed off after the chemical reaction has taken place.</i>            Followed by <b>(insert selected sealer, if any)</b> after full cure of substrate (21 – 28 days).            All in accordance with the manufacturers instructions.            Supplier: SAMSON Technologies            Contact : 011 462 2666 or info@samson.co.za</p>	m²	6050	



MBFT dry-shake may be manually or mechanically applied, dependent on the Contractor's equipment

## Optional additional sealers

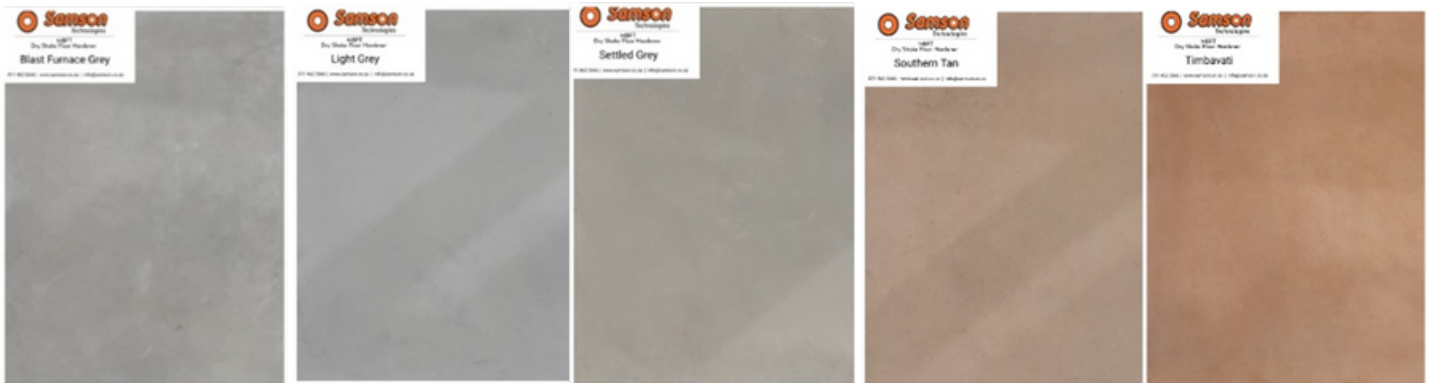
Where a non-staining water and oil penetration treatment is required (e.g. washing bays in a motor vehicle servicing facility) the following additional specification for final sealing may be added. To the finished and densified concrete surfaces apply Samson MM Sealer Siloxane at a rate of 8 to 10 square meters per liter with a suitable soft pad applicator.

MM Sealer Siloxane is a liquid repellent that renders floor non-slip when wet. When trafficked, water is dispersed to the side resulting in a better co-efficient of friction.

Where a polished gloss finish is desired the Samson MM Sealer Combo may be specified and after application by a soft pad and sufficient drying, a normal janitorial rotary polisher fitted with a suitable 3M polishing pad should be used. In some circumstances even a high speed (1000 r.p.m.) burnishing polishing machine may be specified.

## Some facts about Concrete “hardeners”

1. Only dry-shake floor hardeners can provide a 60MPa concrete at the wearing surface. The best defence against dusting, abrasion and early wear is a Samson dry-shake that is densified and appropriately sealed.
2. Liquid Densifiers (Sodium, Lithium or Colloidal Silicate) or claimed to be “hardeners” cannot increase surface strength. Densifiers however have an important role in preventing dirt adhesion and therefore ease of cleaning.
3. Water repellent sealers provide a non-slip characteristic when wet, prevent oil and fat penetration and attack from products like vinegar, wine, tomato sauce etc. All sorts of oily and acidic products found in Supermarkets and households. Dependant on the floor’s performance requirements, a Densifier may be used without additional sealers.
4. The lifetime of serviceability of a hard wearing, abrasion resistant floor is ensured by the use of a dry-shake hardener. MBFT dry-shake floor hardener offers a significant cost saving in comparison to repairs of a high traffic floor not correctly installed and treated.



