PowerGel® S1+
Technical specifications

Elastic anti-fracture tri-polymeric Smart Gel (4th Gen), enhanced with quartz microspheres, Fluidotixo®- C5, with low cement content, prevents the formation of cracks in the installation of tiles, porcelain stoneware, large slabs of all types and formats and natural stones. Combined with SafetyGel®, it forms the High Adhesion Anti-Fracture System-TileSafe System

Product description

Elastic anti-fracture tri-polymeric Smart Gel (4th generation), with exclusive Anti-Fatigue Fluidotixo® mixture, enhanced with quartz microspheres, formulated with low cement content (<29%), prevents the formation of cracks in the installation of tiles, porcelain stoneware, large slabs of all types and formats and natural stones, indoors and outdoors.
Designed for high application safety and, thanks to latest-generation features, the mixture is extremely creamy, fluid and thixotropic. It maintains its shape and thickness on floors and walls with 100% wetting power, it achieves double vertical slip resistance T (T), and has an open time exceeding 60 minutes E (E).
PowerGel® S1+ develops an ultra-high-performance elastic anti-fracture adhesion thanks to the synergy between its tri-polymeric system and the quartz microspheres.
This advanced interaction allows PowerGel® S1+ to ensure high performance even on difficult substrates with potential dimensional instability or subject to strong stresses such as overlays on old floors, radiant systems, balconies, terraces, swimming pools and facades, where even extreme thermal excursions, humidity and strong mechanical tensions make the adhesion conditions critical.

When PowerGel® S1+ is combined with SafetyGel®, it forms the High Adhesion Anti-Fracture System - TileSafe System; this system is engineered for the installation of large-format tiles and slabs of any type and size in high-traffic areas, even on cracked substrates (up to 3 mm). The system helps dissipate and neutralise the movements of the substrate and the expansions

of the covering, and distributes heavy loads evenly without tension.

Classified C2TE S1 - EN 12004

Proprietary Gel formula

Integration of diversified polymers
Low Portland cement content <29%
Hybrid engineered hydraulic binders
Enhanced with quartz microspheres > 35%
Calcium silicate Gel
Latest generation cellulose under proprietary licence
High content of mineral aggregates

PowerGel® S1 embodies Litokol's continuous scientific progress.
It is designed with innovative raw materials to improve the installation experience and safety, and to reduce the environmental impact.

Powered by

Crack Prevention® technology
Adhesion strength - Ultra-high-performance elastic anti-fracture

Mixture classification

Mix class	Smoothness level	Lightness index
C1 - Thick / Paste-like	Requires more force for spreading	Standard
C2 - Medium Consistency	Does not drip, offers good workability	Standard
C3 - Fluid Thixotropic	Smooth and thixotropic	Lightweight
C4 - Dynamic Fluid Thixotropic	Highly fluid and thixotropic	Lightweight
C5 - Anti-Fatigue Fluid Thixotropic	Ultra smooth and thixotropic	Ultra lightweight

Performance Gel fluid thixotropic mixture

Class 5 - Anti-Fatigue Fluidotixo® mix

Anti-Fatigue Fluidotixo® mixture - Ultra-smooth, thixotropic and ultra-lightweight: its extremely fluid consistency facilitates spreading, while maintaining shape and thickness without dripping. Designed with high-tech materials (quartz microspheres), the mixture spreads with minimal effort, making the Gel ideal for prolonged applications on large surfaces.
The Fluidotixo® mixture features a Gel-like rheology, characterised by an initially thixotropic consistency that, under mechanical action (trowelling), reduces its viscosity, becoming temporarily more fluid.
This pseudoplastic behaviour allows for precise and highly smooth application, with greater adhesion to the substrate.
The Anti-Fatigue Fluidotixo® mixture has a very low apparent viscosity that promotes extreme fluidity under the trowel and 100% wettability.
Progettato per applicatori professionisti, con lo stesso impasto è possibile ottenere una spatolabilità eccezionale e un minor affaticamento nella posa prolungata di pavimenti e rivestimenti. Una volta applicato la sua formula tixotropica permette di mantenere forma e spessore invariati, senza cali, sia a pavimento che a parete, garantendo una posa precisa e controllata senza scivolamenti verticali, raggiungendo la prestazione di doppia resistenza allo scivolamento T (T).
The advanced performance features of PowerGel® S1+ allow for corrections even several minutes after spreading, achieving a double extended open time E (E).

