The NanoPhos Casebook:
Applications from across the world

January, 2013 edition

NanoPhos
Pioneering
Nanotechnology

The NanoPhos casebook presents application case studies from across the world. The variety of applications under a wide range of climates and conditions, demonstrates the versatility of our product line. With our active new product development we continue to pursue our vision for protecting, waterproofing, restoring surfaces, and saving energy.

You can always visit our website in order to view the latest information about our products: www.nanophos.com

SurfaPore C protection at the Astrup Fearnley Modern Art Museum in Oslo, Norway

The Astrup Fearnley Museum of Modern Art is a privately owned Contemporary Art gallery in Oslo, Norway. It was founded and opened to the public in 1993 and was funded by two philanthropic foundations established by descendants of the Fearnley shipping family, the Thomas Fearnley Foundation and the Heddy and Nils Astrup Foundation. The museum collaborates with international institutions, and produces exhibitions that travel worldwide. The museum created a stir in the international art world in 2002 when it purchased the American artist Jeff Koons's monumental sculpture in gilt porcelain of the pop star Michael Jackson with Bubbles, his favorite chimpanzee, for USD 5.1m.

After over 18 years in Dronningensgate 4, the museum closed its doors 31 December 2011 and it reopened on September 29th 2012 at Tjuvholmen in the center of Oslo. The world-renowned architect Renzo Piano designed the new museum building. Large, modern exhibition spaces give the museum the possibility to continue its ambitious program of temporary exhibitions as it has at its disposition about 4200 m².

Since the architect and the customer wanted exposed concrete floors, SurfaPore C was the natural choice for its protection.

NanoPhos helps Australians enjoy outdoor living

Australian life is about being outdoors. The temperate weather across the country all year round means that Australians enjoy spending as much time as they can outdoors, at the beach, playing sports, at street cafes and in the backyards of their homes. Australians are increasingly converting their backyards into outdoor entertainment areas by bringing indoor comforts outdoors. By tiling and or paving their backyards they are now able to use their backyard as an all year around entertainment area for themselves and their guests, for lunches, dinners or BBQs.

However, the challenge faced by Australians is tiles and pavers designed for Mediterranean conditions quickly age and deteriorate in the Australian climate and environmental conditions. A warm and humid climate all year round combined with a large range of native animals and plants and heavy use of outdoor areas, results in outdoor areas that quickly look old, dirty, dilapidated.

Given the challenge of keeping surfaces looking brand new and at the same time increasing their longevity, without changing their texture or appearance, Australian homes are increasingly protected by NanoPhos products.

For outdoor stone paved areas, DeSalin C is being used to clean and prepare existing stone pavers. SurfaPore C is used to protect stone pavers from water, but in cases where extra oil stain protection is sought, SurfaPore M is used (also recommended for protection against tree gum, tree oil and native Australian animal droppings). SurfaShield products are also recommended to take advantage of the abundant sunlight and turn surfaces into self-cleaning.

For outdoor polished tile areas, DeSalin T is used to clean and prepare sensitive tile surfaces, SurfaPore T to seal porous and unglazed porcelain tiles and SurfaShield T to make tiles self-cleaning and self-sterilizing.

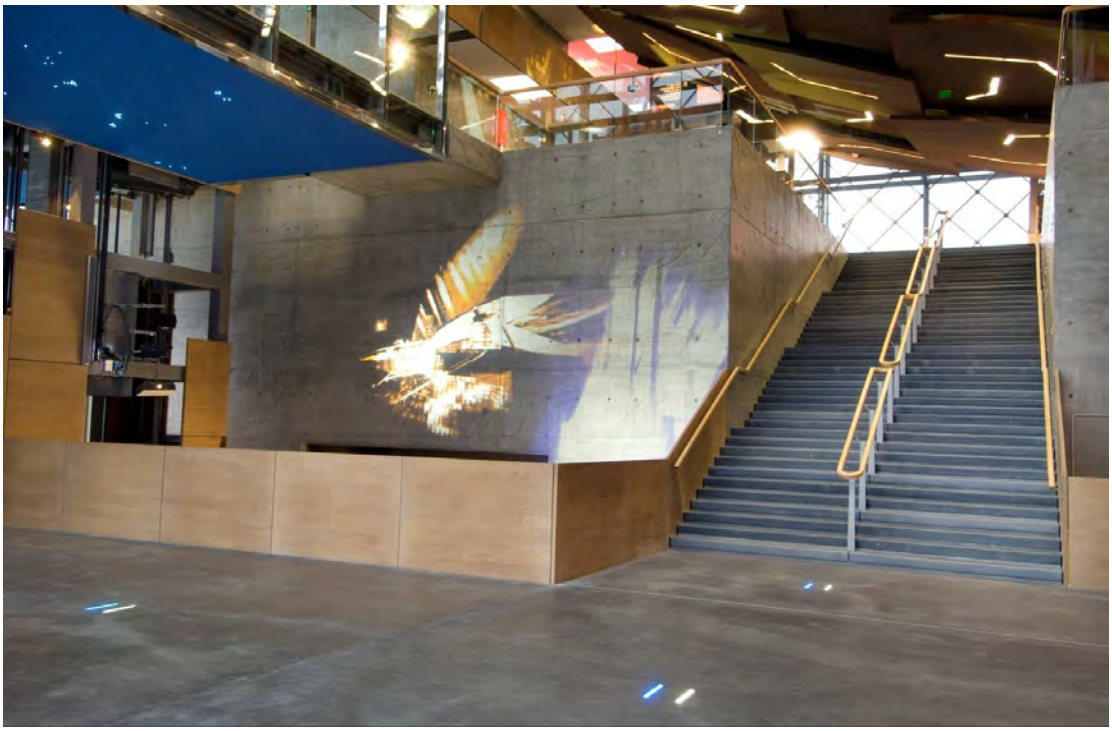
The Onassis Cultural Center in Athens, Greece

