MODERN ROAD SURFACES IN STONE

Mapei solutions for sustainable street furniture

MAPEI®

YOU NEED LOCKING UP

A MORTAR'S POINT OF VIEW

"They say that I am seven times stronger than the concrete used to make pillars that hold up buildings. They say that I have formidable resistance to aggressive salts and freezing weather. This all makes me seem like matter from another planet; as if I were that stuff that melts and then recombines that you can see in the movie Terminator. But all I am is mortar; okay, I am **Mapestone TFB 60** ultra high-strength supermortar, but I am still only mortar, something that locks stone together. And you'd better not forget it. Anyway, if the ancient Romans had been able to use me to build their roads, nobody else would have got a look in. They have used me on the Bobo (Bologna for Bologna) construction site to get the maximum cohesion possible between one flagstone and another in Strada Maggiore, and I can hear the antique flagstones now as they whisper: "you make everything look so simple, little mortar", "your masters don't work as well as the Romans", "they manage to get by thanks to you", end even "of course it was all so different in the good old days, shame on you, it's a sacrilege…". Nasty little flagstones, ungrateful masochists, don't you remember how badly those Roman chisels treated you, strike after strike, pushing one stone against the other, with just really tight, narrow joints to create a solid mass effect, forcing you to match as close as possible? Sand and river gravel were the weak points. The binder was the weak point. The Romans didn't have a really sound binder but, let's get to the point; the Italians are still the best in the world at constructing roads. And if today they can count on me, it means we have always been at the forefront, right back since ancient Roman times. The mallet blows will make you sink into the support of my cradle, my gums will rise up, the wheelbarrows will pour me into the gaps until they are filled, when the bonding slurry has dried out you will be tied to me forever, I will hold you tight in the heat and in the cold, in the rain and snow, even under the weight of the wheels of the trolleybuses and cars, from here you will never move again. **I am a super-mortar because you need locking up.**"

Comune di Bologna · TPer Trasporti Passeggeri Emilia-Romagna · è Bologna · CANTIERE BOLOGNA PER BOLOGNA

MODERN ROAD SURFACES IN STONE

The new UNI 11714-1:2018 standard introduces the classification of external paving according to the type of traffic loads and, for each class (P4, P5, P6, P7, P8 and P9), identifies the main design conditions.

P4 – PEDESTRIAN USE ONLY
Balconies, terraces, patios, courtyards, domestic paths and pavements

P5 – PEDESTRIAN USE ONLY
External terraces of restaurants/bars, pavements for pedestrian and cycle use only

P6 – PEDESTRIAN AND LIGHT VEHICLE USE
Pavements suitable for parking, carparks or ramps/garage pathways, courtyards, adjacent lots and pathways for the connection between buildings and their parking lots

P7 – PEDESTRIAN AND LIGHT VEHICLE USE
Squares used occasionally by slow-moving vehicles, including heavy vehicles (parvises, cemeteries, etc.), market squares, loading/offloading areas, and squares for events, town festivals, etc.

P8 – PEDESTRIAN AND LIGHT VEHICLE USE
Areas with a 30 km/h speed limit, streets or squares with limited access to vehicles, public carparks and public access ramps

P9 – HEAVY VEHICLE USE
Streets, streets with lanes for public transport or prescribed lanes, high-traffic roads, roundabouts and speed bumps

MAPESTONE GR-ECO LINE

Architectural paving with filtering properties

MAPESTONE JOINT AND MAPESTONE JOINT GHOST

Flexible and pervious paving

MAPESTONE SYSTEM

Monolithic waterproofing paving

MAPESTONE CALCIX SYSTEM

Architectural paving even of historical interest

MAPESTONE GR-ECO LINE

MAPESTONE GR-ECO

Mapestone GR-ECO is a pre-blended, cement and lime-free grouting mortar made from natural fibres (apple fibres) and specific aggregates for grouting architectural stone, self-locking cementitious block, porcelain or terracotta brick paving subjected to light stresses and loads from pedestrians and light vehicles in classes P4, P5 and P6; complies with UNI 11714-1:2018.

Mapestone GR-ECO can be used to create architectural stone paving with **filtering properties**, and the binder component of **Mapestone GR-ECO** has **self-generating properties**: the fibres hold the water and then release it in the form of vapour, just like a sponge.

