BUILDING TRUST

PRODUCT DATA SHEET

EQIOM Spinor® A12 Microcement

Ultra-fine binder (UFB) designed for oilwell cementing, soil and rock grouting, rehabilitation of damaged structures and high-performance solutions

PRODUCT DESCRIPTION

Microcement based on ultra-fine blast furnace slag with a grain size of ≤12 µm, and a highly accurate, controlled particle size distribution ensuring consistency and reliability. This Product is the ideal solution for various applications, including:

- Injection (alternative to silicate gels).
- Sealing, waterproofing and consolidation (soils, alluviums, slurries, sands, gravels, etc.).
- Rehabilitation (masonry, concrete, etc.). Consolidation and regeneration (rocks, damaged structures, weak mortars and concretes, etc.).

Ultra-fine microcements require dispersing agents in order to defloculate the grains. Sikament® 160 has been proven to work extremely well with EQIOM Spinor® A12 Microcement, enabling optimal penetrability, as well as improving the rheological properties (viscosity, yield value, etc.) and the stability of the suspensions. Special (e.g. heavily stabilised or accelerated) grouts can be formulated.

USES

The Product can be used in numerous fields of construction, including:

- Consolidation and stanching in underground works (tunnels, covered trenches, etc.), foundations and cut-off walls.
- Injection of soils, rock fissures, micro and millimetric inter-annular voids (e.g. concrete segments) and under slabs.
- Can be used to create waterproof barriers, allowing dry areas to be created on sites.
- Rehabilitation by filling cracks and porous mortars, or by reinforcing weak mortars or concretes, in historical monuments, viaducts, aqueducts, bridges, dykes, embankments, sewage works, dams and power plants (including nuclear reactors).
- Consolidation and regeneration of wells (oil, gas and water) and mines.

CHARACTERISTICS / ADVANTAGES

- Ultra-fine binder based on blast furnace slag, a by-product of the iron-making industry, making it a sustainable solution.
- EQIOM Spinor® A12 Microcement is an hydraulic binder. It can be also used as an additive for complex mix-designs.
- Consistent and reliable.
- Flexibility of use.
- High level of precision due to a controlled grain size distribution.
- Resistance to aggressive water-soluble agents (sulphates, chlorides, acids, etc.).
- Outstanding injectability (penetration ability, due to its very low viscosity and yield value).
- Offers excellent durability, once injected, as opposed to gels.
- High resistance to aggressive media.
- Eco-friendly (not polluting for the environment, resistant to leaching, does not emanate gases, chemically stable, non-disruptive, prevents removal and replacement of various media, etc.), as opposed to silicate gels and certain resins.
- Does not suffer strength reduction through time.
- Cost-effective compared to resins.
- Creation and improvement of soil watertightness.
- Fills cracks and porous mortars preventing water ingress and therefore further damage to structures. EQIOM Spinor® A12 Microcement can fill lower porosity (finer) media and narrower microcracks than ordinary Portland cements.
- Ideal solution for fixation and water sealing in fractured zones.
- Can be used to recover normal mechanical properties when used with weak mortars or concretes.
- Excellent durability (of grouts and structures).
- Exceptional for stabilising and consolidating poorly compacted or unstable media (e.g. soils, sands and gravels), and is an effective solution in areas prone to landslips and landslides.

- Can be used to prevent settlement, heaving and boiling (e.g. inside cofferdams).
- Effective at preventing settlement of roads and embankments.
- Remedies and prevents differential settlement of oil tanks.
- Excellent protection of concrete reinforcing (steel is passivated when contained in this highly alkaline grout, thereby protecting from corrosion, and the injected media is closed and air tight, effectively eliminating carbonation).
- Convenient alternative for the treatment of cracked rocks.
- Absence of long-term segregation.
- Due to its large range of grain size distribution, enhanced by the addition of dispersing agents (e.g. Sikament® 160), the Spinor®-containing grout surpasses the groutability of conventional Portland cement/bentonite suspensions.