A marvel of architecture on Syngrou Avenue in Athens, is hosting the multifaceted cultural events organized by the Alexander S. Onassis Foundation, as well as by other notable institutions promoting the letters and fine arts. The building, with a surface area of 18,000 m^2, is being constructed on a plot of private land measuring 3,000 m^2, and covers an entire block.

The international competition for the design of the building attracted 66 candidates from all over the world. The winning design was put forward by the French architectural firm "Architecture Studio", which provided for a building 89 feet tall, faced with white marble and glass, in a reference to the minimalism demonstrated by Ancient Greek architecture. The building is destined to be a model of contemporary architecture. Its simplicity of volume and plainness of form have a powerfully monumental character. At the same time, the outside of the building lends it an expression of mystery, like changing scenery. By day, the white horizontal strips of marble on the facades reflect the light of Attica, producing a wave-like impression. The opposite happens at night, when the white marble strips are illuminated in a different way and the inside of the building becomes visible, revealing the shell surrounding the large performance halls.

SurfaPore C was used to protect the strips of unpolished white marble that are used to provide this magnificent wave-like effect outside the building.

Copenhagen Concert Hall in Denmark



The Copenhagen Concert Hall by Jean Nouvel is a part of the new DR Byen (DR Town) that will also house all of the Denmark's Radio (DR). The concert hall and the DR Town are located in the northern part of Ørestad - an ambitious development area in Copenhagen. The concert complex consists of four halls with the main auditorium seating 1,800 people. It serves as the home of the Danish National Symphony Orchestra.

Pritzker Prize winner Jean Nouvel is the architect of the project. The structure can be likened to a meteor covered by big blue screens, supposed to resemble water that can be used to project visual content on.

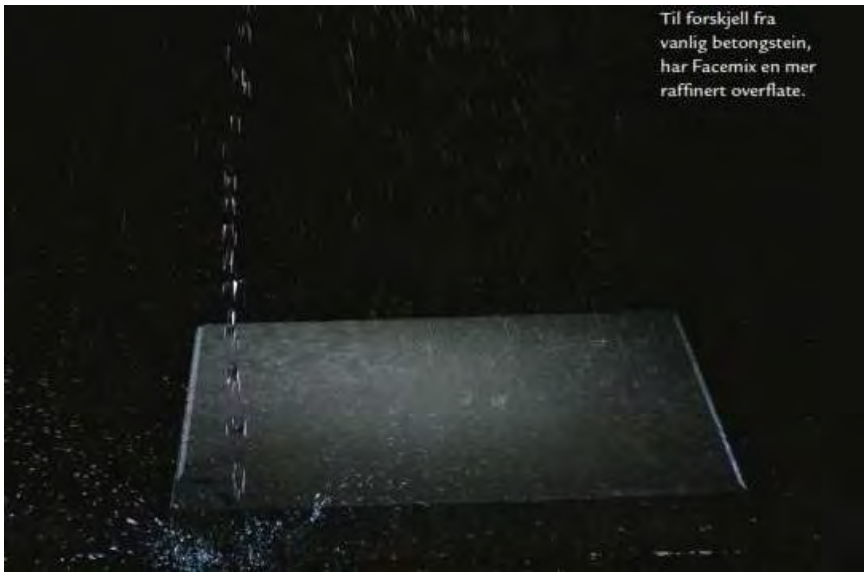
The construction budget reached almost 300 million dollars making the Copenhagen Concert Hall along the Walt Disney Concert Hall in Los Angeles the most expensive concert hall ever built.

SurfaPore C was used to protect the precious cement based surfaces that dominate the concert hall.

Industrial application of Surfapore C in Norway

Production of concrete blocks has been a long tradition at Multiblokk. The company has advanced the production of concrete blocks with an emphasis on the creation of new products and early on created new blocks that are lighter and stronger. Facemix is one of the company's latest concrete products that includes Surfapore C as an ingredient in the production process. This two-layered-stone is unlike conventional concrete stone: it has a more refined finish and is positions as paving for connoisseurs.

