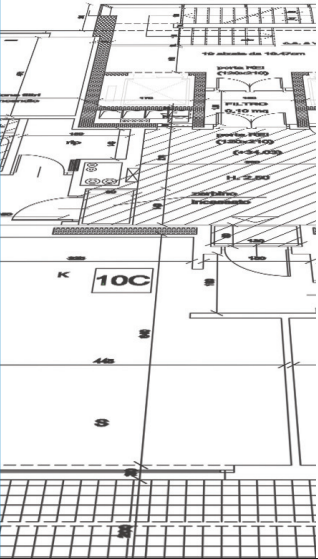


Q

ROAD MAINTENANCE AND URBAN FEATURES & FITTINGS



Q

specifications of **ROAD MAINTENANCE AND URBAN FEATURES & FITTINGS**

- Q.1** ***MAINTENANCE WORK ON URBAN AND EXTRA-URBAN ROADS***
- Q.1.1 **REPAIRING POT-HOLES IN ROADS**
- Q.2** ***ANCHORING URBAN FITTINGS***
- Q.2.1 **ANCHORING DRAIN SHAFTS, MAN-HOLES, ROAD SIGNS, FENCING AND ELECTRICITY AND TELEPHONE POLES**
Procedure
- Q.2.2 **GROUTING JOINTS**
Procedure
- Q.3** ***URBAN FITTINGS: INSTALLATION OF ARCHITECTONIC FLOORING***
- Q.3.1 **FORMING INSTALLATION LAYERS**
Procedure
- Q.3.2 **GROUTING JOINTS**
Procedure
- Q.4** ***DECORATIVE DRAINAGE FLOORING***
- Q.4.1 **HIGH-RESISTANCE, DECORATIVE, NATURAL STONE DRAINAGE FLOORING**
Procedure
- Q.5** ***INSTALLATION OF SYNTHETIC GRASS PLAYING SURFACES***
- Q.5.1 **INSTALLATION OF SYNTHETIC GRASS PLAYING SURFACES**
Procedure
- Q.6** ***INSTALLATION OF MULTI-PURPOSE PLAYING SURFACES, CYCLE TRACKS AND FOOTPATHS***
- Q.6.1 **INSTALLATION OF MULTI-PURPOSE PLAYING SURFACES**
Procedure
- Q.6.2 **INSTALLATION OF CYCLE TRACKS AND FOOTPATHS**
Procedure
- Q.7** ***MAPEI COLOR PAVING ARCHITECTURAL SURFACING***

Q.1 MAINTENANCE WORK ON URBAN AND EXTRA-URBAN ROADS

Q.1.1 REPAIRING POT-HOLES IN ROADS

Q.1.1.1 Application of one-component, ready-to-use, cold-applied reactive asphalt

Supply and application of one-component, solvent-free, ready-to-use, cold-applied, reactive asphalt conglomerate, which hardens in contact with the open air and water at temperatures down to 0°C (such as Mape-Asphalt Repair 0/8 produced by Mapei S.p.A.), for quick repairs to pot-holes in asphalt roads and industrial floors without interrupting the flow of traffic. Apply the product after preparing the substrate according to specification, which must be clean, well compacted and strong and free of debris and standing water. Spread the product in the hole using a trowel, rake or shovel, wet the surface with water and then compact the product manually or with a vibrating plate-compact or road roller, according to the size of the area under repair.

The product must have the following performance characteristics:

| | |
|--|--|
| consistency: | plastic |
| colour: | black |
| density (g/cm ³): | 2.3 |
| grain size (mm): | 0-8 |
| binder content (%): | 7.4-8.4 |
| softening temperature (°C): | 70-75 |
| content of gaps (%): | 7-9 |
| Marshall test (after 24 hours in water at +60°C) | |
| – stability (kN): | ≥ 4 |
| – slump (mm): | 2-5 |
| application temperature range: | from 0°C to +35°C |
| transitable: | immediately |
| consumption: | approximately 23 kg/m ² per centimetre of thickness (approximately 6 litres in volume of the bag) |

The following are included and calculated in the price for work completed according to specification:

– per square metre per mm of thickness (€/m²-cm)

Q.2 ANCHORING URBAN FITTINGS

Q.2.1 ANCHORING DRAIN SHAFTS, MAN-HOLES, ROAD SIGNS, FENCING AND ELECTRICITY AND TELEPHONE POLES

Procedure

The following products are recommended for anchoring urban fittings and features:

- **Mapegrout SV** one-component, rapid-setting and hardening, shrinkage-compensating castable mortar for reconstructing deteriorated concrete structures and for anchoring drain shafts, man-holes, urban features and fittings, road signs, fencing and electricity and telephone poles (see section **Q.2.1.1**);
- **Mapegrout SV T** one-component, rapid-setting and hardening, shrinkage-compensating thixotropic mortar for reconstructing deteriorated concrete structures and for anchoring drain shafts, man-holes, urban features and fittings, road signs, fencing and electricity and telephone poles (see section **Q.2.1.2**).