Double Open Time E (E)
PowerGel® S1+ is modified with double open-time technology based on an innovative blend of quartz microspheres and latest-generation celluloses modified under proprietary license.
The system regulates wettability in two phases: it maintains and extends the active adhesion window and reactivates it under tile pressure for more than 60 minutes, generating more time to install, correct and adjust, even in challenging conditions.
Ideal for the installation of large formats on large surfaces, in hot climates and on low-absorption surfaces.

Double Slip Resistance T (T)
PowerGel® S1+ is formulated with an innovative mix of latest-generation modified celluloses. Designed for wall applications, it features double slip resistance: maximum mixture stability after application with no dripping, and enhanced adhesion under pressure, without tile slippage.
The role of advanced celluloses on anti-slip behaviour is essential for developing a static grip effect and activating an elastic memory that locks the tile immediately after application, allowing for precise adjustments without compromising adhesion.
Constant performance, even with heavy formats or in critical environmental conditions.

Performance Gel adhesive interface

Tri-Polymeric Smart Gel
Latest-generation high-tech Gel designed to create an active, elastic and resistant interface between different materials.
The triple polymeric matrix works synergistically to ensure permanent chemical-mechanical adhesion, controlled elasticity, and an integrated anti-fracture effect.
Fluidotixo® rheology allows for dynamic application: fluid under load, stable during installation. Quartz microspheres reinforce the ITZ (Interfacial Transition Zone), turning it into a monolithic elastic zone capable of absorbing movements, mechanical shocks and thermal variations without crack propagation.

Smart Gel - Crack Prevention® Technology
Crack Prevention® technology is a molecular platform integrated into the Gel, designed to:
1. Absorbs and dissipates mechanical energy before fracture.
2. Stabilises the internal microstructure of the Gel under dynamic stress.
3. Blocks the formation and propagation of micro-cracks in the adhesive zone.
This technology activates in real-time during the different phases of the system's life: hydraulic shrinkage of cement, sudden thermal shocks, cyclic stresses (vibrations, bending, differentials, thermal expansion or micro-movements of the substrate).

Smart Gel - Operating Mechanism
1. Tri-polymeric elastic network: compensates for the movements of the covering in an elastic and cohesive manner.
2. Polymerised quartz microspheres: manage internal stress and optimise the dimensional stability of the laying bed.
3. Integrated Crack Prevention® modules: dissipate peak energy and prevent crack growth in the adhesive matrix.
4. ITZ stabilisation: the contact zone between the back of the tile, the Gel and the substrate becomes monolithic and elastic, capable of working synchronously with the SafetyGel® membrane.

Anti-Fracture System - TileSafe System

In critical environments or on substrates subject to differential movements, thermal shock, vibrations and structural deformations, simple adhesion is not enough: a system capable of preventing the initiation and propagation of fractures that would damage the tiles is needed. The High Adhesion Anti-Fracture System consists of 2 different technologies:

1. SafetyGel® - a 6-Dimensional elastic, anti-fracture membrane, capable of absorbing and compensating for movements in all six spatial directions before they are transmitted to the covering.
2. PowerGel® S1+ - a smart, tri-polymeric, elastic anti-fracture Gel, enhanced with Crack Prevention® technology, capable of protecting the internal adhesion zone from micro-cracks and mechanical stress.

It acts as a smart structural interface, protecting the adhesive transition zone (ITZ) and promoting an elastic and durable anchorage.

Together, these two elements form an active integrated system that works in adhesion: the interaction between the 2 technologies drastically reduces stress concentration, prevents the vertical and lateral propagation of micro-cracks, and increases the mechanical durability of the covering system.

SafetyGel® and PowerGel® S1+ are not two separate products, but a co-engineered system that elevates installation to a new level of reliability. A single, resilient, adaptive and monolithic surface capable of preventing cracks, managing stress and lasting over time.