The elegant surfaces of Facemix products take paving stones to a new level. All Facemix products incorporate SurfaPore C in the production process increasing the quality of the product and extending its life by making them water repelling. SurfaPore C allows Facemix products remain beautiful longer and require less maintenance!



SurfaPore C protects the Synagogue of Trieste in Italy

It was built between 1908 and 1912, and bears the brilliant hallmark of Christian architects Ruggero and Arduino Berlam. The Temple was unveiled in 1912 in the presence of city authorities, and it replaced the four smaller Synagogues that previously existed. The synagogue was closed in 1942 following the instigation of the Race laws under the Fascist regime. As soon as the war finished the synagogue went back into operation. Today it is recognized as one of the largest and most important places of worship for Jews in Europe.

In order to protect the internal frescoes, SurfaPore C was used externally to block moisture to penetrate the walls but at the same time allow for breathability.

The exterior style was said to be late Roman of a type found in 4th century Syria, and the architects chose it because it brought them as close as possible to ancient Jewish architecture.

Tasta District Center in Stavanger, Norway

The new Tasta District Center that opened in October 2012 is more than a shopping mall. With nearly 50 shops, a fitness center and service offices it has a clear social profile and environmental profile. OBOS Business Construction is the builder that will also operate the center. OBOS Forretningsbygg has already developed six shopping centers in Oslo, but this is the first one outside the country's capital. Property Manager Elisabeth Braaten Sverdrup expects the center to become the gathering place for the town.

The building's 41,600 square meters received an A-class rating and only require 500 kWh of heating for extra cold days when temperature drops below -7 C^{o}! Tasta Center is able to recycle up to 84 percent of the heat. According to Torstein Fugelli Simonsen, project manager for turnkey Block Berge Construction AS, the concrete elements that make the building absorb heat and do not leak air.

The 50cm thick pre-fabricated cement elements were sprayed with SurfaPore C in the factory before shipping out to the construction site for assembly. Besides the surface protection offered, keeping the structural elements dry with SurfaPore C dramatically improves their insulating ability - water is a very good thermal conductor where a 5% increase in moisture can have a 100% increase in the conductivity of a wall. The white polished concrete elements of the façade contain white marble aggregates and the whole façade was treated with SurfaPore C in order to maintain it clean and dry.

SurfaPore C excels in Norwegian tests and is used for tunnels and major public road works

The Norwegian Public Roads Administration (Statens Vegvensen) is responsible for the planning, construction and operation of the national and county road networks. With its stated vision being “On the road to a better society”, the Norwegian Public Roads Administration has set as an objective, to develop and maintain a safe, eco-friendly and efficient transport system. To achieve its objective, it continuously tests material that will increase transport system safety in an eco-friendly manner. As a result of testing that was conducted in Askim in 2010, the Statens Vegvensen found that SurfaPore C was the best solution for protecting tunnel surfaces among a number of competing products: it kept them cleaner and brighter than any other material tested after a whole year in use under the freezing Norwegian conditions!

Statens vegvesen

Further, SINTEF, the largest independent research organization in Scandinavia, certified that when SurfaPore C is used on concrete, water absorption and chloride ion penetration are reduced by nearly 90%. The B45 and M45 grade concrete were used for the tests as they are commonly used for bridges, tunnels, piles and buildings.

SINTEF

There are over 1000 tunnels in Norway, with a total length of 1200 km: 81 tunnels are over 3000m long and 36 are underwater. At the same time, about 20-30km of new tunnels are built each year. The T- forbindelsen is a road project in Rogaland, Norway consisting of the 8.9km Karmøy Tunnel, a 9.8 km road, the 50m Tuastad Bridge, the 687m Husafjell Tunnel and the 260m Spannavarden Tunnel. Construction work began in the autumn of 2009 and completion is planned for 2013. Given the Statens Vegvesen and Sintef test results, SurfaPore C was applied on the tunnel portals. Concrete elements were prefabricated by Ølen Betong, and the portal was casted and molded directly on the mountain. All concrete was cleaned using DeSalin C and sprayed with SurfaPore C. SurfaPore C was applied for protection against water, salt, and for easy-cleaning from the dirty road water, resulting in a dry and brighter tunnel entrance.

SurfaPore C protects the NICE4 luxury resort in Egypt

The Mimary Group of companies was founded by architect Mahmoud Mohamed Abdel-Wahab Helal in 1983. The company is considered as a pioneer in real estate investment and has more than 3275 clients and about 110 employees in Egypt and other countries. It concentrates on luxury and pays a great deal of attention on architectural details. It uses the most modern techniques and aims to achieve the highest quality at affordable prices.

After the success of the NICE series of resorts, the Mimary group proudly presents its latest, NICE 4 that is built on a total space of 205,800 square meters. Located 74.25 kilometers from Alexandria on the Mediterranean Matruh beachfront, its stunning white sand, breathtaking turquoise waters and greenery free your mind and soul. Its architecture allows spectacular panoramic views from all units that include 72 villas and 614 Chalets.