Q.2 ANCHORING URBAN FITTINGS

Q.2.1.1 Application of rapid-setting and hardening castable mortar

Supply and application of grey or black one-component, rapid-setting and hardening, shrinkage-compensating, castable mortar, made from hydraulic binders, high-strength cement, selected aggregates and special additives (such as **Mapegrout SV** produced by MAPEI S.p.A.), for reconstructing deteriorated concrete structures and for anchoring drain shafts, man-holes, urban features and fittings, road signs, fencing, electricity and telephone poles etc. Apply the mortar, after preparing the substrate according to specification (to be charged separately), by removing all deteriorated concrete to form a sufficiently-rough, solid substrate with no loose materials.

The product must be applied on a clean substrate saturated with clean water by casting it into the prepared area in a layer from 1 to 5 cm thick, making sure that all air is expelled, and must set to pedestrian traffic and wheeled vehicles after approximately 2 hours (at +20°C). If thicker layers are required, add 40% of dry, siliceous stone aggregate in a granulometric curve of 6 to 10 mm (such as Ghiaietto 6-10 produced by MAPEI S.p.A.) to the mortar (to be charged separately).

The product must comply with the minimum requirements of EN 1504-3 for structural R4-class structural mortars and have the following characteristics:

| | | | |
|---|------------------------------|-------|-------|
| application temperature range: | +5°C | +10°C | +20°C |
| pot life of mix: | 60' | 20' | 15' |
| time for complete setting: | 100' | 60' | 35' |
| compressive strength (EN 12190) (MPa): | | | |
| – 2 h: | > 4 | > 15 | > 20 |
| – 1 day: | > 34 | > 34 | > 34 |
| – 28 days: | > 55 | > 55 | > 55 |
| flexural strength (EN 196/1) (MPa): | > 9 (after 28 days) | | |
| compressive modulus of elasticity (EN 13412) (GPa): | 25 (after 28 days) | | |
| adhesion to substrate (EN 1542) (MPa): | > 2 (after 28 days) | | |
| resistance to accelerated carbonatation (EN 13295): | less than reference concrete | | |
| capillary absorption (EN 13057) (kg/m ² ·h ^{0.5}): | < 0.5 | | |
| thermal compatibility measured as adhesion according to EN 1542 (MPa): | | | |
| – freeze-thaw cycles with de-icing salts (EN 13687/1): | > 2 (after 50 cycles) | | |
| – storm cycles (EN 13687/2): | > 2 (after 30 cycles) | | |
| – dry thermal cycles (EN 13687/4): | > 2 (after 30 cycles) | | |
| reaction to fire (EN 13501-1) (Euroclass): | A1 | | |
| consumption (per cm of thickness) (kg/m ²): | 20 | | |

Mapegrout SV mixed with 40% of Ghiaietto 6-10:

| | | | |
|--|------|-------|-------|
| consistency of mix (EN 12350-2) (slump in cm): | 25 | | |
| compressive strength (EN 12390-3) (MPa): | +5°C | +10°C | +20°C |
| - 1 h: | - | - | > 15 |
| - 2 h: | > 4 | > 14 | > 20 |
| - 4 h: | > 20 | > 25 | > 25 |

consumption (per cm of thickness) (kg/m²): 14.5 (**Mapegrout SV**) 5.7 (Ghiaietto 6-10)

The following are included and calculated in the price for work completed according to specification:

- hydro-cleaning of deteriorated surfaces and saturation of substrate with clean water immediately before applying the mortar;
 - casting the mortar around the metallic elements;
 - careful curing of the mortar by spraying on water for at least 24 hours after application.
- per square metre per mm of thickness (€/m²-cm)



Q.2 ANCHORING URBAN FITTINGS

Q.2.1.2 Application of rapid-setting and hardening thixotropic mortar

Supply and application of black one-component, rapid-setting and hardening, shrinkage-compensating, thixotropic mortar, made from hydraulic binders, high-strength cement, selected aggregates and special additives (such as **Mapegrout SV T** produced by MAPEI S.p.A.), for reconstructing deteriorated concrete structures and for anchoring drain shafts, man-holes, urban features and fittings, road signs, fencing, electricity and telephone poles etc. Apply the mortar, after preparing the substrate according to specification (to be charged separately), by removing all deteriorated concrete to form a sufficiently-rough, solid substrate with no detached portions.

The product must be applied on a clean substrate saturated with clean water by trowel into the prepared area in a layer from 1 to 5 cm thick, and must set to pedestrian traffic and wheeled vehicles after approximately 2 hours (at +20°C).

