Drainbeton®

Concrete for self-draining paving

DESCRIPTION

High-performance self-draining and sound-absorbing concrete, specially designed for the paving sector.

The workability characteristics of the material allow it to be laid using a road paver.

Drainbeton® can be used in a single-layer configuration (in natural or pigmented colour), or covered with a wear layer of porous asphalt, to create double-drainage/sound-absorbing surface.

Drainbeton® is particularly recommended for:

- self-draining road surfaces (in single-layer configuration, or combined with a porous asphalt wear layer)
- cycle or foot paths
- secondary and access roads
- mixed-use areas and 30 kph zones
- avenues and roads in environmentally protected areas
- paths for sports facilities and golf course
- car parks

The use of self-draining materials on roads is becoming more and more common, both to meet the high demands of road safety even in unfavourable weather conditions and as a means of managing rainwater runoff.

The most common measures are the use of porous asphalt or, alternatively, self-locking pavers.

The advantages of asphalt's ease of laying is inevitably offset by the high cost of raw materials, especially bitumen, which tracks the constantly rising cost of oil. In the case of double-layer self-draining/sound absorbent paving, costs increase further, both in terms of installation and planned maintenance during the infrastructure's lifetime.

The use of self-locking pavers is also particularly expensive, both in terms of time and cost. In addition, the surface regularity characteristics required for the work cannot

always be guaranteed. If the structure is designed to carry dynamic loads, there is also the problem of poor road surface stability, which may, over time, suffer localised failure with frequent dislodging of the pavers.

Drainbeton® is the solution that meets the various structural and aesthetic requirements, while reducing both construction and maintenance costs.

LAYING

The mix has been specially designed for use with road pavers. The workability of the mix means that it can be laid using procedures and methods similar to those normally used for road surfacing.

This not only speeds up the surfacing process, but also ensures full control over the level and evenness of the road surface

In addition:

- the laying is carried out "cold", therefore without the emission of fumes into the environment and risks to the safety of operatives;
- the material can be laid at ambient temperatures significantly lower than the minimum for asphalt;
- **Drainbeton®** paving can be coloured throughout its entire thickness (pigmentation with metal oxides), giving it a very natural appearance, or its surface can be treated with special non-filmogenic mineralising solutions which, by penetrating into the substrate in a grey colour, make the material itself more resistant to external attack (de-icing salts, detergents, mechanical sheer forces, UV rays), giving a totally uniform and even more long-lasting colour effect, while maintaining its drainage properties;
- the laying surface requires the same regularity and load-bearing capacity characteristics as those normally required for road paving substrates.

STRENGTH

A few days after laying, **Drainbeton®** achieves sufficient strength to open the road to traffic, including construction vehicles. The strengths at 7 and 28 days are such that the material can also be used for high-volume road surfacing.

DRAINABILITY

The high percentage of interconnected cavities enables **Drainbeton®** to drain 30 l/m2 every second, while still ensuring high load-bearing capacity.

ANTI-ICING EFFECT

The open matrix of **Drainbeton®** allows continuous air circulation, which speeds up the melting process of snow and ice.

LOWER HEAT ABSORPTION

The light colour of the material, together with the high porosity of the mix, means that it is less likely to absorb heat than asphalts, which also means that heat dissipates more quickly. The reduced thermal emissivity of **Drainbeton®** surfaces therefore guarantees that the user perceives a heat at about 10°C less than a surface made of porous asphalt.

HYDROLOGICAL MITIGATION

Its excellent drainage properties make **Drainbeton®** particularly suitable for use in environmentally protected areas where rainwater must be returned to the ground.

FILTERING ACTION

The filtering structure of the material reduces the need for rainwater treatment and also the harmful effects of pollutants.

RESISTANCE TO FIRE AND HYDROCARBONS

Drainbeton® is resistant to hydrocarbons and fire. This allows the material to be used in areas at particular risk of fire or fuel spillage (e.g. car parks, service stations, fuel depots, etc.).

MAINTENANCE

Drainbeton® is able to retain its physical, mechanical and aesthetic characteristics over time and therefore does not require any special maintenance.

For applications in areas affected by large amounts of debris or dust, it may be necessary occasionally to restore drainability by cleaning with pressurised water or industrial suction sweeping machines.

APPLICATION IN A DOUBLE-LAYER ROAD DRAINAGE PACKAGE

Drainbeton® can be used in combination with a porous asphalt wear layer to create a dual-drainage/sound-absorbing surface.

Drainbeton® can therefore replace the base and binder layers (normally "closed"), giving the package not only double drainability and sound absorption characteristics, but also less deformability and greater resistance to loads, increasing the useful life of the road surface.

The advantages of using this solution can be summarised as follows:

- Thanks to the asphalt wear layer, the surface of the self-draining paving appears "normal" and is therefore perceived positively by both public authorities and road users;
- For the same reason, the surface characteristics of adhesion, surface evenness and compatibility with road markings are guaranteed;
- The presence of two highly porous layers gives the paving considerable drainage capabilities, as well as sound absorption properties distributed over different ranges of sound frequencies;
- Thanks to the load-bearing capacity and fatigue resistance of the material, the paving is able to guarantee a long service life with little maintenance, mainly limited to the asphalt wear layer;
- The double drainage layer reduces the obstruction of the interconnected voids through a self-cleaning action, thus prolonging the drainage properties over time;
- Construction and maintenance costs are much lower than for a traditional road package. stradale tradizionale.

DEFINITION (AND ORDER)	DRAINBETON®	
	Workability	damp/plastic soil
	Average drainability	30/l/mq/s (HC=0,06)
	Volumetric runoff coefficient (Cv) (*):	0,3 – 0,5
	Average strength (3 days)	10 MPa
	Average strength (7 days)	13 MPa
	Average strength (28 days)	15 MPa
	Elastic modulus (28 days)	15.000 MPa
	Average flexural tensile strength	2 MPa
	Volumetric Mass	1850 – 2000 kg/mc
	Percentage of cavities	20% approx
	Recommended laying temperatures	5°C/30°C
	Average workability times (**) :	60 min
	Flammability	Incombustible
	(*) values taken from specific tables in literature relating to the average drainability value of the paving	
	(**) depending on environmental conditions	
	The values indicated in the table refer to a self-draining concrete mix with standard characteristics. These values may therefore vary depending on the composition of the mix and the degree of its compaction on site.	

INSTRUCTIONS (AND WARNINGS)

- The temperature range over 24 hours should be between 5 and 30°C.
- The contraction joints must be made in accord with the technical requirements relating to the thickness or geometric conformation of the pavement; the cuts must be made on fresh material using special equipment, in accord with the requirements of the Law.
- In order to ensure the correct hydration of the cement mix so as to achieve the expected performance of the concrete, it is important to maintain suitable humidity and temperature conditions by taking appropriate steps (curing) for ensuring the optimum conditions for curing of the concrete. Protection of the paving (using polythene sheets, non-woven fabric or internal agents), which is crucial to avoid premature evaporation of the mix water, must begin as soon as possible after the surface finishing of the paving itself.
- Usability: pedestrian after 24 hours, light and heavy traffic after 7 days (depending on temperature and humidity).
- There is no real need to use de-icing salts to melt snow and ice, but if it is desired to use them, we recommend that they be used in limited quantities, with sodium chloride (NaCl) being preferable to calcium chloride (CaCl2).