Wanting to offer the best available quality to its customers, The Mimary Group selected SurfaPore C for waterproofing all building and villa roofs and all outdoor wall finishes.

SurfaPore C offers an additional layer of protection against moisture and water ingress

SurfaPore C protects the exterior Travertine of Bab Al Bahr Luxury collection Hotel in Ajman, U.A.E.

The Bab Al Bahr Luxury collection Hotel project involves the construction of a 5 star hotel offering 202 rooms and amenities such as restaurants, pools, conference rooms, and a spa.

Travertine is a limestone, formed by the precipitation of carbonate minerals from solution in ground and surface waters, and/or geothermal hot-springs. The relative softness of the stone, combined with its holes and troughs, make travertine difficult to finish and maintain.

The customer was searching for an effective and affordable protection for the highly porous Travertine stones. When the contractor examined the available options, they chose SurfaPore C for its better performance and cost effectiveness. The total area covered was 5,000 m^2.

Sofitel Beach Resort at the Palm Island Jumeirah, Dubai, U.A.E.

A prestigious 5 Star Beach Resort of Sofitel Group is nearing completion at Dubai's Palm Island in Jumairah; adjacent to the world famous Atlantis Hotel. The resort is located on the beach and the client selected SurfaPore C to protect the external sand stone façade from aggressive weathering. Apart from water repelling property, being located close to the sea, the façade had to be protected against salt water and efflorescence. The total area protected with SurfaPore C is about 8,000 m^2.

Exterior sand stone façade protected with SurfaPore C

SurfaPore C protects Muckamish Fort Martello Tower in Ireland

Martello Towers were small defensive forts first built in the South East of England during the Napoleonic War between 1805 and 1808. They were later built throughout the British Empire, in 5 different continents, during the first half of the 19th Century and a large number can be found in Essex, Suffolk and in Ireland. Martello towers were inspired by a round fortress at Mortella Point in Corsica (completed 1565). In 1794 two British warships for two days unsuccessfully attacked the tower at Mortella Point. This impressed the British who copied the design for the British Martello Towers.

Muckamish Fort Martello Tower that was built at the beginning of the 19th century on Crohey Head in Donegal. The Tower was constructed beside the sea using sandstone and limestone. It has a line of sight to the North with a similar Tower near Kincasslagh, and to the South with another Tower built on Glen Head, Glencolmcille. The Tower was refurbished in the 1950's, but that time the parapets were covered with asphalt about 20mm thick, and the walls were pointed with cement mortar. The run off from the asphalt and the hardness of the cement mortar caused serious erosion to the sandstone.

The Heritage Council of Ireland financed the restoration of the Tower. Given that immediate remedial work was required to protect this monument, SurfaPore C was used to protect it from water ingress that would have led to continued erosion.

Protecting Luxury Villas by the Caspian Sea in Iran

The Caspian Sea is the largest inland body of water and accounts for 40 to 44% of the total lake waters of the world. The coastlines of the Caspian are shared by Azerbaijan, Iran, Kazakhstan, Russia, and Turkmenistan. Caspian Sea coastal towns in northern Iran are among the most favorite destinations for Iranians. These towns offer a moderate but humid weather, beautiful scenery and of course the Caspian waters.

Behesht e Darya (sea paradise) condominiums on North of Iran are located near the Caspian Sea and forest. The villas are covered externally with brick and faced severe humidity and efflorescence problems. SurfaPore C was used in 2009 for this case because the particular bricks exhibited a very high level of porosity versus regular bricks. To date, SurfaPore C has solved all moisture ingress and efflorescence problems.

Residential and Commercial projects in Cyprus

Strovolos is one of the best residential areas within the greater area of Nicosia where Kotsonis Enterprises has developed the Makrinitsas project. In this project, SurfaPore C and SurfaPore Thermodry were utilized.

Paralimni is a town situated in the South East of Cyprus. The project above in the area of Paralimni, had its cement based areas treated with SurfaPore C, exterior walls were painted using SurfaPore ThermoDry, and SurfaMix C in the tile grouting.

Limassol or Lemesos is the second largest city in Cyprus located on Akrotiri Bay, on the island's southern coast. Limassol is one of the busiest Mediterranean ports and the largest port in Cyprus. The apartment building on the left build in Lemesos was protected using SurfaPore C and SurfaMix C.

The University of Cyprus suffered from moisture problems in the roof of a particular building. SurfaPaint ThermoDry Elastomeric Roof was used to waterproof and thermally insulate the roof.

The BMW Showroom in Larnaca has been protected using SurfaPore C on all cement surfaces

The basement of this building suffered from moisture problems and severe cracks. SurfaMix C was used in the repairs for the cracks and SurfaPore C covered the whole surface

The fair faced cement building above was all treated with SurfaPore C

Major SurfaPore C projects in Russia

Gazprom is a global energy company. Its major business lines are geological exploration, production, transportation, storage, processing and sales of gas, gas condensate and oil, as well as generation and marketing of heat and electric power. Gazprom holds the world's largest natural gas reserves. Gazprom pursues its strategic objective of establishing itself as a leader among global energy companies by entering new markets, diversifying its activities and ensuring reliable supplies.