MBFT is available in a wide variety of colours, a few above. Light Grey is ideal for use in Warehouses and Stores

## Selection Chart Info :

Product / Other	Product description
<b>SDS Standard dry-shake Floor Hardener</b>	Densifying and strength enhancing dry-shake treatment for concrete floor surfaces.
<b>MBFT Dry-shake</b>	Pigmented densifying and strength enhancing dry-shake treatment - 60 MPa
<b>MBFT P Dry-shake</b>	Powdered polymerized dry-shake floor hardener for improved chemical resistance
<b>HC Densifier</b>	Hydroxide conversion densifier and chemical pore blocker for fresh and hardened concrete. Aids curing.
<b>MM Sealer Siloxane</b>	Methacrylate sealer for hydrophobic induction, oil barrier and rubber grip = water repellent
<b>MM Sealer Combo</b>	Methacrylate sealer for hydrophobic induction, oil barrier and rubber grip = water repellent & can polish to sheen
<b>Siloxane Solution</b>	Injection resin to stop rising damp and for general water repellency

## SELECTION CHART

Description of floor :	1 Dry-shake floor hardener			2	3 Sealer		
	SDS	MBFT	MBFT P	HC	MM Sealer Siloxane	MM Sealer Combo	Siloxane Solution
Warehouse		5 to 7kg/m <sup>2</sup>		✓			
Shopping Centre		5kg/m <sup>2</sup>		✓	* or	* or	
Health reason to wash down/ Exposure to chemical attack		5kg/m <sup>2</sup>		✓	Yes		
Back of Store - colour not required	5kg/m <sup>2</sup> or	5kg/m <sup>2</sup> or	5kg/m <sup>2</sup>	✓			
Lodges - General/Reception			5kg/m <sup>2</sup>	✓		Yes	
Lodges - Wet areas (Kitchen/Bar etc.)		5kg/m <sup>2</sup>		✓	Yes		
Parking garages	5kg/m <sup>2</sup> or	5kg/m <sup>2</sup>		✓	* or		* or
Vehicle workshop/ Wash bay			5kg/m <sup>2</sup>	✓	Yes		
Fibre suppressant	3kg/m <sup>2</sup>			✓	* or	* or	* or
Abattoirs / Food processing / Chicken processing			7kg/m <sup>2</sup>	✓	Yes		
Dry-pack granular screed - House / Lodge			5kg/m <sup>2</sup>	✓	* or	* or	* or
Aircraft hanger		7kg/m <sup>2</sup>		✓	* or	* or	

\*Sealer optional dependent on performance requirements

# Stealth Bomber Hangar in WACO, Texas

The American Delta wing stealth bomber required a very specialized hangar.



No windows were allowed and even air had to be specially filtered with directional fans for application of perfect surfaces by spray of specialized paint. The Delta wings introduced a problem regarding lighting. Sources of light could only be placed at ceiling level. Under the shade of the wings the minimum lumens required by trade unions could not be met without bouncing light from the floor up under the wings.

David Samson was asked by the engineers to provide a solution to this problem. He acquired a book published by the Texas Institute of Illumination Engineers which helped to establish some guidelines. David then considered the spectrum of light produced by various light sources provided by General Electric. Firstly, light meters were used to establish reflectivity percentages of various concrete colours. Untreated plain concrete in clean pristine state was found to reflect 40% of the light that struck it. Immediately, there was dirt degradation (such as oil spillage) reflectivity would go as low as 20%, in other words the concrete was absorbing 80% of the light that struck it and therefore wasting the energy that was utilized to produce the light in the first place.

Ultimately, a particular grade of light grey dry-shake surfacing was selected for compatibility with mercury vapour light generation and specialized crystal parabolic light shades.