The product must comply with the minimum requirements of EN 1504-3 for structural R4-class structural mortars and have the following characteristics:

| | | | |
|---|------------------------------|-------|-------|
| application temperature range: | +5°C | +10°C | +20°C |
| pot life of mix: | 30' | 15' | 10' |
| time for complete setting: | 100' | 60' | 35' |
| compressive strength (EN 12190) (MPa): | | | |
| – 2 h: | 2 | 10 | 17 |
| – 1 day: | 20 | 22 | 25 |
| – 28 days: | 45 | 45 | 45 |
| flexural strength (EN 196/1) (MPa): | 6 (after 28 days) | | |
| compressive modulus of elasticity (EN 13412) (GPa): | 25 (after 28 days) | | |
| adhesion to substrate (EN 1542) (MPa): | > 2 (after 28 days) | | |
| resistance to accelerated carbonatation (EN 13295): | less than reference concrete | | |
| capillary absorption (EN 13057) (kg/m ² ·h ^{0.5}): | < 0.5 | | |
| thermal compatibility to freeze/thaw cycles with de-icing salts (EN 13687/1) measured as adhesion according to EN 1542 (MPa): | > 2 (after 50 cycles) | | |
| reaction to fire (EN 13501-1) (Euroclass): | A1 | | |
| consumption (per cm of thickness) (kg/m ²): | 20 | | |

The following are included and calculated in the price for work completed according to specification:

- hydro-cleaning of deteriorated surfaces and saturation of substrate with water immediately before applying the mortar;
 - application of the mortar around the metallic elements;
 - careful curing of the mortar by spraying on water for at least 24 hours after application.
- per square metre per mm of thickness (€/m²·cm)



**Q.2.2 GROUTING JOINTS
Procedure**

After preparing the substrate and installation layer:

- Lay the stone according to the design with a 5 to 10 mm gap between each piece.
- Hose the flooring with a good, continuous flow of clean water so that the installation layer is well hydrated and then tamp the surface of the stone.

Grout the joints using **Mapestone PFS 2** (see section **Q.2.2.1**) or **Mapestone PFS PCC 2** (see section **Q.2.2.2**) using the “fresh on fresh” technique as follows:

1. before pouring in the mortar, the stones must be wet and the joints must be clean and free of standing water;
2. prepare the **Mapestone PFS 2** or **Mapestone PFS PCC 2** pre-blended grouting mortar by mechanically mixing for at least 3 minutes with 3.8 to 4.5 litres of water per sack (according to the surrounding temperature) until a fluid, even slurry is formed;
3. pour the slurry onto the wet stones with the aid of a rubber rake or by pouring it directly into the joints using suitable containers. Deep joints may be filled in a single application.

Clean the stones as per standard procedure before the **Mapestone PFS 2** or **Mapestone PFS PCC 2** has completely hardened. Residues of mortar may be removed using sawdust, by gently hosing the surface or with a suitable machine.

Once laid, if the atmospheric conditions are unsuitable, special protective or anti-evaporation systems must be used to avoid the material drying out too quickly and to keep it at the optimum temperature.

Q.2 ANCHORING URBAN FITTINGS

Q.2.2.1 Grouting joints with pre-blended mortar

Supply and application of pre-blended mortar (such as **Mapestone PFS 2** produced by MAPEI S.p.A.), made from special binders and top-grade aggregates in a granulometric curve (max. size of inert 2 mm), specifically produced for filling joints in architectonic stone road surfaces. The product must be exposure class XF4, comply with UNI EN 206-1:2006 standards and have a characteristic resistance value of $R_{ck} = 55 \text{ N/mm}^2$. Application of the mortar must allow all gaps to be filled through the thickness of the layer applied to obtain a perfectly-shaped form, as prescribed by the Director of Works.

Included and calculated in the price all tasks and instructions for work completed according to specification:

..... (€/m²)



Q.2 ANCHORING URBAN FITTINGS

Q.2.2.2 Grouting joints with pre-blended, polymer-modified mortar

Supply and application of pre-blended, polymer-modified mortar (such as Mapestone PFS PCC 2 produced by MAPEI S.p.A.) with a low modulus of elasticity (17 GPa), made from special binders and top-grade aggregates in a granulometric curve (max. size of inert 2 mm). The product must be exposure class XF4, comply with EN 206 standards and have a mechanical strength at 28 days higher than 45 N/mm². Application of the mortar must allow all gaps to be filled through the thickness of the layer applied to obtain a perfectly-shaped form, as prescribed by the operations director.

Included and calculated in the price all tasks and instructions for work completed according to specification:

| | |
|--|---------------------------|
| | (€/m ²) |
|--|---------------------------|

Q.3.1 FORMING INSTALLATION LAYERS

Procedure

To guarantee the durability of work carried out, the substrate on which Mapestone System is to be installed must be dimensionally stable (e.g. a concrete floor slab with electro-welded reinforcement mesh).

The following operations must then be carried out:

- dust the substrate (e.g. floor slab made from concrete with electro-welded reinforcement mesh) with sand or lay non-woven fabric on the substrate to create isolated flooring;
- form expansion joints, if required;
- spread on the installation substrate.

If the flooring is for traffic use, we recommend using **Mapestone TFB 60** for the installation substrate (see section **Q.3.1.1**). In such cases, follow these guidelines:

a) mix the **Mapestone TFB 60** XF4 exposure-class mortar with the correct amount of water according to the type of flooring to be laid:

Laying tiles, slabs and bricks

Mix **Mapestone TFB 60** with enough water to obtain a “plastic” consistency (approximately 9%). The same consistency may also be used for laying small blocks in straight rows.

Laying small blocks, smoller bricks and cobblestones

Mix **Mapestone TFB 60** with enough water to obtain a “no-slump” consistency.

b) Spread a 5-7 cm thick layer of **Mapestone TFB 60** on small areas of the substrate on which the stone is to be laid;

make sure that there is the optimum amount of humidity in the mix to maintain the characteristics of the product.