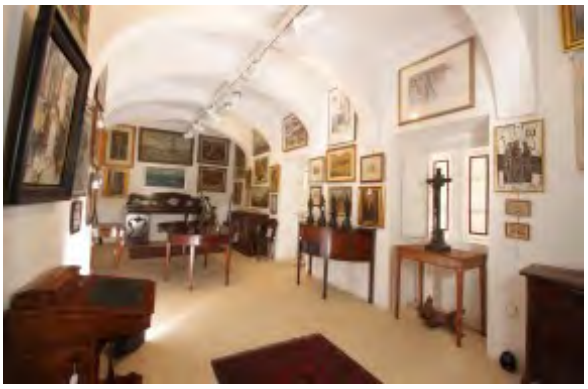
GAZPROM

SurfaPore C is used to protect building substations that supply gas to factories and residential buildings.

The Novogorsk Olympic Village is a premium class residential complex with a focus on families with children. The project's visionary has been Irina Viner the famous rhythmic gymnastics head trainer of the Russian national team and President of the Russian Federation of Rhythmic Gymnastics. The complex, is placed next door to an existing Olympic training base just outside the northern border of Moscow and includes a preschool, an English-language primary and secondary school that will feature British curriculum, a fitness center and, of course, an international sports academy chaired by Irina Viner herself, who also has a Ph.D. in Education. SurfaPore C was used to protect concrete surfaces of walls and facades of this prestigious project.

SurfaPore C protects 18th Century Palazzo in Malta

Obelisk Auctions Ltd is one of the leading Auction Houses in Malta, specializing in Antiques & Fine Arts; Arms, Militaria & other. The premises, a large 18th Century Palazzo, have been professionally restored and currently house the firm's offices, galleries & auction rooms. The main Gallery has a multi-purpose function and is also used for Lectures and Seminars.



In order to protect the valuable interiors from any rainwater ingress through the ceiling, the roof of this 18th C Palazzo has been treated with Surfapore C. In this manner the roof has maintained its breathability whilst remaining dry and repelling rainwater.

SurfaPore R protects clay tiles of cottage in the South of France

Clay tile roofs are a key architectural feature of cottages in France and many other European countries. However, clay tiles can be absorptive and as a result they may suffer from frost-threat and crack, as the absorbed water will expand when it becomes ice. Further, roof tiles commonly accumulate mold as they remain moist for long periods of time. Nonetheless, it is an essential requirement that any protective coating, will allow the breathability of these natural surfaces.

A typical French cottage with apparent roof tile moisture and ageing problems

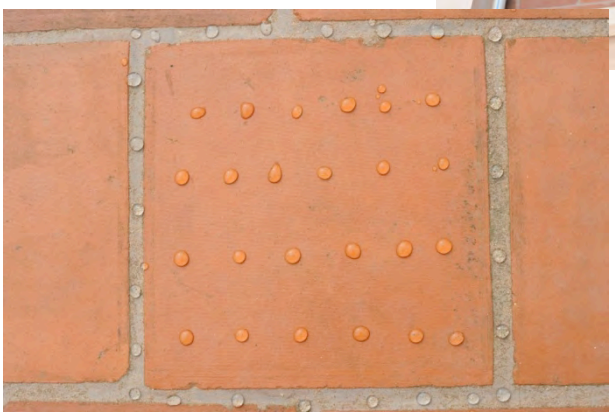
Martin Thornton, the builder of the French cottage shown below, used handmade clay tiles from Tudor Roof Tiles (http://www.tudorrooftiles.co.uk/) a company based in Kent, United Kingdom. The owner of the cottage is very pleased, since 3 years after the original application his roof looks like new and he has earned the admiration of his neighbors.

Clay roof tiles 3 years after SurfaPore R treated treatment

SurfaPore R protects clay-based tiles in T. Nagar, Chennai, India

Theagaraya Nagar, is a neighborhood in the city of Chennai, India. The weather in Chennai is warm and wet with monthly maximum temperatures ranging between 34.8 ^{o}C and 43.2 ^{o}C and with an average monthly rainfall reaching 336.5mm for the month of October! Under these weather conditions, material need to last and protect horizontal surfaces from water ingress.

An individual house at T. Nagar, Chennai is shown below, where the clay based tiles were coated with Surfapore R in order to arrest the leaks. The total area covered by Surfapore R was 3000 square feet.



Grafham Water Centre needs protection from water in Cambridgeshire, United Kingdom

Situated on the southern shore of Grafham Water in the village of Perry in Cambridgeshire, Grafham Water Centre is set in an idyllic waterside location with wonderful views of the reservoir. Grafham Water Centre has an excellent reputation for providing land and water based activities for schools and youth groups, as well as individuals wishing to learn a new sport or develop existing skills. The Centre also caters for conferences, team development, and management training within the newly refurbished conference facilities.