Tensile adhesion of the TileSafe System > 1.8 N/mm^2 according to EN14891

Direct Technological Advantages

1. Synergistic system SafetyGel® + PowerGel® S1+: maximum multi-directional anti-fracture protection.
2. Active crack prevention - dampening of their propagation.
3. ITZ stability - monolithic and dynamic adhesion on difficult surfaces.
4. Advanced structural elasticity - adapts to movements without losing any adhesion performance.
5. Durability even in extreme conditions - freeze/thaw cycles, internal thermal shocks, vibrations, heavy loads
6. Ideal for large slabs - withstands bending, tension, shear and deformation.

Performance Gel Safety

Safety - Level 4

Thanks to Crack Prevention® technology, it is possible to achieve elastic anti-fracture adhesion which develops as the Gel hardens and which is maintained over time, increasing the durability of the Interfacial Transition Zone (ITZ) and protecting it from tensile, compressive and shear stresses.

This elastic adhesion makes PowerGel® S1+ particularly suitable for applications on radiant heating systems, swimming pools, outdoor environments and façades, with tiles of any type and format.

Elastic anti-fracture adhesion allows for the application of PowerGel® S1+ even on cracked and/or diverse substrates (in combination with SafetyGel®), where expansion and shear stresses are more intense and where the risk of crack formation is higher.

Chemistry + intelligent

Low Portland cement content <29%

Very low emissions of volatile organic compounds - VOC

Certifications

EN 12004
EN 12002
ISO 13007
EC1 Plus Gev Emicode
A+ Emissions dans l'air interieurs
EPD Environmental Product Declaration

PowerGel® S1+ and the Environment

LCA results for Global Warming Potential – Greenhouse Gas GWP-GHG

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
Climate change GWP-GHG	kg CO2 eq	5.08 10^{-1}	4.38 10^{-3}	1.08 10^{-2}	0	4.90 10^{-3}	-5.52 10^{-3}

Materials

Porcelain stoneware
Ceramic and porcelain tiles
Large sizes
Laminated stoneware slabs
Marble – Granite – Stone
Natural stones
Ceramic and vitreous mosaics
Terracotta - Clinker
Recomposed stone made with resin or cement
Indoor insulating and soundproof panels

Substrates

SafetyGel®
Screeds
Self-levellers
Skim coats
Plasters
Gypsum
Gypsum and anhydrite
Existing tiles
Underfloor heating systems
Waterproofing systems
Separation membrane
Aerated concrete
Fibre cement slabs
Concrete

Uses

Adhesive - skimming plaster
Floors - walls
Interiors - exteriors
Overlaying
Underfloor heating systems
Indoor wet areas - bathrooms and showers

Tanks, swimming pools and fountains
Terraces and balconies
SPA and Hammam
Façades
Industrial floors
Residential, public, commercial and street furniture
Areas subject to high traffic and high stress

In combination with SafetyGel® indoors
Cracked substrates
New substrates that have not fully cured or of different nature
Change the installation pattern or tile format
Installation near thresholds
Installation over tracks for systems
Installation near expansion - control joints (combined with SafetyTex Anti-Fracture)

In combination with SafetyGel® and SafetyTex Anti-Fracture outdoors
Cracked substrates
New substrates that have not fully cured or of different nature
Change the installation pattern or tile format
Installation near thresholds
Installation over tracks for systems
Installation near expansion - control joints

Limitations

Refer to national regulations, such as Standard UNI 11493
Ensure full bedding outdoors or in the presence of high loads
Protect the tiled surface against rain for at least 24 hours
Temperature, ventilation, substrate absorption and installation material can change the workability and setting times of the Gel
Do not add water to the mixture when it has already begun to set
Do not use on inadequately cured concrete
Do not use on gypsum or anhydrite-based substrates without first applying X-Prime®
Do not use on wood and wood-based panels
Do not use on metal, rubber, PVC or linoleum surfaces
Do not use on floors that need to quickly set for light foot traffic
Do not use on reactive waterproofing membranes of organic nature (such as RM according EN 14891)
Do not use the product for applications not indicated in this Technical Data Sheet
For further information, contact the Litokol Technical Help Service at +39-0522-622811 or via customercare@litokol.com