If the flooring is made from slabs, before laying the stone on the fresh **Mapestone TFB 60** installation layer, apply a layer of bonding slurry made from 1 kg of **Planicrete**, 1 kg of water and 3 to 4 kg of cement on the back of the stone.

Q.3 URBAN FITTINGS: INSTALLATION OF ARCHITECTONIC FLOORING**Q.3.1.1 Forming the installation layer**

Supply and installation of paving road made of (describe type of stone, shape and dimension - for instance: blocks of porphyry cubes 10x10 placed on straight rows) over a special layer of pre-mixed mortar (such as Mapestone TFB 60 produced by MAPEI S.p.A.) made from special binders and selected aggregates in a granulometric curve (D. max 2.5 mm).

The product must be exposure class XF4, comply with EN 206 standards and have a mechanical strength at 28 days higher than 60 N/mm².

After mixing the mortar with the required amount of water (according to the consistency required for the form of stone to be laid), spread a 5-7 cm thick installation layer on small areas of the substrate in order to lay the stone and create the specified design for the selected form of stone.

Included and calculated in the price all tasks and instructions for work completed according to specification:

– per square metre per mm of thickness (€/m²-cm)

Q.3.2 GROUTING JOINTS Procedure

After preparing the substrate and installation layer:

- lay the stone according to the design with a 5 to 10 mm gap between each piece;
- hose the flooring with a good, continuous flow of water so that the installation layer is well hydrated and then tamp the surface of the stone.

Grout the joints using **Mapestone PFS 2** (see section **Q.3.2.1**) or **Mapestone PFS PCC 2** (see section **Q.3.2.2**) using the “fresh on fresh” technique as follows:

1. before pouring in the mortar, the stones must be wet and the joints must be clean and free of stagnant water;
 2. prepare the **Mapestone PFS 2** or **Mapestone PFS PCC 2** pre-blended grouting mortar by mixing for at least 3 minutes with 3.8 to 4.5 litres of water per sack (according to the surrounding temperature) with a beater or site mixer until a fluid, even slurry is formed;
 3. pour the slurry onto the wet stones and spread it with a rubber rake, or pour it directly into the joints using suitable containers. Deep joints may be filled in a single application.
- Clean the stones as per standard procedure before the **Mapestone PFS 2** or **Mapestone PFS PCC 2** has completely hardened. Residues of mortar may be removed using sawdust, by gently hosing the surface or with a suitable machine.
 - Once laid, if the atmospheric conditions are unsuitable, special protective or anti-evaporation systems must be used to avoid the material drying out too quickly and to keep it at the optimum temperature.

Q.3 URBAN FITTINGS: INSTALLATION OF ARCHITECTONIC FLOORING**Q.3.2.1 Grouting joints with pre-blended mortar**

Supply and application of pre-blended mortar (such as Mapestone PFS 2 produced by MAPEI S.p.A.), made from special binders and top-grade aggregates in a granulometric curve (max. size of inert 2 mm), specifically produced for filling joints in architectonic stone road surfaces. The product must be exposure class XF4, comply with EN 206 standards and have a mechanical strength at 28 days higher than 55 N/mm². Application of the mortar must allow all gaps to be filled through the thickness of the layer applied to obtain a perfectly-shaped form, as prescribed by the operations director.

Included and calculated in the price all tasks and instructions for work completed according to specification:

..... (€/m²)

Q.4 **DECORATIVE DRAINAGE FLOORING**

Q.4.1 **HIGH-RESISTANCE, DECORATIVE, NATURAL STONE DRAINAGE FLOORING** **Procedure**

To create internal and external, decorative drainage flooring with high resistance to wear and yellowing using dry aggregates and/or natural stone, such as in piazzas, parks, gardens, etc., we recommend using **Mapefloor Binder 930** (see section **Q.4.1.1**) one-component, solvent-free, aliphatic, moisture-curing, non-yellowing, transparent polyurethane binder.

Q.4 DECORATIVE DRAINAGE FLOORING

Q.4.1.1 Installation of drainage coatings using one-component, aliphatic, polyurethane binder

Supply and application of one-component, solvent-free, aliphatic, moisture-curing, non-yellowing, transparent polyurethane binder (such as **Mapefloor Binder 930** produced by S.p.A.) mixed with natural, dry aggregates such as marble, quartz or natural stone in various colours and grain sizes (2-4 or 4-8 mm), to create internal and external drainage coatings with high resistance to wear and yellowing. Prepare the mix by adding the binder to the chosen aggregates at a ratio of 1:20, and spread it on a suitably prepared, primed substrate (to be charged separately) like normal mortar using a rake and straight edge, then compact the mix with a smooth, flat trowel and/or a mechanical vibro-compactor (helicopter).