The recent refurbishment of the Centre was undertaken by Mouchel. In 1897, Louis Gustave Mouchel first brought the patent for reinforced concrete to the UK and, following its introduction, there were huge strides in engineering and the company remained a pioneer in its use in all aspects of construction, such as the first bridges made out of the material; the first UK skyscraper (the Liver Building built in 1909); the chimneys for Battersea Power Station; and, in the time of war, floating concrete structures called Mulberry Harbours which helped the D-Day landings.

Grafham Water Centre, used SurfaPore R on bricks to stop water penetration from the rising lake water, but also in order to maintain the existing look.

SurfaPore R protects chapel at King's College, in New Zealand

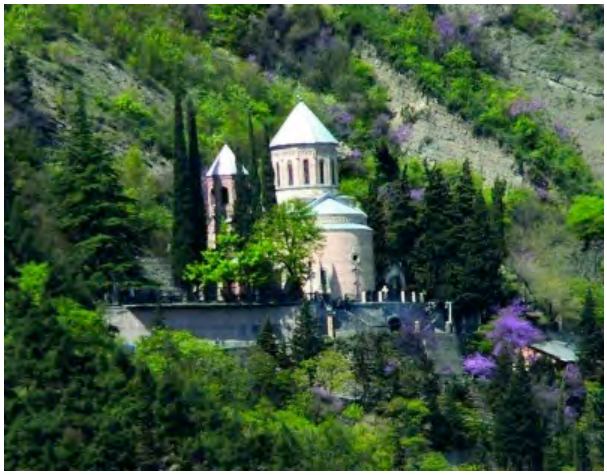
King's College is an independent secondary school in New Zealand. It was originally a boys-only school but also admits girls (since 1980) in the sixth and seventh forms (Years 12 and 13). The school has strong links to the Anglican church; the Anglican Bishop of Auckland, and the Dean of Auckland are permanent members of the school's Board Of Governors. The school caters for both boarding and day students. The College is a member of the Headmasters' and Headmistresses' Conference. The school is also a member of the G20 Schools Group that has a commitment to excellence and innovation.

The new chapel at Kings College is an exceptional work of beautiful red clay brick architecture. SurfaPore R was used to provide long term protection against the weather and to keep the surface looking pristine.

The Governor-General of New Zealand unveils the plaque to officially open the Chapel Close

Protecting Monuments with SurfaPore T in Tbilisi, Georgia

The Mtatsminda Pantheon of Writers and Public Figures is a necropolis in Tbilisi, Georgia, where some of the most prominent writers, artists, scholars, and national heroes of Georgia are buried. It is located in the churchyard around St. David's Church "Mamadaviti" on the slope of Mount Mtatsminda (Geo. **მთაწმინდა**, meaning the Holy Mountain) and was officially established in 1929. It is one of the "must see" locations included in tourist guides for visitors in Tbilisi.