PRE-BLENDED MORTAR MADE FROM NATURAL FIBRES (APPLE FIBRES) AND SPECIFIC AGGREGATES

AREAS OF USE

Mapestone GR-ECO is used for filling grouts in architectural paving subjected to light loads, such as access areas to homes, hotels and carparks subjected to modest use by vehicles and for pedestrian zones, pavements and porticoes.

MAPESTONE GR-ECO AND SUSTAINABILITY

Thanks to its special formulation, **Mapestone GR-ECO** reduces the level of CO_2 emissions responsible for climate change by up to 95% compared with traditional slurry. For example, if used to renovate a piazza with an area of around 500 m^2, using **Mapestone GR-ECO** instead of traditional slurry saves almost 10,000 tonnes of CO_2, the equivalent of 100 fewer car journeys from Milan to Rome or the planting of 130 trees.

Mapestone GR-ECO is a highly sustainable product, in that its reduced impact on the environment safeguards our planet and the absence of harmful substances guarantees the health of end users.

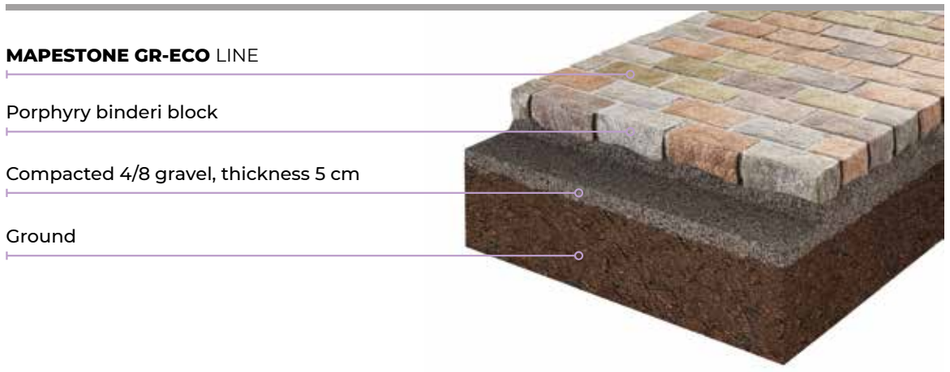
MAPESTONE GR-7

Mapestone GR-7 is a pre-blended, cement and lime-free mortar made from natural fibres (apple fibres), Pozzolan-reaction materials and specific aggregates for grouting architectural stone, self-locking cementitious block, porcelain or terracotta brick paving subjected to light stresses and loads from pedestrians and light vehicles in classes P4, P5 and P6; complies with UNI 11714-1:2018. Thanks to its particular composition, its mechanical strength reaches 7 MPa which makes it particularly suitable for paving class P6.

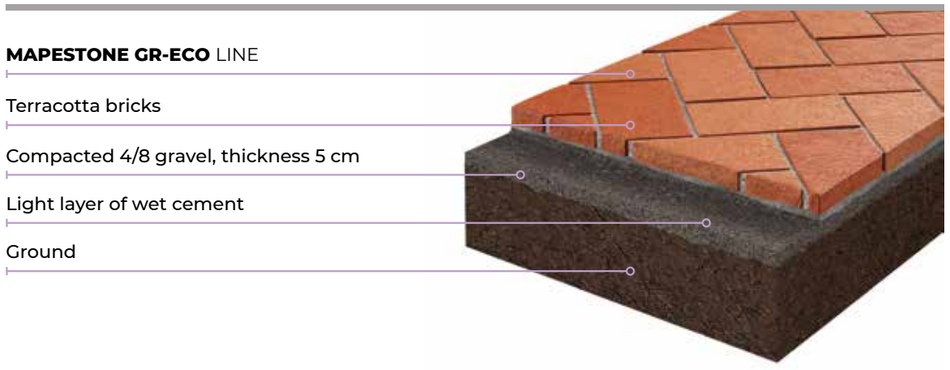
MAPESTONE GR-ECO FILL

Mapestone GR-ECO FILL is a pre-blended grouting product containing natural fibres, specific aggregates and recycled materials (blast-furnace slag, silica fume) developed specifically for grouts between self-locking block, terracotta, porcelain and natural stone architectural paving subjected to pedestrian traffic and light vehicle use in classes P4, P5 and P6; compliant with UNI 11714-1:2018.