David Samson was then involved in pre-construction trials with a Mexican managed concrete floor installer. Several trial panels were laid and each of the three light sources were directed at the panels at a specified angle and then light meters used to measure the reflectivity. The blue spectrum of mercury vapour lighting was the most successful in illuminating polished metallic parts under the delta wing of the bomber.

Authorities allowed a South African onto a militarily sensitive site because he had a Canadian drivers licence. However, the Mexican contractor said to David "Gringo, you talk funny!"

Despite the South African accent the then Canadian employers of David Samson got the contract!



## Technical Data (Powder Product)

Dry-shakes put the benefit of triple blend binders where they count – at the top wearing surface of concrete floors.

Samson dry-shakes are uniquely formulated. The mathematics of optimal mechanical packing of aggregates are applied. Furthermore, specific surface area of CEM I 52,5 and that of binders down to nano-sized particles has been used to calculate proportioning.

This applies to:-

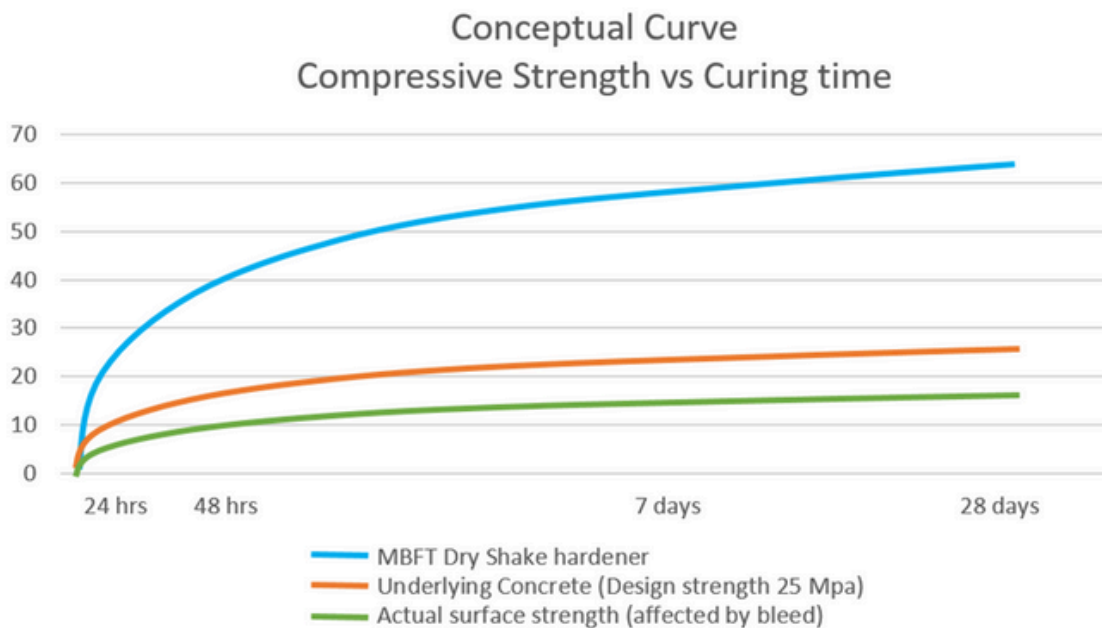
**MBFT** – moisture barrier floor topping

**MBFT P** – Polymered moisture barrier floor topping

**SDS** – Standard dry-shake floor topping

### Compressive strength:

Samson dry-shakes tested in 70mm or 50mm cubes and mixed with water to produce a 25mm slump will at full cure achieve over 75MPa. The strength development curve is reflected in the graph below. Rebound hammer testing on finished floors has indicated the strength development recorded in the second curve on the same co-ordinates. The third curve is that of the average strength development of a design strength 25MPa concrete. The fourth curve is conceptual since the surface strength of unhardened concrete varies considerably according to the skill of placing of finishing crews.