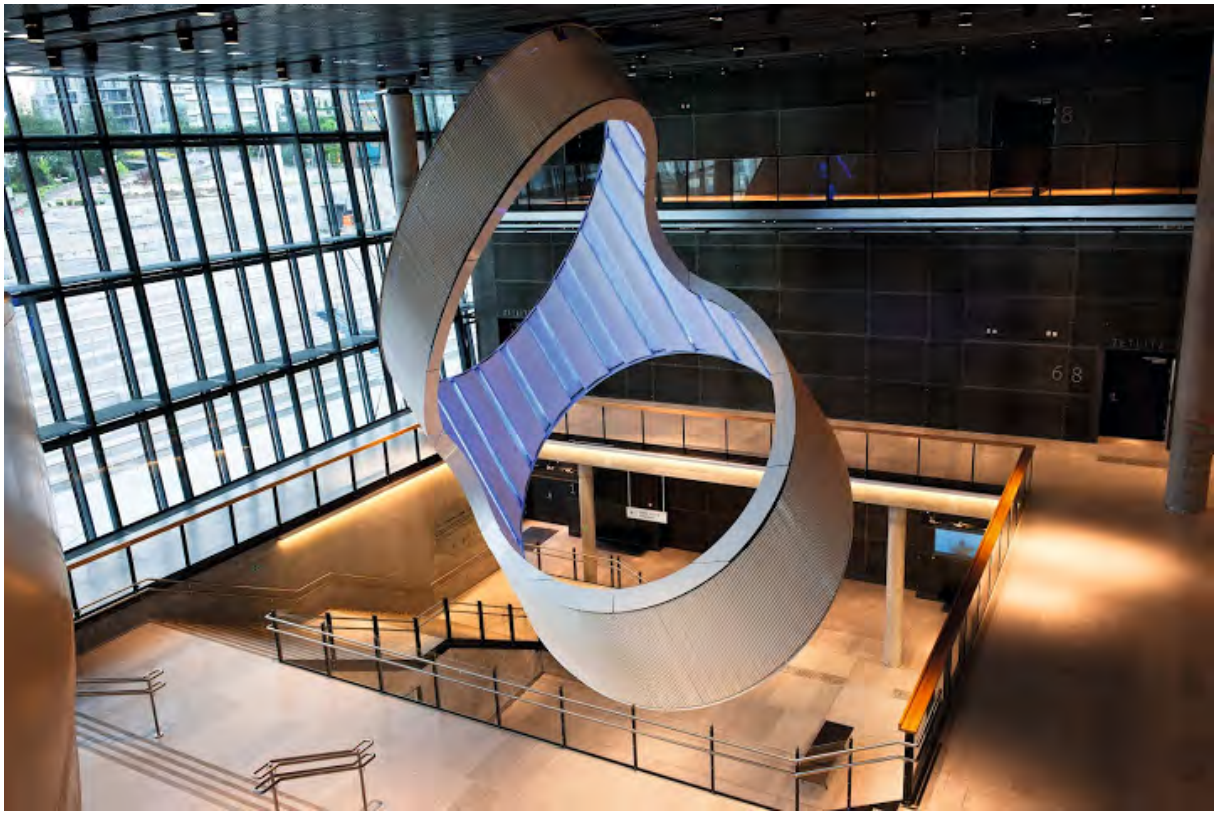


The Great Purge was a series of campaigns of political repression and murder in the Soviet Union orchestrated by Joseph Stalin. The "Memorial for Victims of Stalin's Repressions" was erected in the Mtatsminda Pantheon on order to remember Georgian writers and artists who were murdered during the Great Purge in 1937. The polished marble of this very important monument has been protected by SurfaPore T.

SurfaPore T at the Stavanger Concert Hall, Norway

Stavanger Concert Hall has now become the new cultural arena for the Stavanger Region with its opening of two new spectacular concert halls the 15th September 2012. The new concert hall plays a fundamental role in the long-term strategy to position Stavanger as an economic and cultural node in northern Europe. Stavanger Concert Hall is the city's main venue for concerts, shows, and an attractive facility for meetings, galas and other gatherings. Located in the beautiful surroundings of Bjergsted Park, a ten-minute walk from the city centre of Stavanger. The Stavanger Concert Hall now includes three large concert halls of exceptional standard and other related smaller arenas of music.

The granite floor surfaces in the Concert Hall were protected from staining by using SurfaPore T.



SurfaPore T and M protect high traffic areas of luxurious shopping malls in Iran

Sam center project: *One of the most luxurious malls in Tehran located on Fereshteh St. The customer was looking for a solution for protecting the floor from stains without any effect on the appearance. SurfaPore T and SurfaPore M were applied on the various surfaces of the mall*

Aamout tower *is the biggest, luxurious and most modern mall in Karaj (city 20km west of Tehran). SurfaPore T and SurfaPore M protected its high traffic floor that appears like new after continuous use.*

Standard Chartered Bank protects its marbles and sandstone surfaces in Business Bay Dubai, U.A.E.

Standard Chartered Bank was formed in 1969 through the merger of two separate banks, the Standard Bank of British South Africa and the Chartered Bank of India, Australia and China. Having operated for over 150 years in some of the world's fastest-growing markets, the bank aims to lead the way in Asia, Africa and the Middle East.

With an aim to lead in its markets, Standard Chartered branch opened a new branch in the Business Bay area of Dubai. Business Bay is part of the vision of His Highness Sheikh Mohammed Bin Rashed Al Maktoum, Ruler of Dubai, to be a new 'city' within the city of Dubai covering an area of 5,900,000 m2. It will become the region's business capital as well as a freehold city. The Standard Chartered branch shown below has its internal 1,500 m^2 floor area covered with Sofia Bella polished marble from Indonesia that had to be protected. At the same time, 500 square meters of Floriancia sandstone from Iran were used in the external corner façade. Among the various options the contractor had, SurfaPore T and SurfaPore C were selected for this project.

SurfaPore T used to protect the Sofia Bella polished marble inside the bank

SurfaPore C was used to protect the Floriancia sandstone on the external façade

Top Portuguese ceramic tiles manufacturer adopts SurfaPore T51

Revigrês is one of the top ceramic tiles producers in Portugal. It is an innovative company that incorporates new technologies in their production lines and their products. Revigrês has been a privileged NanoPhos partner since from the very beginning of NanoPhos, the two companies have been conducting product trials in order to enhance their product portfolio.

In the beginning of 2012, Revigrês did run a trial with SurfaPore T51 – the industrial version of SurfaPore T. The initial trial was conducted on the production line (figure 1) of white polished ceramic tiles (porcelanato). These tiles are very attractive and highly valued by the market, but their microscopic pores attract dirt that is almost impossible to remove. Therefore, customers frequently complain about the difficulty in keeping such surfaces shinny and clean, especially in white or light coloured tiles. The results were considered amazing as the application of T51 did not affect at all the shine of the tile and it enabled the easy removal of the black spots of a permanent marker. These results enabled the company to adopt T51 for its big production lots.