Product specifications

Appearance	Hydrolysed gel in powder
Colour	Ultra White - Grey
Responsible Packaging	20 kg recyclable bag
Preservation	12 months in original packaging in a dry place
Customs code	38245090

Technical specifications

Compliance	EN 12004 – ISO 13007	C2 TE S1
Initial adhesion after 28 days	≥ 1.0 N/mm^2	EN 1348
Adhesion after water immersion	≥ 1.0 N/mm^2	EN 1348
Adhesion after heat action	≥ 1.0 N/mm^2	EN 1348
Adhesion after freeze/thaw cycles	≥ 1.0 N/mm^2	EN 1348
Open time	≥ 0.5 N/mm^2 after 30 minutes	EN 1346
Slip	≤ 0.5 mm	EN 1308
Transverse deformation	> 2.5 mm - < 5 mm	EN 12002
Resistance to humidity	Excellent	
Resistance to alkalis	Excellent	
Resistance to solvents	Excellent	
Resistance to acids	Low	
pH of mix	13	
Specific gravity	1.55 kg/dm^3	

Specifications for application

Mixture class	Class 5 - Anti-Fatigue Fluid Thixotropic
Preparing the Grey Gel mix	Water = 26-29% ~ 5.2-5.8 l / 20 kg
Preparing the Ultra-White Gel mix	Water = 31-34% ~ 6.2-6.8 l / 20 kg
Mix curing time	5 min
Duration of mixture	6-8 hrs
Applicable thicknesses	From 1 to 20 mm
Open time	> 60 min
Bonding time	> 60 minutes
Application	Notched trowel suitable for the format and for the substrate
Application temperatures	From +5°C to +35°C
Waiting time for grouting	Wall: 3 hours – Floor: 12 hours
Ready for light foot traffic	12 hours
Ready for use	4-5 days - Swimming pools 14 days
Temperature of use	From -40°C to +90°C
How to clean equipment	With water when product is fresh. Mechanically when product has set.
Consumption	3.5 mm trowel: ~ 1.8 kg/m^2
Consumption	6 mm trowel: ~ 2.5 kg/m^2
Consumption	8 mm trowel: ~ 3 kg/m^2
Consumption	10 mm trowel: ~ 3.5 kg/m^2
Consumption	Back-buttering: ~ 5 kg/m^2
Notes	Data detection at temperature +23 °C, R.H. 50% and with no wind. May vary depending on the specific conditions of the installation site.

Substrate preparation

In accordance with Standard UNI 11493-1, the substrates must be mechanically resistant and free of friable parts, and clear of grease, oils, paints, waxes and rising damp.
Cement plasters must have a curing time of at least one week per cm of thickness.
Cementitious screeds must have a total curing period of at least 28 days or be made with the innovative anti-fracture screeds, X-Floor and X-Floor Pro.
Create slopes on balconies or pavements with the latest-generation anti-fracture levelling compound HydroLevel® 1-30.
Particularly dusty, porous and absorbent substrates must be treated with X-Prime®, an innovative primer and consolidating product.

Smooth and compact substrates such as polished concrete, old ceramic or marble tiles, must be treated with the latest-generation adhesion promoters, X-Activator® or X-Activator® Grip, after thorough cleaning with the specific detergent X-Cleaner® Scrub.
In anhydrite screeds, check for the presence of a suitable vapour barrier in order to prevent rising damp.
Use a carbide hygrometer to check that the residual humidity is less than 0.5% and 0.3% for heating screeds.
The surface must be sanded and isolated with X-Prime®.
Any cracks or fissures must be sealed with CrackRepair.
In any case, the respective technical data sheets must be consulted for the correct use of the indicated products.