### Effect of application rates:

3 – 4 kg/m<sup>2</sup> of applied dry-shake will normally provide a surface strength of 45–55 MPa. 5 – 6 kg/m<sup>2</sup> of applied dry-shake will normally provide a surface strength of 55-65 MPa. Application of dry-shake at more than 6 kg/m<sup>2</sup> will provide a thicker depth of protection but will only marginally add to compressive strength except in the case of a concrete with high bleed characteristics.

### Curing:

Samson Dry-shakes are formulated to require no water curing, membrane forming curing compound or plastic sheeting; the application of HC Densifier ensures surface strength and the locking in of moisture required for curing.

### Packaging:

All grades of Samson Dry-shakes are packaged in 25kg moisture-proof bags.

### Shelf Life:

Properly stored in dry, cool conditions Samson Dry-shakes have a shelf life of about nine months. Where expired stock is proposed for use, the products should be pre-tested to ensure retention of properties.

# Technical Data (Liquid Products)

## HC Densifier

### Description

HC Densifier is an aqueous solution of reactive silicates and a non-foaming surfactant. HC Densifier can be applied to concrete as soon as it is hard enough not to be damaged by the applicator, or at any time deemed desirable on cured concrete.

### Advantages

HC Densifier reacts with hydroxides included in Samson Dry-shake formulations as well as those generated by the cementitious binders in the product. HC Densifier cures fresh concrete without forming a membrane.

The product is useful for the curing of dusting on concrete floors and also inhibits penetration of oil and other damaging materials. HC Densifier is useful in the process of diamond disc polishing for exposure of aggregates on concrete. (For this application request detailed information from Samson Technologies).

### Application

HC Densifier is best applied by spray onto dry concrete and then spread with a suitable soft brush or fibre mop to keep the product moving to promote thorough chemical reaction. The process of brushing or mopping should be continued for about 30 minutes and then it is important that the reacted material be removed by thorough washing with water. If during application the product thickens it may be kept mobile by the spraying on of water.

The average application rate is 8-10m<sup>2</sup> per litre but this is dependent on the porosity of the concrete being treated.

Request the Samson Technologies detailed method statements to be given to site personnel.

## MM Sealer Combo

MM Siloxane Combo is simply MM Siloxane with a hard wax component introduced to promote shine when floors treated with the product are buffed by rotary polishing machines. The main advantage of this buffable grade of sealer is that it gives a better long lasting shine when this is required for aesthetic purposes. All other advantages of the product are as for MM Siloxane above.

## MM Sealer Siloxane

MM Siloxane is simply a siloxane with an added dissolve methacrylate resin.

### Advantages

The methacrylate resin component provides a surface membrane in addition to the penetration of the siloxane. This makes the product more effective where fatty products, oils, mayonnaise or alcohols are likely to be spilled onto the floor. The methacrylate component also introduces a non-slip characteristic to wet concrete floors.

## Siloxane Solution

Clear penetrating treatment for inducing water repellency.

### Description

Siloxane Solution is a solvent carried reactive siloxane for use on concrete and other mineral based materials. (Not suitable for marble).

### Advantages

By repelling ingress of liquids (such as; water/soft drinks/wines/vinegar/etc.) Siloxane Solution helps prevent staining and acid degradation of concrete floors. The product leaves no membrane and on evaporation of the solvent leaves concrete looking untreated except for its liquid repellency. When wetted concrete treated with Siloxane Solution does not change colour and liquids can be easily mopped up.

### Application

Siloxane Solution is best applied by spray and then spread with a fibre mop to prevent pooling. On Samson Dry-Shake treated floors the application rate is 10-15 m<sup>2</sup> per litre.

### Precaution

The solvent used in Siloxane Solution is flammable and good ventilation is required to prevent applicator discomfort.

All Liquid products :

### Packaging

25lt and 5lt Polycans.

### Shelf life

Indefinite, if properly stored