

HSRS SYSTEM PAVEMENTS

Intelligent Materials for Urban Environment

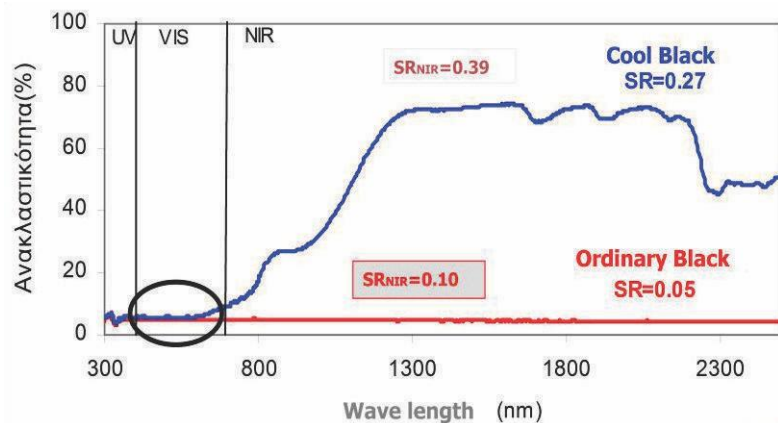
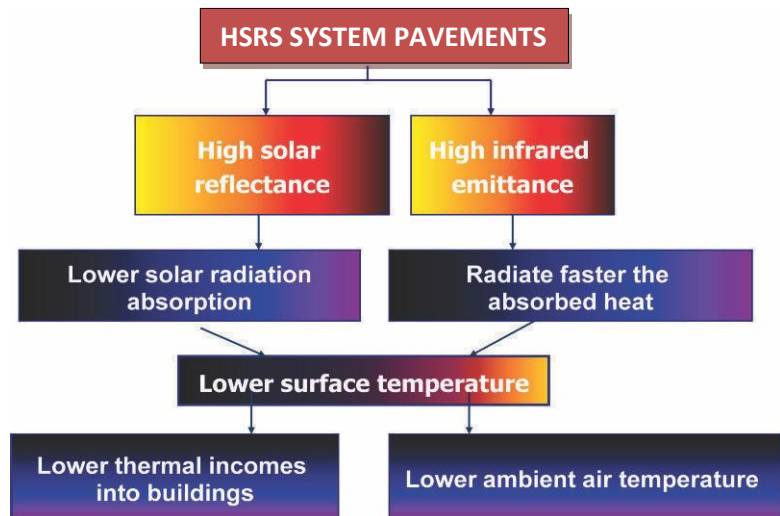


Watergy International Group

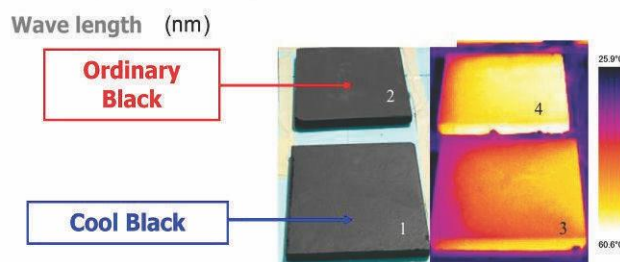


HSRS System Pavements

- Contributes to “Urban Heat Island” mitigation
- Mitigates the consequences of the Global Warming phenomenon
- Creates thermal comfort conditions
- Cool & Colored
- Environmentally and user friendly



$\Delta T_{\max} = 10^{\circ}\text{C}$



What is HSRS System Pavements

HSRS system pavements refer to a range of construction materials. These pavement technologies tend to store less heat and may have lower surface temperatures compared with conventional products. They can help address the problem of urban heat islands, which result in part from the increased temperatures of paved surfaces in a city or suburb.

Why to Need HSRS System Pavement

The conventional pavement surface temperature is generally 20-30°C [68-86°F] higher than the air/surrounding temperature due to pavement solar energy absorption during daytime, especially in the summer. Also, the absorbed heat energy from pavement surface, which stored in the pavement subsurface, will be re-released into the atmosphere after sunset, keeping heating the atmosphere at nighttime. Due to the large area covered by pavements in urban areas, they are an important element to consider in heat island mitigation. HSRS System pavements can help to address heat islands effect through reducing pavement and air temperature, if used in a large scale. Also the cool pavements with lower surface temperature could reduce the chance of heating stormwater as it runs off the pavement into the local waterways. Besides these effects contributing to address the problem of urban heat islands and improve water quality, the lower temperature in the pavements also would reduce pavement damage/deterioration and improve pavement service life/durability.

It's time to be cool.