Preparing the mixture

To fully appreciate the superior smoothness and thixotropy of the innovative Anti-Fatigue Fluidotixo® Gel mixture, it is advisable mix the product according to the indicated mixing ratio.
Pour the right quantity of water into a container and slowly add the product, mixing with a mechanical mixer until a creamy, homogeneous, lump-free mixture is obtained.
Let the mixture rest for about 5 minutes, during which the polymeric Gel development is completed: the hydraulic binders, fillers and cellulose hydrate uniformly, air micro-bubbles incorporated during mixing are eliminated, and the polymers begin their activation process.
Briefly remix to obtain the ultra-smooth, thixotropic, ultra-light Anti-Fatigue Fluidotixo® Gel consistency, easy to apply on both floors and walls.

Application

To ensure the perfect adhesion of the Gel to the substrate, apply a scratch coat of the mixture using the smooth side of the trowel, and then straight after apply the desired thickness with the notched side.
The trowel notch size must be chosen according to the format of the material to be installed and the substrate.
In accordance with Standard UNI 11493-1, use the back-buttering technique, applying the Gel also on the back of the tiles to ensure complete wetting during installation outdoors, in swimming pools, on façades or in particularly stressed areas.
To ensure the complete transfer of the Gel to the back of the tiles, they must be laid on the still-fresh adhesive with adequate pressure.
The open time in standard temperature and humidity conditions is approximately 60 minutes.
Very warm or windy climates, or particularly absorbent substrates may drastically reduce it to a few minutes. It is therefore recommended to regularly check that the adhesive has not skinned over.
In accordance with Standard UNIT 11493-1, the tiles must be installed with joint widths suitable for their size.
Respect any control or structural joints and create adequate expansion, separation and perimeter joints.

Special Applications

TileSafe System

Indoor application To create the High Adhesion Anti-Fracture System indoors, apply SafetyGel® as a “High adhesion anti-fracture Gel safety membrane" (see the SafetyGel® technical data sheet).

After the last coat of SafetyGel® has completely dried, apply a scratch coat of PowerGel® S1+ using the smooth side of the trowel, and then straight after apply the desired thickness with the notched side. (For applications on expansion or separation joints, use SafetyTex Anti-Fracture as for outdoor applications)

Outdoor application To create the High Adhesion Anti-Fracture System outdoors, embed the SafetyTex Anti-Fracture membrane into the first fresh coat of SafetyGel®, applied as a "High adhesion anti-fracture Gel safety membrane" (see the SafetyGel® technical data sheet).

After the last coat of SafetyGel® has completely dried, apply a scratch coat of PowerGel® S1+ using the smooth side of the trowel, and then straight after apply the desired thickness with the notched side.

Marble, natural and recomposed stones

Materials subject to deformation or stains due to water absorption require a quick-setting, self-curing Gel such as FastGel® or FastGel® S1+ (C2F - EN 12004) or a reactive Gel such as PowerGel® Pro Max (R2 - EN 12004).

Marble and natural stones, even if similar in nature, may have different features.

In case of doubt, contact the Litokol Technical Help Service for detailed information or to perform a laboratory test.

Natural stone slabs with reinforced backing (resin, mesh, etc.) or specific treatments (for example anti-rising damp, etc.), unless otherwise prescribed by the manufacturer must be tested for compatibility with the adhesive.

Before installation, check for any traces of dirt or material deposits on the back of the slabs.

If so, these must be removed.

Underfloor Heating Systems

After at least 4 days from the installation of the X-Floor® o X-Floor® Pro anti-fracture screed, the heating system can be used with a variable supply water temperature between +20°C and +25°C, kept constant for at least 3 days.

Then set the maximum design temperature and hold it for another 4 days.

At the end of this cycle, bring the screed back to ambient temperature and install the covering (EN 1264-4).

Swimming pools

In accordance with Standard UNI 11493 – 7.13.3, swimming pool tiling must be designed considering mechanical, thermo-hygrometric, and chemical stresses: continuous contact with chemically treated water (even in winter) and frequent sanitation interventions.

In concrete structures, adequate composition must be guaranteed (UNI 11104 – EN 206) and the correct curing time must be respected (at least 6 months, UNI 11493 - 7.3.1).

It is essential to waterproof the external part of the structure, adopting preventive measures against possible infiltrations, which could cause the detachment of the waterproofing layer applied inside the tank, for example on drains along the side walls of excavations or waterproofing consisting of osmotic mortars.