The product must have the following performance characteristics:

| | |
|---|--|
| colour: | transparent, colourless |
| appearance: | liquid |
| workability time: | 70 min. |
| set to light foot traffic | 8 h |
| set to foot traffic: | 48 h |
| final hardening time: | 7 days |
| binder/inert consumption: | 1:20 |
| compressive strength at +23°C (EN196-1) (N/mm ²): | 11.44 (after 3 days) 12.47 (after 7 days) |
| flexural strength at +23°C (EN196-1) (N/mm ²): | 4.58 (after 3 days) 5.19 (after 7 days) |

Included and calculated in the price for work completed according to specification:

..... (€/m²)



Q.5.1 INSTALLATION OF SYNTHETIC GRASS PLAYING SURFACES Procedure

Checking and preparing the substrate

Before installing artificial grass surfaces, the substrate must be prepared according to specification. After checking that the ground is suitable, it may be stabilised using **Mapesoil 100** (see section **Q.5.1.1**). When analysing the ground soil in the laboratory, the amount of stabiliser and mixing water required must also be defined.

The first step is to prepare the ground:

- for existing pitches, remove the topsoil and any vegetation in the ground, break up the surface of the exposed soil and, if required, correct the grain size of the broken-up soil;
- for new pitches, roll the surface of the installation layer and spread on a layer of aggregate according to the specified design thickness.

After preparing the ground as described above, spread on a layer of **Mapesoil 100** with a sand-blaster, salt-spreader or similar equipment at the rate per square metre defined during the laboratory tests. Mix the **Mapesoil 100** thoroughly into the entire thickness of the layer of ground to be stabilised using a harrow, disk harrow, horizontal plough, etc.

After mixing the **Mapesoil 100** into the ground soil, wet the ground if required until the level of humidity defined during the laboratory tests is reached.

Once the required level of humidity is reached, complete the stabilisation treatment by compacting the ground with a vibro-roller (minimum 3 tons). Roll the ground a number of times until the grade of compaction defined during the preliminary phase is reached. Level off and form the slope on the surface either before or after compacting the ground. The entire surface must then be cured by spraying on water for at least 24 hours.

If it is not possible to stabilise the ground with **Mapesoil 100**, before installing the synthetic grass, the substrate must be checked to make sure it complies with the client's specifications or, if it requires approval, that it meets the minimum requirements of the relative sporting federation.

Before installing the grass, unroll and lay out the rolls to acclimatise them to the surrounding conditions and to relieve any stresses accumulated in the rolls.

Installation of the grass

After laying out and acclimatising the rolls of grass, bond the joints between each roll using special 40 cm wide Ultrabond Turf Tape 100 jointing tape coated with a suitable adhesive applied using a notched trowel or a spreader.

It is very important that the correct amount of adhesive is applied so that the adhesive transfers fully onto the back of the rolls of synthetic grass and prevents it detaching.

After bonding the edges and once the adhesive has set, the pitch may be marked out by bonding rolls of regulation-width white lines with the same characteristics as the synthetic grass on the surface.

The system used to bond the lines is the same as that used to bond the edges of the rolls.

After marking out the lines, dress the pitch with silica sand and infill the surface with organic rubber granules to stabilise the grass surface and promote the drainage of water, as specified by various sports federations (FIFA; UEFA; LND).

Which adhesive to use to bond the joints between the rolls depends particularly on the type of grass installed and also if approval is required for sports federations.

To bond the joints, use either **Ultrabond Turf PU 1K** (see section **Q.5.1.2**) or **Ultrabond Turf PU 2K** (see section **Q.5.1.3**), depending on the federation's certificate of approval. The second adhesive has very low emission of volatile organic compounds (VOC).

Q.5 INSTALLATION OF SYNTHETIC GRASS PLAYING SURFACES

Q.5.1.1 Preparation of substrates by stabilisation

Supply and application of an inorganic, fibre-reinforced, powdered stabilising system (such as **Mapesoil 100** produced by MAPEI S.p.A.). The stabilising agent is either mixed into the ground soil using suitable equipment to correct the ground soil without removing and replacing it (class A1-A2, and in all cases no lower than class A2-A4), or into recycled material applied in layers according to design specifications (minimum thickness 8 cm). Recycled material means inert material from demolition and maintenance work of buildings or infrastructures, including partial demolition and maintenance work. The content of organic substances in the material to be stabilised must be less than 3% according to UNI EN 1744/1 standards.

The stabilising agent is a pre-blended, fibre-reinforced, powdered hydraulic binder (fibre content $\geq 0.1\%$) made from pozzolanic minerals (minimum 50% in weight of the agent, of which at least 22% with inert and binder properties). The stabilising agent must also guarantee that the loss in compressive strength is less than 30% after 28 days, demonstrated on 4x4x16 cm test pieces prepared according to UNI EN 196-1 standards with a binder/water ratio of 0.5 and subject to freeze/thaw cycles according to EN 1348 standards.

Apply the stabilising agent using a binder spreading machine equipped with a dosing system to guarantee even distribution of the stabiliser if the consistency and characteristics of the ground soil or the spreading speed vary. Mix the ground soil with the stabilising agent using equipment which scarifies, pulverises and mixes the material evenly. The installation surface must be prepared according to specification using laser-controlled equipment, and according to the specified apparent density (NR B.U. N°22) and load-bearing capacity (minimum 500 kg/cm² - Deformation modulus measured using a \varnothing 300 mm plate).