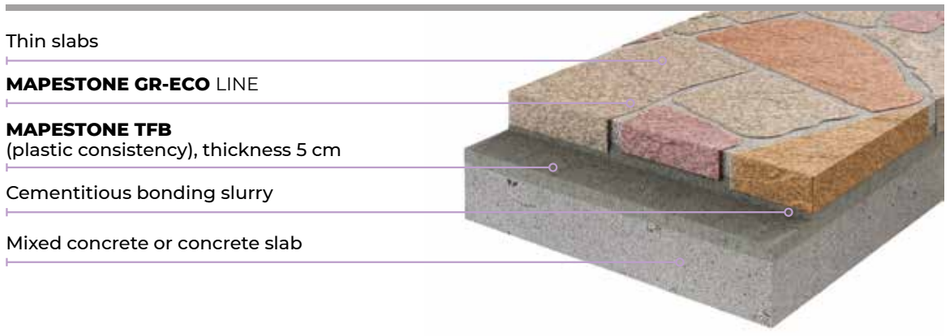
LOOSE-BED INSTALLATION



LOOSE-BED INSTALLATION WITH A BROADCAST OF CEMENT



INSTALLATION ON MAPESTONE TFB



THE CAUSES OF DETERIORATION

MECHANICAL STRESSES

The constant passage of cars and heavy vehicles generates compressive stress (the weight of the vehicles themselves) and tensile stress (manoeuvres carried out by vehicles) that cause failure in weak and irregular substrates on which the blocks of stone that make up the road surface have been installed.

FREEZE/THAW CYCLES, DE-ICING SALTS AND SEA-SALTS

There is a contrast between the high amount of heat generated when using de-icing salts (calcium and sodium chloride) and brusque cooling down due to low surrounding temperatures. This alternation in temperatures, combined with freeze/thaw cycles (with stresses caused by water cooling down and turning into ice), causes contraction, expansion and crumbling, which in turn deteriorate the joints and substrate. The action of chlorides in the sea-salts accelerates deterioration in porous cementitious matrixes.

DESIGN AND INSTALLATION

Modern stone road surfaces must be developed and then designed as structures that are meant TO LAST over the years, similar to any other vertical structure. With this in mind, choosing the most suitable installation system is fundamental. Also, using only expert workers qualified in the installation of stone is a key factor to ensure that this type of system is installed correctly. If unsuitable installation systems or methods are chosen, the service life of stone road surfaces will be shortened.

MAPEI SOLUTIONS

MAPESTONE JOINT

Mapestone Joint is a one-component, solvent-free, non-flammable, sound absorbing, polyurethane binder with a characteristic odour, used for grouting joints for flexible and pervious architectural stone paving, particularly resistant to de-icing salts, to thermal shock and to acids; it allows opening to vehicular traffic in short times (48 hours after placing at +20° C). **Mapestone Joint** is available in 25 kg tanks, 200 kg drums and 1000 kg IBC containers.

MAPESTONE JOINT GHOST

Mapestone Joint Ghost is a one-component, solvent-free, rapid-curing and drying silane-terminated polymer based binder for sealing grouts in paving blocks, binderi bricks and cobblestones for elastic, pervious architectural paving quickly ready for use. Available in 25 kg tanks.

Fill the grouts with **Mapestone Joint** resin

Resin coating grouts with **Mapestone Joint Ghost**

Resin-grouted blocks

CROSS SECTION OF A BLOCK PAVING GROUTED WITH MAPESTONE JOINT

1. Concrete
2. 5/8 cm thick installation bed of 4/8 mm or 3/6 mm coarse stone chippings
3. Blocks of porphyry or other stone material
4. 3/6 mm gravel infill
5. **Mapestone Joint** or **Mapestone Joint Ghost**

TECHNICAL ADVANTAGES

- FLEXIBLE SYSTEM
- PERVIOUS CAPACITY
- RESISTANT TO FREEZING WEATHER, DE-ICING SALTS, SEA-SALTS AND SEA SPRAY

ECONOMIC ADVANTAGES

- HIGHLY DURABLE FINISHED WORK
- HIGH RESISTANCE TO THE CLEANING ACTION OF POWER SWEEPERS
- NO WASTE OF MATERIAL
- LESS TIME REQUIRED FOR ROAD WORKS

