CONCRETE
SikaFume®-50 S

MICROSILICA ADMIXTURE FOR ULTRA-HIGH PERFORMANCE CONCRETE

BUILDING TRUST

THE POWER BEHIND THE PERFORMANCE

Clients, specifiers and contractors have a wide variety of construction requirements that require technologically advanced concrete delivering high strength and high performance in many different applications.

SikaFume®-50 S when added to concrete changes the rheology and reacts with the cement hydration products to dramatically improve concrete strengths, durability and impermeability, allowing concrete to be used in environments where performance demands are high.

APPLICATIONS

SikaFume®-50 S can be used to produce microsilica concrete which can be utilised in all forms of construction including:

- **Residential projects**
- **Transport infrastructure**
- **Coastal protection barriers and general marine environments**
- **Power plants**
- **Commercial and high-rise office buildings**
- **Material recycling plants**

IYLO BUILDING, CROYDON:
Uses SikaFume®-50 S

HOW IT WORKS

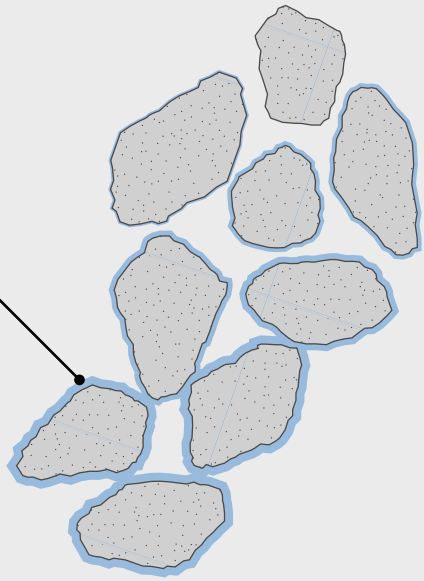
KEY TO THE PERFORMANCE OF ANY CONCRETE IS THE INCLUSION OF ADMIXTURES IN ITS MIX DESIGN. SikaFume®-50 S IS A CONCRETE ADDITIVE BASED ON SILICA FUME TECHNOLOGY.

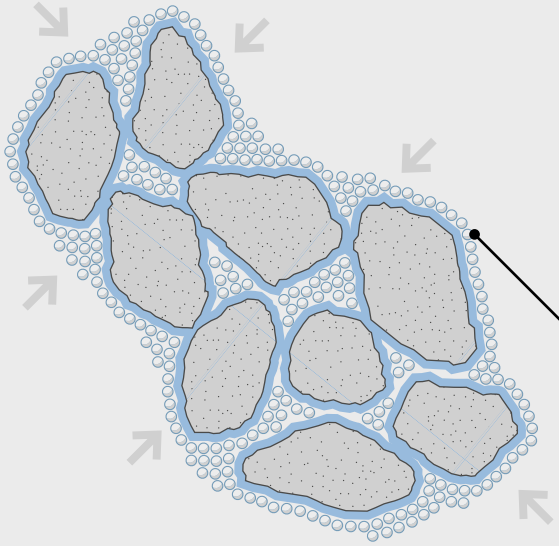
It is a mineral admixture composed of very fine solid glassy spheres of silicon dioxide. It is a by-product of the industrial manufacture of ferrosilicon and metallic silicon in high-temperature electric arc furnaces. Silica fume particles have a diameter of less than 1µm; about 100 times smaller than the average cement particle.

1. Pozzolanic action

A chemical reaction takes place between the free lime $Ca(OH)_2$ in the cement paste and the silica fume particles, which results in the formation of an additional calcium silicate hydrate (CSH) gel, the glue that holds the concrete constituents together.

The formation of this extra binding force within the gel increases the compressive and flexural strength of the concrete.





2. Void reduction

The fine particles of SikaFume®-50 S fill the tiny voids and capillary pores within the cement matrix, and significantly reduce porosity to produce an extremely dense and impermeable concrete.

ADVANTAGES

THE POZZOLANIC AND MICRO-FILLER EFFECT OF SikaFume®-50 S IMPROVES MANY PROPERTIES OF CONCRETE HELPING WITH ITS DURABILITY INCLUDING:

Abrasion resistance

Concrete containing silica fume has very high abrasion resistance. In floor and pavement construction it increases durability in high-traffic areas. Its use saves money and time and improves operational efficiencies for the facility operator.