Rectify and even out surfaces with HydroLevel®, a quartz-reinforced structural levelling compound with controlled anti-fracture expansion.

Waterproof the surfaces of the tank with the elastic, watertight, and anti-fracture Gel membrane SafetyGel® with 6-Dimensional Elasticity technology, or with the breathable tri-polymeric waterproof Gels enhanced with quartz

microspheres from the HydroPad® line with 4-Way Flex technology.
Seal critical points such as construction joints with HydroStop, and through-pipes for recirculation, filtration, drainage and lighting systems with HydroPixel®.
It is advisable to perform a hydraulic seal test before installing the covering.
Always apply Gel to the back of the material as well (back-buttering) to achieve a full adhesive bed, guarantee total force transfer and the durability of the system.

Façades

For exterior wall installations (H>3 m) where tiled surfaces are subject to high levels of tension in expansion joints due to the variations in air temperature and relative humidity and considering the safety risks posed by any eventual detachments, it is recommended to consult Litokol's Technical Help Service in order to precisely define the safest type of installation.
In accordance with Standard UNI 11493 – 7.13.7, follow these general guidelines: the installation substrate must guarantee a cohesive tensile strength of ≥ 1,0 N/mm^2.
In the case of masonry substrates made of bricks/clay blocks, lightweight blocks, etc., direct installation is not allowed; instead, installation on plaster conforming to the specifications mentioned above is required.
For coverings with side > 30 cm the designer must evaluate the potential need to use suitable mechanical fasteners for safety purposes.
Control and expansion joints must be provided as specified in sections 7.11.1.2 and 7.11.1.3.
Always apply adhesive to the back of the material as well (back-buttering) to achieve a full adhesive bed, guarantee total force transfer and the durability of the system.

Grouting, sealing and maintenance

For grouting, the decorative grouts X-Color® 0-6 or X-Color® 2-12 and the ready-to-use polymeric mortar FillGood® EVO can be used.
To create waterproof, highly colour-stable joints with greater chemical-mechanical resistance, use the decorative epoxy Gels from the Starlike® line.
For the elastic sealing of expansion, control and perimeter joints, use sealants from the Pixel 3D line.
For end-of-construction washing, cleaning, maintenance and surface protection, use specific Litokol detergents from the X-Cleaner and Starlike® Care lines.

Warnings

Due to its high content of adhesive polymers, it is advisable to wash tools and any product residues from the surfaces with water before the Gel sets.
Once the reaction is complete and the Gel has hardened, it can only be removed mechanically.

Information regarding safety

For the safe use of our products, refer to the latest version of the Safety Data Sheet, available on the website www.litokol.com
PRODUCT FOR PROFESSIONAL USE

Legal notes

The information and provisions contained in this technical data sheet reflect our best experience.
Given the impossibility of directly intervening on the conditions of the work site and execution of the works, they represent indications of a general nature, which are in no way binding for our Company.
It is therefore recommended to perform a spot test in order to check the suitability of the product for the intended use. In any case, those who intend to use the product must establish whether or not it is suitable for the intended use, and in any case assume all liability for any consequences resulting from such use.
Always refer to the latest updated version of the Technical Data Sheet, available on the website www.litokol.com

Item specification

The installation, both indoors and outdoors, in accordance with Standards UNI 11493-1 and 11714-1, of floors and wall coverings made from all types of ceramics—porcelain stoneware, single-fired, double-fired, clinker, and terracotta—dimensionally stable and non-staining stone material and mosaics, will be carried out using an elastic, anti-fracture, fourth-generation tri-polymeric Smart Gel, enhanced with quartz microspheres, formulated with low cement content (<29%), which is fluid and thixotropic and maintains its shape and thickness unchanged on floors and walls with 100% wetting power, which is resistant to vertical slip, has an extended open time of over 60 minutes and is classified as C2TES1 according to Standard EN 12004: PowerGel® S1+ by Litokol Lab SpA.

Data sheet **n. 033**
Revision **n. 0**
Date: **03 25**

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