• HSRS System Concrete Blocks



DOUBLE T

The new **"heavy weight"** champion of Wategy International Group. With a height of 80 millimeters (20 more than the height of all our pavers) is ideal for industrial exterior flooring in spaces with especially high demand in loads and traffic. So, we recommend its application for exteriors of factories, logistics centers, hypermarkets, transport companies, etc.



CLASSIC

The simplicity of the **classic paver** with a rectangular shape and dimensions 100x200x60 mm combines advantages of installation and aesthetics. Classic squared style, with edges and right angles and 5 different installation patterns that will add finesse and glamour to your space.

TRI STAR

The **best-seller** of Wategy International Group!

*Why? **Because you have chosen it to be!***

Is it the modern shape of the three hexagons, bound together forming a star? Or is it the 12 side faces which guarantee excellent interlocking features? What about its peculiar symmetry and its installation advantages? Maybe, it is all of these altogether!



WAVE

The wave! If, instead of corners and edges, you prefer curves and continuity, this is the ideal shape to choose. Consecutive wavy curves installed as a running bond or as a herringbone pattern may be some of the choices that fit you most!

COBBLESTONE

The **new rising "star"**. Demonstrating a rustic surface resembling small natural stone cubes, this new paver type has started to steal the show! It reminds us the traditional cobblestone pavements and alleys therefore, we named him "cobblestone".

Particularly non-skid due to a quite rough surface and possessing excellent interlocking properties after installation, it is recommended for exteriors we wish to have a traditional look, for especially inclines floors as well as modern layouts with a tradition redolent of the past ...



HSRS System Pavements

- HSRS Concrete Tiles (flags)



PLAIN FINISH

Coming straight out of the production line, without any further processing with a **flat surface**. The produced standard color palette includes tile-colored, white and beige. It is recommended for exterior flooring applications that do not hold dirt and can be easily maintained and cleaned.

TEXTURE FINISHES

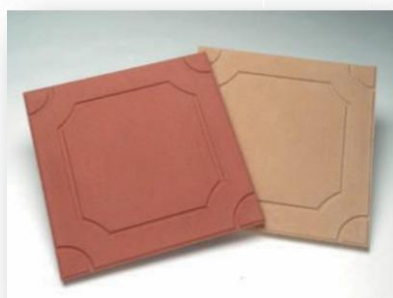
Coming straight out of the production line, without any further processing with various surface textures. The standard color palette includes tile-colored, white, grey and beige. So, depending on your space and taste you may choose among “**Porolithos**”, “**Lithos**”, “**Karo**” and “**Kadreto**”. In this product range one may also find the “**Tactile Paving Flags**” for the blind and partially sighted people.



POROLITHOS



KARO



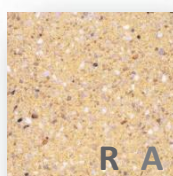
KADRETO



TACTILE

SANDBLASTED

This is the **ideal type** for personalized exteriors possessing high with anti-slip properties and simultaneously intriguingly classy. One may blend the lively colours which provide happy and delicate combinations with an air of chaste style:



IRIS



ERGANI



ERATO

It's time to be cool.

Characteristics

Product	Test Certifications	Available Colours	Dimensions	LEED CREDITS
Concrete Blocks	European Standard EN 1338	Yellowish brown, grey, off white, green, beige		Sustainable Sites (SS) Credit 7.1 Heat Island Effect: Non-Roof Solar reflectance Index: SRI ≥ 29
Concrete Tiles (flags)	European Standard EN 1339	Yellowish brown, grey, white, green, beige	40cmX40cmX3,5cm, 33cmX33cmX1,8cm	Sustainable Sites (SS) Credit 7.1 Heat Island Effect: Non-Roof Solar reflectance Index: SRI ≥ 29

An Example of a success story

FANEROMENIS AVENUE HOLARGOS - ATHENS

PROJECT NAME: REFORMATION OF FANEROMENIS AVENUE

PERIOD OF THE PROJECT: August- September 2010

AUTHOR: MUNICIPALITY OF HOLARGOS, Athens Greece

CONTRACTOR: KAT CONSTRUCTIONS

PROJECTS PRODUCT CHARACTERISTICS:

APPLICATION OF COOL CONCRETE BLOCKS AND TILES

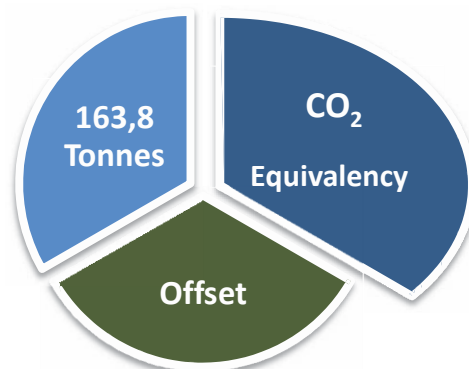
TOTAL SURFACE: 5.000 SQUARE METERS

TECHNICAL SPECIFICATIONS AND PLANNING:

The project's proposal had drafted from our partner Abolin Co and the technical service department of the municipality of Holargos. The approval of the proposal is implemented through the "GREEN LIFE IN CITY PROGRAMM" and the contract is co-funded by the European Regional Development Fund and by national resources through the "National Strategic Reference Frame 2007 -2013 Program" as well as by own resources of the municipality of Holargos. The core target of the specific project, in terms of sustainability, was the increasing of the surface Albedo by 0, 2. At the end of the Project there was an estimation of the CO₂ equivalency offset, using Albedo offset calculators.

TEST MEASUREMENTS AND STANDARDS:

The solar reflectance of the cool pave blocks and tiles measured according to the ASTM E903-96 and ASTM G159-98. The infrared emittance of the cool blocks and tiles measured was measured according to the ASTM E408-71 (2002).**Projects Requirements:** SOLAR REFLECTANCE INDEX VALUE more than 60.



It's time to be cool.

HSRS System Pavements

INSTALLATION INSTRUCTIONS FOR LAYING PAVING TILES / CONCRETE TILES

PREPARATION

The paving tiles are laid on reinforced concrete, which needs to be manufactured at least one day before the concrete tiles are laid down and it must have a minimum thickness of 12 cm. Apart from that, it needs to have the desired inclinations as well (photos [1](#), [2](#) & [3](#)).

ACTUAL WORK

We make sure that the area where the paving tiles will be laid down is clean and damp.

A thread is placed at the required height of the paving tile, which will also function as our "guide" when the pipes of 3cm and 3.5 cm thickness will be placed under it.

The space among the pipes needs to be such, so that it can enable us to drag the mortar (sand and concrete with a little water) with a piece of a straight timber. (photo [4](#)).

We cover the surface where the header pavers (pipes) are placed, with mortar. Then we put a straight piece of timber from the one header paver (pipes) to the other and the mortar is dragged by it, scraping this way the header pavers (pipes) (photos [5a](#) & [5b](#))

After having done this, we remove the header pavers (pipes) (photo [6](#)) and we throw screed (water and cement mixed well together) on the surface where the slabs will be **instantly** laid down. This means that the screed shouldn't have dried up. (photos [7a](#) & [7b](#)).

Afterwards, we lay down the concrete tiles by using a rubber mallet. We tap down the slab that is laid down, in order to achieve the best joining and to efface the probable hypsometrical differences. (photos [8a](#) & [8b](#)).

If the concrete tiles have to be laid down jointed, then we put spacers (crosses) of 2 or 1 cm in each slab. If the concrete tiles are laid down with no joints (end to end), then we have to put dilatation joint at approximately every 100 m² depending always on the surface.



1. Preparation of concrete



2. Reinforcing the concrete



3. Concrete inclinations



4. Installation of pipes



5a. Mortar



5b. Mortar



6. Removal of pipes



7a. Screed



7b. Screed



8a. Installation of tiles



8b. Lay down the concrete tiles by using a rubber mallet

It's time to be cool.

INSTALLATION INSTRUCTIONS FOR LAYING PAVING CONCRETE BLOCKS

PREPARATION

A) The paving blocks are laid on pebble, which must have a thickness of at least 15cm and to be compressed by road roller.

B) The paving blocks are laid on reinforced concrete, which needs to be manufactured at least one day before their setting and to have a thickness of at least 12 cm and the necessary inclinations as well.

ACTUAL WORK

We make sure that the area where the paving blocks will be laid down is clean.

1. We place geotextile in order to prevent plant roots from coming out in the surface (photo 1).
2. We place thread at the required height of the paving blocks so that it can be our "guide" when we are trying to create a level surface.
3. We set head pavers (pipes) of 5 cm thickness below the thread. The distance between the pipes needs to be such, so that it enables us to drag the sand with a straight piece of timber (photo 2).
4. We cover the surface where the head pavers are set with sand and then we compact it with a plate vibrator (photo 3).
5. Then we set the straight piece of timber on the head pavers so that the sand is dragged, scraping the head pavers. If necessary, more sand can be added or it can be removed (photo 4).
6. After having done this, we spread soft sand and we leave it there to dry. Then we vibrate it using the plate vibrator, so that the joints are filled. (Photos 5 & 6).
7. Afterwards, we wipe off and remove the needless sand.



1. Installation of geotextile



2. Installation of pipes



3. Plate vibrator



4. Drag the sand and scrap the pavers



5. Installation of paving blocks



6. Plate vibrator



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