PRODUCT INFORMATION

Chemical Base	Ultra-fine binder (UFB) based on ultra-fine blast furnace slag
Packaging	25kg bags, 1000kg bulk bags and bulk tankers (10 - 27 tonnes)
Shelf Life	12 months from date of production
Storage Conditions	Under cover in a cool, dry place, in its original sealed packaging
Maximum Grain Size	12 µm
Density	~2.94 kg/m³
Bulk Density	~0.70 kg/m³
System Structure	Ultra-fine microcements like EQIOM Spinor® A12 Microcement require dispersing agents in order to defloculate the grains, and Sikament® 160 is the ideal superplasticiser for this purpose. In terms of cement:water ratio, EQIOM Spinor® A12 Microcement can be used between 0.33 and 1.0. As mix design examples below, the superplasticiser addition has been optimised at 3.7% by weight of EQIOM Spinor® A12 Microcement. The actual mix design will depend on the application and will require verification before full-scale use on sites.

Mix Design Examples (to produce 1m³ of Grout):

Water : Cement Ratio	Cement : Water Ratio	EQIOM Spinor® A12 Microcement (kg)	Water (Litres)	Superplasticiser (Sikament® 160) (kg)	Specific Gravity of Grout (kg/m³)
3.0	0.33	300	890	11.10	~1.20
2.0	0.50	430	845	15.91	~1.29
1.5	0.66	541	805	20.02	~1.37
1.0	1.00	754	730	27.90	~1.50

The above mix designs permeate soils consisting of sands between 0.1 to 0.3mm (i.e. permeability of 10^{-4} m/s) and can achieve a permeability coefficient of approximately 10^{-6} m/s. A summary of the properties achieved is provided below:

Water : Cement Ratio	Flow Time (Marsh Cone) (1)	Plastic Viscosity at t_0	Free Water After 3 Hours (2)	Gelling Time (3)	7 Day Compressive Strength (4)
3.0	29 seconds	2.5 mPa.s	25 %	11 hours	~6.5N/mm²
2.0	29 seconds	2.5 mPa.s	14 %	8 hours	~8.0N/mm²
1.5	30 seconds	2.5 mPa.s	12 %	6 hours	~10.0N/mm²
1.0	31 seconds	3.0 mPa.s	5 %	5 hours	~12.0N/mm²

(1) - 4.75mm aperture; reference water: 27 seconds.
(2) - Measured in 1 litre test tubes.
(3) - In accordance with AFTES.
(4) - Measured on grouted sand (granulometry: 0.1 - 0.3 mm).

VALUE BASE

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

ECOLOGY, HEALTH AND SAFETY

- User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

APPLICATION INSTRUCTIONS

EQUIPMENT

When used as a grout, EQIOM Spinor® A12 Microcement requires the same on-site equipment as conventional cementitious grouts:

1. High energy mixer (1500 rpm), turbo mixer, or high speed colloidal mixer.
2. Low agitation tank (approximately 60 rpm) to keep slurry at low viscosity and prevent sedimentation.
3. Grouting pump or press.

MIXING

The additives are generally put into the water before the introduction of Spinor®.
It is necessary to mix the grout initially with high energy, and then keep it under low agitation during the injection works.
Mixing time: ≥5 minutes.
Maximum batch size = 80% of container volume.

Note:

- The handling of Spinor® requires the same care as ordinary Portland cement.
- Bulk supplies require the use of waterproof and clean silos.
- Paddle mixers are not recommended for high quality slurries.
- A turbo mixer is more appropriate: a centrifugal pump circulates the slurry at high speed in the container of the turbo mixer and creates a displacement action between the fractions. The best result is obtained using this mixer type.
- In a colloidal mixer, the temperature can rise several degrees due to the release of energy from the displacement breaking force. This can cause early hardening of the slurry and should be controlled by the agitator.

CLEANING

Clean all tools and application equipment with water immediately after use. Hardened material can only be mechanically removed.

LOCAL RESTRICTIONS

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

SIKA LIMITED
Watchmead
Welwyn Garden City
Hertfordshire, AL7 1BQ
Tel: 01707 394444
Web: www.sika.co.uk
Twitter: @SikaLimited