ACCS Ltd
Industrial Protective Linings

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Product Information Sheet **March 2014**

SILCRETE SG

Description
Silcrete SG (Structural Grade) is an inorganic silicate-based castable concrete for the construction of floors, sumps, pits, trenches, plinths and walls in areas exposed to corrosive environments. It replaces the requirement for concrete bonded by Portland Cement, in new construction and maintenance operations. The granulometry of Silcrete SG can be tailored for each application with grain sizes of 1, 3 and 6mm available (SG1, SG3 and SG6 respectively). It is provided in two-component format, a potassium silicate solution and a catalysed mineral filler powder.

Typical Uses
Silcrete SG is recommended as a construction concrete in most applications where strong acid materials are present, in particular for general tiling / masonry work and for trenches, pits and storage areas. Silcrete SG should not be used to thicknesses smaller than 20mm. Silcrete SG has a relatively high surface porosity which is useful in thermal cycling conditions. However, care should be taken in exposure to variable temperature environments where moisture is present. Freeze-thaw variances can lead to premature disintegration of the castable body.

Advantages
Silcrete SG displays excellent chemical resistance to literally all acids (except hydrofluoric) and is recommended for all applications with sulphuric and other strong oxidising acids. Silcrete SG also displays excellent resistance to organic materials such as solvents and oils. Silcrete SG can be applied in a similar manner to civil concrete by using formers and finished off by trowels, floats or by mechanical means. Silcrete can perform up to refractory temperatures of 900°C. Where higher temperatures are required, please contact ACCS Ltd for alternatives.

Chemical Resistance
Full details are available on ACCS website: www.protectivelinings.co.uk. Silcrete SG will not withstand hydrofluoric acids, concentrated bases or crystallising salts. For instances where environmental restrictions inhibit the use of halogenated products, please contact ACCS Ltd.

Surface Preparation
For all pre-existing surfaces of metal or concrete, abrasive blast or scarify to remove all laitance and surface contaminant. Due to acid catalyst components of the Silcrete SG castable, a primer base should be applied before application. Without a primer, the catalyst is likely to react with the substrate (eg alkaline concrete). The surface should be dust-free and dry and the ambient temperature should be above the dew point of air.

Typically, the substrate should be prepared with a coating of silicate solution prior to application. By painting the substrate surface with silicate solution and allowing to go tacky (approximately 1hour, dependant on temperature), sufficient adhesion between substrate and concrete will occur. For areas where significant degradation of the substrate has occurred, alternative primers such as PE120 membrane (metal) or AC90 primer (concrete) should be used before application of the silicate primer. For new-build concrete constructions, a damp tolerant primer AC95 is recommended and can be applied within 48 hours of concrete set, potentially expediting any construction schedule. Silcrete SG can then be applied once silicate priming has been completed. When higher service temperatures (>100^{o}C) are required, it is recommended that the silicate solution only be used as a primer. When casting Silcrete SG, formers should be constructed of firmly braced wood or metal, which has been given a light coating of release agent. The release agent will prevent Silcrete SG from adhering to the screeds or formers, but should not leave a residue on the freshly cast material. The forms are to be completely sealed and rendered watertight with heavy consistency pliable caulking. Seal formers placed over horizontal rough surfaces. Do not apply over any standing water. In severely aggressive environments, corrosion resistant reinforcement must be used in place of formers. Do not impose loads until final set has been achieved. Lower temperatures will require longer cure periods before removing formers.

Application
Silcrete SG comprises a silicate solution and a catalysed powder. Nominal thickness of >20mm are recommended. Typical product application:

SG1 – 20mm,
SG3 – 20-40mm
SG6 - >40mm.

For thicknesses greater than 100mm, coated steel rebar is recommended to improve structural strength. Values are an intended guide.

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Mixing Ratio	4-5 parts powder to 1 part solution
By weight By volume	~25kg powder to 6.25kg solution ~3L powder to 1L solution

Using an inclined mixer or traditional cement mixer, place powder in mixing vessel and add solution. Mix thoroughly for at least 3 minutes; the powder will 'wet' out to a castable.

The castable can then poured into place, where tamping methods or pencil vibration are suitable for distributing the material. Use a trowel or screed board to level the Silcrete SG flush with the top of the former. If necessary trowel finish within 15 minutes after mixing. Similar to civil concrete, large areas should be protected by damp hessian/cloths to prevent excessive evaporation of liquid components during curing process, which may lead to micro cracks forming in the Silcrete SG surface. All tools and equipment should be cleaned off with excess water and damp cloths to ensure their continued use. Acid resistant epoxy expansion joints of PE120 or PE120N are recommended for concrete slabs at intervals of 4m.

Pot-Life

at 15°C – 60mins
at 20°C – 50mins
at 30°C – 20mins

An initial set occurs approximately 12hours after mixing, with light foot traffic permissible after 24hours and with a full chemical cure occurring after 5-7days. Silcrete SG should never be exposed to water, steam or chemical environments before the primer is completely cured.

Note: Do not mix more material than required by pot-life. It cannot be reconstituted. Never add unapproved materials to the mix, in particular Portland Cement or excess water.

Coverage

Typical coverage on a relatively smooth concrete surface for a mixed Silcrete SG system:

at 25mm thickness - 55kg/m²
at 50mm thickness - 110kg/m²
at 100mm thickness - 220kg/m²

Values are approximate requirements.

Acidification

In cases where exposure to neutral conditions (eg rain water before completion and beginning of service life, it is recommended that all joints should be liberally treated with an acid wash to ensure complete reaction of the silicate components. This should occur after setting has taken place (7 days). Washing with a 25% solution of HCl in a solvent; or 35% solution of H_2SO_4 in a solvent, is recommended.

Standard Packing

Powder – 25kg lined polyweave bags (40 per pallet)
Solution – 34kg in 25L UN drums (24 per pallet)

Storage

Store in a cool, dry, frost-free place. Normal storage conditions in up to 25°C should provide shelf life of:
Powder – 24 months
Solution – 12 months
Do not store a combined stack of solution and powder components. Accidental leakage could lead to flash setting of material.

Safety

Safety data information available on request. Adequate ventilation must be provided whilst work is in progress and is compulsory for closed or indoor applications. The instructions on storage, fire and explosion are to be observed. No releases to the sewers or drains are to be permitted under any circumstances. Always refer to MSDS data sheets for hazard and transport information.

Warranty

We warrant that our products will conform to the description contained in the order and that we have good title in all goods sold. WE PROVIDE NO WARRANTY, WHETHER OF MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHERWISE, EXPRESS OR IMPLIED, OTHER THAN AS EXPRESSELY SET FORTH HEREIN. We are glad to offer suggestions or to refer you to customers using ACCS Ltd cements and compounds for similar applications. Users shall determine the suitability of the product for intended application before using, and users assume all risk and liability whatsoever in connection therewith regardless of any suggestions as to application or construction. In no event shall we be liable hereunder or otherwise for incidental or consequential damages. Our liability and your exclusive remedy hereunder or otherwise, in law or in equity, shall be expressly limited to our replacement of non-conforming goods at our factory or, at our sole option, to repayment of the purchase price of non-conforming goods.

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Technical Data

Parameter	Test Method	Unit	Value
Density		kg/m³	2000
Specific Volume		m³/tonne	0.5
Tensile Strength		kg/cm²	55
Compressive Strength	BS1902	kg/cm²	255
Flexural Strength		kg/cm²	122
Water absorption		%	10
Maximum Operating Temperature		°C	900

Disclaimer

The technical data contained in this document represents the current state of our product knowledge and is for information purposes only. It does not constitute a guarantee or specification.