High strength

Compressive strengths are dramatically increased for high performance concretes. SikaFume®-50 S in conjunction with Sika superplasticisers are used to produce very high strength concrete. It is also much easier to pump concrete up the high rise buildings during construction.

Corrosion resistance

The reduced permeability of silica fume provides protection against intrusion of chloride ions, thereby making it ideal for applications where concrete will be required to resist chemical attack.

Sulphate and chemical resistance

Concrete containing silica fume has a low penetrability and high chemical resistance that provides a higher degree of protection against sulphates.

Freeze-thaw resistance

Decreased permeability gives the concrete excellent freeze-thaw resistance because less water is trapped inside the cement paste.

Heat reduction

A higher rate of loss of heat from the outer surface of concrete causes cracking. Cracking is dangerous due to many reasons like reduced strength and reduced durability. Replacing cement with silica fume and observing the efficiency factor of silica fume, a lower maximum temperature rise and temperature differential will take place for concrete with the same strength.

COMPLETING THE SYSTEM

SIKA PROVIDES NUMEROUS ADMIXTURES AND ADDITIVES FOR USE IN CONCRETE PRODUCTION. SikaFume®-50 S CAN BE USED WITH A VARIETY OF OTHER SIKA ADMIXTURES TO ENHANCE SPECIFIC PROPERTIES OF THE FRESH OR HARDENED CONCRETE.

Sika® ViscoFlow®

Sika provides a number of superplasticisers which are used to increase the fluidity of concrete without adding excess water. As a result, the concrete is easier to place. The concrete workability can be maintained for a long period of time, which is beneficial to many processes, including transport, pouring, pumping, compaction, and casting.

The Sika® ViscoFlow® range are superplasticisers that have become a key ingredient in high performance modern concretes. They can be used to enhance workability without altering the water-to-binder ratio that controls concrete durability and strength.

SikaFiber® Force

Fibres are an ideal ingredient for improving the performance and durability of concrete. Different fibre types are used to deliver different performance requirements.

Combining SikaFume®-50 S with Sika Fibres helps create a high performance, high strength concrete that provides crack control.

By incorporating macro synthetic Sika fibres into the concrete mix it eliminates the need for 'A' grade crack control mesh.

TECHNICAL SERVICE SUPPORT AND DISPENSING EQUIPMENT

Sika produce and market a wide range of technologically advanced systems. This activity is underpinned by unrivalled innovation in product development, the highest standards of manufacturing and renowned technical advice and in-situ guidance.

Unique services and support include:

- Concrete mix design guidance
- Laboratory and field testing support
- Dispensing and dosing systems.

SIKA FULL RANGE SOLUTIONS FOR CONSTRUCTION:

LIQUID APPLIED ROOFING

SINGLE PLY ROOFING

CONCRETE

CONCRETE REPAIR

STRUCTURAL STRENGTHENING

WATERPROOFING

JOINT SEALING

FAÇADE STRUCTURAL ADHESIVES

FLOORING

INDUSTRY

DISTRIBUTION

BUILDING TRUST

FOR MORE INFORMATION:

Visit **www.sikaconcrete.co.uk**

WHO WE ARE

Sika Limited and Sika Ireland Limited are part of the global Sika Group, specialising in the manufacture and supply of chemical based products. Sika have a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing, and protecting in the building sector and the motor vehicle industry. Sika has subsidiaries in 101 countries around the world and manufactures in over 200 factories. With more than 20,000 employees Sika generates annual sales of CHF 7.09 billion (£5.45bn). We are also committed to providing quality, service, safety and environmental care.

In the UK and Ireland, we provide market-leading solutions for concrete, waterproofing, roofing, flooring, refurbishment, sealing & bonding, and industry, and have manufacturing sites in Welwyn Garden City, Preston, Leeds and Dublin with more than 870 employees and a turnover of more than £260 million.

SYSTEM CERTIFICATION ISO 9001 SGS SYSTEM CERTIFICATION ISO 14001 SGS SYSTEM CERTIFICATION OHSAS 18001 SGS

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