SOCIAL ADVANTAGES

- LOWER MAINTENANCE COSTS
- LESS NOISE
- LESS DISRUPTION FOR INHABITANTS
- FEWER ACCIDENTS (DUE TO FALLS FROM BIKES, MOPEDS AND HIGH HEELS)

MAPESTONE JOINT AND MAPESTONE JOINT GHOST BLOCK

P4 P5 P6 P7 P8 P9

System to create elastic and pervious architectural stone paving by applying **Mapestone Joint** or **Mapestone Joint Ghost**. For use with **block**, **sett** and **pebble** paving in class P4, P5, P6, P7, P8 and P9.

MAPESTONE JOINT SLAB

P4 P5 P6

System to create elastic and pervious architectural stone paving by applying **Mapestone Joint**. For use with **slab** paving in class P4, P5 and P6.

MAPEI **SOLUTIONS**

MAPESTONE SYSTEM

P4 P5 P6 P7 P8 P9

The monolithic **Mapestone System** represents a “turnkey” solution in compliance with UNI 11714-1:2018 standard to obtain durable, long-lasting work resistant to freeze-thaw cycles, de-icing salts and to sea water. Mapei has specifically developed pre-blended cementitious products with exceptional physical-chemical characteristics suitable for areas exposed cyclically to wet and dry periods, as described in exposure class XF4 cementitious products which need only to be mixed with water, made from special binders and selected aggregates, to make architectonic stone paving which is suitable for vehicles. The System includes: **Mapestone TFB 60**, a pre-blended powder mortar, particularly suitable for making screeds and installing stone; **Mapestone PFS**, **Mapestone PFS 2 Flex**, **Mapestone PFS 2 Visco** and **Mapestone PFS PCC 2**, pre-blended powder mortars for grouting joints. **The combined use of these products creates a long-lasting monolithic structure**.

1 Concrete
2 Non-woven fabric or PVC sheets
3 **Mapestone TFB 60**
4 Porphyry and flagstones
5 **Mapestone PFS 2** or **Mapestone PFS 2 Flex** or **Mapestone PFS 2 Visco** or **Mapestone PFS PCC 2**

MAPESTONE SYSTEM

P4 P5 P6 P7 P8 P9

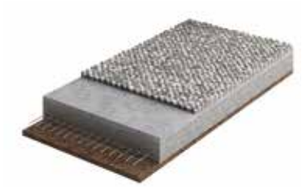
SAFETY
Prevents wear and tear, often the cause of accidents.

DURABILITY
Withstands the rigours of the most intense road traffic.

WHERE TO USE

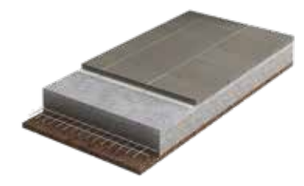
The monolithic **Mapestone System** is used to make architectural stone paving (made from setts, smolleri, pebbles, slabs and blocks).
When it is not necessary to meet the requirements for exposure classes XF3, XF4 and XS3, joints may be quickly grouted with **Keracolor PPN**.

Paving stones



Pebbles

Blocks



Low-thickness slabs

MODERN ROAD SURFACES IN STONE

TECHNICAL ADVANTAGES

- HIGH MECHANICAL STRENGTH
- HOMOGENOUS, UNIFORM PRODUCT
- RESISTANT TO FREEZING WEATHER AND DE-ICING SALTS
- RESISTANT TO SEA SALTS, THAT MEANS DURABLE, LONG-LASTING WORK

LOGISTIC ADVANTAGES

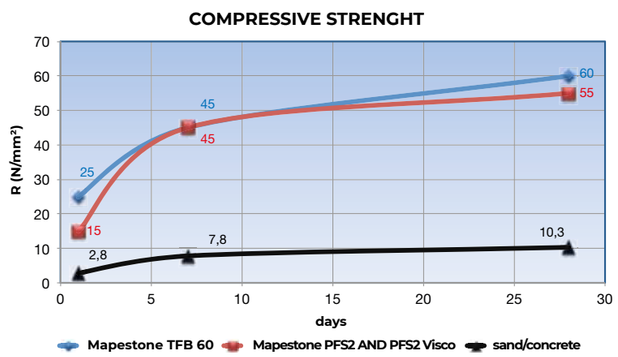
- REDUCTION IN AMOUNT OF WASTE AND OBSTACLES DUE TO ROAD-WORKS
- LOW IMPACT ON THE ENVIRONMENT
- EASY TO CLEAN