Before work commences, the installation company must prepare a preliminary laboratory study of the material to be stabilised containing the following information:

- granulometric analysis (CNR UNI 10006);
- Atterberg limits (CNR UNI 10014);
- classification (CNR UNI 10006);
- optimum moisture content (OMC) and dry density of the ground soil and ground soil/stabiliser mix;
- CBR load-bearing index (CNR UNI 10009) of the ground as is and after adding the stabiliser.

Prepare the substrate as follows:

- remove the topsoil and any vegetation in the ground using a skimmer;
- break up the surface of the exposed ground soil or the soil added to bring it up to the specified level (to a depth of at least 10 cm) with a disk-harrow, plough, harrow or similar equipment;
- wet the ground to the specified optimum moisture content (OMC), as per the value determined by laboratory tests (Proctor curve);
- spread on the stabilising agent using a suitable spreading machine. This operation must only be carried out on the portion of ground which will be treated the same day. The dose of **Mapesoil 100** or similar stabiliser, calculated through laboratory tests, varies between 3 and 6% on the weight of the ground soil, equal to approximately 6-12 kg per square metre to a depth of 8 cm (minimum);
- mix the ground soil using a horizontal plough or disk harrow to mix the binder and ground soil together down to the specified depth. The number of times it must be mixed will depend on the type of ground soil and the level of humidity;
- level and even out the ground using laser-controlled equipment;
- compact the ground with a vibro-roller (minimum 3 tons) to a compaction density of at least 98% AASHTO;
- cure the surface for at least 24 hours after application with water.

Included and calculated in the price for work completed according to specification:

..... (€/m²)



Q.5 INSTALLATION OF SYNTHETIC GRASS PLAYING SURFACES

Q.5.1.2 Installation of synthetic grass using one-component polyurethane adhesive

Installation of synthetic grass after preparing the surface according to specification and checking the surface. Install the grass as follows:

- lay the rolls of grass in their required position so they may acclimatise to the surrounding conditions;
- position jointing tape (such as Ultrabond Turf Tape 100 produced by MAPEI S.p.A.) in correspondence with the joints between each adjacent roll;
- spread one-component polyurethane adhesive (such as **Ultrabond Turf PU 1K**) on the tape using a notched trowel or spreader;
- bond the edges of the sheets to the tape.

The jointing tape must have the following characteristics:

thickness: 0.100 mm
width of roll: 400 mm

The adhesive used to install the grass must have the following characteristics:

density of mix (kg/m³): 1,350
pot life of mix: 60 minutes
open time: 80-100 minutes
time to completely set: 12 hours
set to foot traffic: 12 hours

Included and calculated in the price for work completed according to specification:

- checking suitability of the installation surface;
- cutting and trimming to size and marking out the surface of the grass;
- cleaning and removal of waste material upon completion of work, differential collection of waste material, transport and delivery of waste material to an authorised waste disposal site and all waste disposal charges;

- per square metre (€/m²)



Q.5 INSTALLATION OF SYNTHETIC GRASS PLAYING SURFACES

Q.5.1.3 Installation of synthetic grass using two-component polyurethane adhesive

Installation of synthetic grass after preparing the surface according to specification and checking the surface. Install the grass as follows:

- lay the rolls of grass in their required position so they may acclimatise to the surrounding conditions;
- position jointing tape (such as Ultrabond Turf Tape 100 produced by MAPEI S.p.A.) in correspondence with the joints between each adjacent roll;
- spread two-component, polyurethane adhesive with very low emission of volatile organic compounds (**Ultrabond Turf PU 2K**) on the tape using a notched trowel or spreader;
- bond the edges of the sheets to the tape.

The jointing tape must have the following characteristics:

thickness: 0.100 mm
width of roll: 400 mm

The adhesive used to install the grass must have the following characteristics:

density of mix (kg/m³): 1,600
pot life of mix: 60 minutes
open time: 70-80 minutes
time to completely set: 12 hours
set to foot traffic: 12-24 hours
EMICODE: EC1 R

Included and calculated in the price for work completed according to specification:

- checking suitability of the installation surface;
- cutting and trimming to size and marking out the surface of the grass;
- cleaning and removal of waste material upon completion of work, differential collection of waste material, transport and delivery of waste material to an authorised waste disposal site and all waste disposal charges;

- per square metre (€/m²)



Q.6 **INSTALLATION OF MULTI-PURPOSE PLAYING SURFACES, CYCLE TRACKS AND FOOTPATHS**

Q.6.1 **INSTALLATION OF MULTI-PURPOSE PLAYING SURFACES** **Procedure**

Checking and preparing the substrate

Before finishing off the surface, check that the substrate is in good condition. Asphalt substrates must be uniform, compact and have no detached areas, cracks or hollows. Concrete substrates must be solid, well-cured and dry and have no detached areas, paint, wax or any other material or substance which could compromise the bond of the finishing layer. Concrete surfaces impregnated with oil and grease must be thoroughly cleaned with a 10% solution of water and caustic soda and then rinsed several times with plenty of clean water. If these substances have penetrated deeper into the substrate, all the polluted concrete must be removed by scarifying and then repaired.

Treat concrete substrates with an even coat of **Mapecoat I 600 W** applied using a medium or long-haired roller.

Application of the coating system

After preparing the surface according to specification, apply the **Mapecoat TNS Multisport Professional** system (see section **Q.6.1.1**).

Apply **Mapecoat TNS White Base Coat** on the surface. This product may also be used to eliminate uneven areas and hollows before applying the coloured finishing coat. Apply the undercoat as is or diluted with 5-15% of water using a metal or rubber trowel. Apply 1 or 2 coats of undercoat according to the condition of the substrate and the amount of cover required, especially if the finishing coat is a particularly bright colour. Wait 8-12 hours between each coat.

Do not expose **Mapecoat TNS White Base Coat** to direct sunlight or the external environment, and protect it with a final coat of **Mapecoat TNS Finish**.

When the undercoat is dry, apply 2-3 coats of **Mapecoat TNS Finish** with a rubber trowel, waiting 8-12 hours between each coat. The number of coats required depends on the intensity of colour required (the colour is brighter if more coats are applied) and the hiding capacity of the colour.

When the final coat of **Mapecoat TNS Finish** is dry, mark out the surface using **Mapecoat TNS Line**.

Q.6 INSTALLATION OF MULTI-PURPOSE PLAYING SURFACES, CYCLE TRACKS AND FOOTPATHS

Q.6.1.1 Installation of multi-purpose playing surfaces by applying an acrylic resin system in water dispersion

Installation of multi-purpose playing surfaces by applying a coloured acrylic resin system in water dispersion.

Apply the system as follows:

- check that the surface of the asphalt or concrete is suitable for application;
- On concrete substrates, we recommend applying a two-component, transparent epoxy primer in water dispersion (such as Mapecoat I 600 W produced by MAPEI S.p.A.);
- apply 1-2 coats of undercoat with good filling properties using a metal or rubber trowel to prepare and even out the surface (such as **Mapecoat TNS White Base Coat** produced by MAPEI S.p.A.), diluted if required with 5-15% of water. Wait 8-12 hours between each coat;
- when the undercoat is dry, apply 2-3 coats of coloured acrylic resin finish with selected fillers in water dispersion (such as **Mapecoat TNS Finish** produced by MAPEI S.p.A.), in the colour indicated by the Director of Works. Wait 8-12 hours between each coat;
- mark out lines on the playing surface if required using acrylic resin paint in water dispersion (such as **Mapecoat TNS Line** produced by MAPEI S.p.A.).

The coloured finishing product must have the following characteristics:

| | |
|---|-----------------------|
| dry solids content (%): | 70 |
| density (g/cm ³): | approx. 1.40 |
| failure load (DIN 53504 after 7 days at +23°C): | 0.7 N/mm ² |
| vapour diffusion resistance coefficient (μ): | 200 |
| adhesion to concrete: | 2.4 N/mm ² |

The following are included and calculated in the price for work completed according to specification:

- checking suitability of the installation surface;
 - cleaning and removal of waste material upon completion of work, differential collection of waste material, transport and delivery of waste material to an authorised waste disposal site and all waste disposal charges;
- per square metre (€/m²)



Q.6 INSTALLATION OF MULTI-PURPOSE PLAYING SURFACES, CYCLE TRACKS AND FOOTPATHS

Q.6.2 INSTALLATION OF CYCLE TRACKS AND FOOTPATHS Procedure

Checking and preparing the substrate

Before finishing the surface, check that the substrate is in good condition. Asphalt substrates must be uniform, compact and have no detached areas, cracks or hollows. Concrete substrates must be solid, well-cured and dry and have no detached areas, paint, wax or any other material or substance which could compromise the bond of the finishing layer. Concrete surfaces impregnated with oil and grease must be thoroughly cleaned with a 10% solution of water and caustic soda and then rinsed several times with plenty of clean water. If these substances have penetrated deeper into the substrate, all the polluted concrete must be removed by scarifying and then repaired.

Treat concrete substrates with an even coat of Mapecoat I 600 W applied using a medium or long-haired roller.

Application of the coating system

After preparing the surface according to specification, apply the **Mapecoat TNS** system (see section **Q.6.2.1**).

Apply **Mapecoat TNS Finish** on the surface. The first coat of undercoat may be applied as is or diluted with 5-15% of water using a metal or rubber trowel.

When the undercoat is dry, apply 2-3 coats of **Mapecoat TNS Finish** with a rubber trowel, waiting 8-12 hours between each coat. The number of coats required depends on the intensity of colour required (the colour is brighter if more coats are applied) and the hiding capacity of the colour.

When the final coat of **Mapecoat TNS Finish** is dry, mark out the cycle track or footpath using **Mapecoat TNS Line**.

Q.6 INSTALLATION OF MULTI-PURPOSE PLAYING SURFACES, CYCLE TRACKS AND FOOTPATHS

Q.6.2.1 Installation of cycle tracks and footpaths by applying an acrylic resin system in water dispersion

Installation of cycle tracks and footpaths by applying a coloured acrylic resin system in water dispersion.