SOCIAL ADVANTAGES

- LOWER MAINTENANCE COSTS
- LESS NOISE
- LESS DISRUPTION FOR INHABITANTS
- FEWER ACCIDENTS (DUE TO FALLS FROM BIKES, MOPEDS AND HIGH HEELS)

ECONOMIC ADVANTAGES

- HIGHLY DURABLE FINISHED WORK
- REDUCTION IN MAINTENANCE AND/OR REPAIR WORKS
- NO WASTE OF MATERIAL
- LESS TIME REQUIRED FOR ROAD WORKS



NEUTRAL | DARK GREY | WHITE

Colours available for **Mapestone PFS 2**, **Mapestone PFS 2 Flex** and **Mapestone PFS 2 Visco**

Due to the printing processes involved, the colours should be taken as merely indicative of the shades of the actual products

MAPEI SOLUTIONS

MAPESTONE CALCIX SYSTEM

P4 P5 P6 P7

Pre-blended mortars for screeds and grouting, made from natural hydraulic lime (NHL), inorganic Pozzolanic materials rich in amorphous silica, selected aggregates and specific additives for laying stone paving in areas subject to high pedestrian and light traffic; class P4, P5, P6 and P7 according to UNI 11714-1:2018, with good mechanical strength and resistance to frost. The system is made up of **Mapestone TFB Calcix** bedding screed for stones and grouting mortars **Mapestone PFS Calcix** (light colour) and **Mapestone PFS Tenebris** (dark colour), for their grouting. The combined use of the products makes it possible to realise architectural pavements NOT subject to heavy traffic, in squares, roads and sidewalks in Old Towns present in our countries and cities. The system is ideal for laying pebbles, blocks, smolleri and low-thickness slabs.

MAPESTONE CALCIX AND SUSTAINABILITY

The high percentage of recycled material allows **Calcix** products to contribute to CAM national sustainability protocols (MEC – Minimum Environmental Criteria) and international protocols such as LEED and BREEAM. The special formulation of the products allows the reduction of greenhouse gas emissions and a lower consumption of mineral resources, while maintaining durability and quality performances intact.

TECHNICAL ADVANTAGES

- GOOD MECHANICAL STRENGTH
- HOMOGENOUS, UNIFORM PRODUCT
- RESISTANT TO FREEZING WEATHER AND DE-ICING SALTS
- GOOD ADHESION TO STONE MATERIAL

LOGISTIC ADVANTAGES

- LOW IMPACT ON THE ENVIRONMENT
- EASY TO CLEAN

SOCIAL ADVANTAGES

- LOWER MAINTENANCE COSTS
- LESS NOISE
- FEWER ACCIDENTS (DUE TO FALLS FROM BIKES, MOPEDS AND HIGH HEELS)
- SUSTAINABLE PRODUCT, THANKS TO ITS SPECIAL FORMULATION

ECONOMIC ADVANTAGES

- HIGHLY DURABLE FINISHED WORK
- REDUCTION IN MAINTENANCE AND/OR REPAIR WORKS
- NO WASTE OF MATERIAL
- LESS TIME REQUIRED FOR ROAD WORKS

SOME WORKS CARRIED OUT WITH MAPESTONE SYSTEM

Via Aquileia, Udine (Italy)

San Giovanni in Persiceto (Italy)

Assisi (Italy)

Old town of Orte (Italy)

Pedestrian zone in the old town of Košice (Slovakia)

Old town of Matera (Italy)

Parisian Hotel, Macau (China)

Largo Magnanapoli Rome (Italy)

Hôtel de Ville Vincennes, Paris (France)

Piazza Palazzo del Cinema, Lido di Venezia (Italy)

Via De' Cerretani Florence (Italy)

Piazza Unità d'Italia, Tradate (Italy)

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EVERYTHING'S OK, WITH MAPEI

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