Apply the system as follows:

- check that the surface of the asphalt or concrete is suitable for application; On concrete substrates, we recommend applying a two-component, transparent epoxy primer in water dispersion (such as **Mapecoat I 600 W** produced by MAPEI S.p.A.);
- when the undercoat is dry, apply 3-4 coats of coloured acrylic resin finish with selected fillers in water dispersion (such as **Mapecoat TNS Finish** produced by MAPEI S.p.A.), in the colour indicated by the Director of Works. Wait 8-12 hours between each coat;
- mark out lines for the cycle track or footpath if required using acrylic resin paint in water dispersion (such as **Mapecoat TNS Line** produced by MAPEI S.p.A.).

The coloured finishing product must have the following characteristics:

| | |
|---|-----------------------|
| dry solids content (%): | 70 |
| density (g/cm ³): | approx. 1.40 |
| failure load (DIN 53504 after 7 days at +23°C): | 0.7 N/mm ² |
| vapour diffusion resistance coefficient (μ): | 200 |
| adhesion to concrete: | 2.4 N/mm ² |

The following are included and calculated in the price for work completed according to specification:

- checking suitability of the installation surface;
- cleaning and removal of waste material upon completion of work, differential collection of waste material, transport and delivery of waste material to an authorised waste disposal site and all waste disposal charges;
- *per square metre* (€/m²)



Q.7 MAPEI COLOR PAVING ARCHITECTURAL SURFACING

Supply and installation of concrete architectural surfacing with an exposed, rinsed effect finish, such as Mapei Color Paving by MAPEI S.p.A.

In compliance with the dispositions of UNI EN 206:2014 and applicable norms and standards, and according to the area of use of the surface, the designer (or someone acting on their behalf) has defined the following characteristics and parameters that need to be adhered to when installing the surfacing in order to achieve the best functional and performance figures, the best finish possible and to guarantee the durability of the surfacing:

Concrete: Rck Exposure class

Colour of cementitious matrix N neutral R red G yellow S sand Personalised colour:

Thickness of surfacing (cm): Thickness and type of substrate:

Aggregates: Type: Colour: Size: min max

Type and position of joints

Other details/special requirements

The specified concrete must be made according to the instructions in the relative Technical Data Sheet and, depending on the characteristics and size of the site, must be mixed using one of the following systems which have been specifically developed and are specified for making this type of exposed, rinsed aggregate surfacing by MAPEI S.p.A.: Color Paving Admix - Color Paving Binder - Color Paving Pronto.

Before laying the surfacing, samples measuring cm x cm each must be made directly on site and then approved by the Director of Works.

The mix must be prepared using a suitable mixing unit (dumper mixer, standard site mixer, concrete truck, etc.) until it is perfectly blended and is in workability class S3 (recommended slump 14-15 cm).

When the concrete has been mixed, it must guarantee the minimum performance characteristics and durability specified by the designer and offers:

- higher resistance to freeze/thaw cycles, abrasion and cracking so that electro-welded reinforcing mesh is required (unless specified);
- a durable cementitious matrix with an even colour throughout and less efflorescence.

The substrate must be designed according to its area of use and the Mapei Color Paving finishing layer must only be applied after preparing the substrate as specified (substrate not included in the scope of supply).

Expansion joints, construction joints and/or any inserts that form the pattern in the surfacing must be positioned as specified by the Director of Works and according to the attached tables.

All inserts, kerbstones and other features in or around the surfacing must be protected beforehand with a suitable product, such as Mapewash Protex by MAPEI S.p.A., so they do not get dirty when laying the concrete and/or applying surface set retardants.

The architectural finishing concrete must have the same characteristics as indicated previously and all the components in the mix (aggregates, cement, etc.) must comply with current standards and be suitable for making concrete.

Mapei Color Paving concrete must then be laid in the sectioned areas prepared previously.

The concrete must be tamped and smoothed over by hand to remove the wave effect finish of the straight edge used to level off the concrete. Do not vibro-compact the concrete; the larger aggregates could sink to the bottom and the cementitious paste could rise to the surface.

As you tamp and smooth over the surface, apply an even coat of vegetable-base surface set retardant with a low pressure hand pump (such as Mapewash PO by MAPEI S.p.A.), at a rate of around 3-4 m²/litre. The surface set retardant must:

- delay setting of the surface of the concrete down to the rinsing depth required;
- act as an anti-evaporation agent until it is washed off;
- resist heavy rain;
- be 100% ecological.

How deep the Mapewash PO rinses away the conglomerate depends on the particle size of the aggregates specified by the designer, according to the Technical Data Sheet of the product, and must be approved according to the samples taken before carrying out the work.

After around 24 hours the surface is washed with a power cleaner using cold water at a pressure of 150/200 bar, depending on the amount and characteristics of cement used in the mix and the surrounding temperature and level of humidity. This operation, which must be carried out with great precision, allows the cement and sand to be rinsed off from the areas of the surface that have not hardened to expose the large aggregates used to make the concrete down to the depth established previously, so that an architectural exposed aggregate finish is left.

The surface should then be protected with a suitable product such as from the Mapecrete line by MAPEI S.p.A. to increase the durability of the surfacing even further, reduce its maintenance costs and/or to give it a particular finish.