Figure 1 - Application of T51 on polished tiles at Revigrês

Figure 2 - Permanent ink marker test

Monastiraki Square: overlooking the Acropolis in Athens, Greece

Monastiraki square represents all the different phases of the history of Athens. The square is named after the monastery to which the Pantánassa church belongs - a church that sits in the middle of the square, a foundation dating back to the 10th C. At the southeast corner is one of the city's two surviving mosques, known as the Sindrivani after the former purification fountain, and which now houses the ceramic collection of the Museum of Popular Art. Immediately behind the mosque, in Areos Street, is the pillared facade of the Library of Hadrian a monument of the Roman period; and further south is Athens of the Classical period, with the Acropolis.

The reconstruction of Monastiraki Square by the Culture Ministry's Central Archaeological Council (KAS) has been completed, with the multi-colored stone paving symbolizing its the multicultural history. Visitors can now see - as well as hear - the waters of the River Iridanos flowing in the bed found at a depth of 6 meters during the reconstruction. The square seems to harmoniously co-exist with the surrounding historical area: the Temple of Pantanasas, restored after the 1999 earthquake, the view of the Acropolis, the ancient Agora, Hadrian's Library and the Roman Agora.

The multi-colored stone paving symbolizing its the multicultural history that is a very high traffic area has been all protected by SurfaPore M.

Kilden Performing Arts Centre in Kristiansand, Norway

The Kilden Performing Arts Centre is a theater and concert hall on Odderøya in Kristiansand, Norway. It houses Agder Teater, Kristiansand Symphony Orchestra (KSO) and Opera Sør. Work on the building began in 2007, and Crown Princess Mette-Marit of Norway laid the foundation stone in 2009. The opening was officially finished 6 January 2012. The building has a gross area of 16,000 square meters, a volume of 128,000 cubic meters and it cost nearly 1.7 billion Norwegian kroners.

Outside the Concert Hall and the Theatre and Opera Hall, there are two large bars with high quality slates. The problem faced here was that the slates had to be protected from the occasional red wine and oily food that would stain these precious surfaces. SurfaPore M was selected to protect the slate from staining.

Protecting Byzantine Churches in Cyprus

The third largest and most easterly of the Mediterranean islands, Cyprus lies at a crossroads between Europe, Asia and Africa. During the island's tumultuous past numerous civilizations have left a rich cultural heritage. Experience a continuation through time as the 21st century reflects 10,000 years of history. Neolithic settlements, Ancient Greek Temples, early Christian churches, Byzantine art; all cherished and preserved in a unique and accessible way.

Byzantine church of in Nicosia treated with SurfaPore M

Byzantine art and architecture is featured widely in many churches and monasteries in Cyprus and a number of them are found on UNESCO's World Heritage List. The icons hold a very religious significance and some of the religious artwork are even believed to possess miraculous powers. Pilgrimages are made to certain sites in order to be able to light candles and pray before the icons. However, the practice of lighting candles is also a threat to these monuments as the wax frequently drips and creates oily stains on the very porous local stone called "pouropetra" used to build these churches. Further, the "pouropetra" itself is a very soft stone that needs to be protected against deterioration from humidity.

The monastery of St. Heraklidiou had its beautiful white marble protected with SurfaPore M

The church of Aghia Sophia is the largest church in Nicosia. Its 6000 m^2 of external granite covered area were cleaned with Desalin K and then protected with SurfaPore M

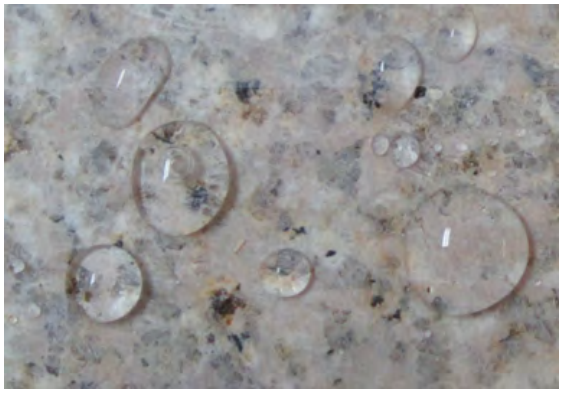
The conservation laboratory of the Kykkou monastery is the most modern and well equipped art conservation laboratory in Cyprus. In this case the laboratory used SurfaPore W in order to protect these 125 year old barrels.

Protecting granites at Royal Projects in Bahrain

Golden Leaf Granite is an igneous stone created several billion years ago. Naturally beautiful and durable, Golden Leaf granite is prized for exterior cladding, countertops, water features, or wherever a long lasting material is needed. Golden Leaf granite is scratch resistant, weather resistant and sanitary.

However, the Golden Leaf Granite tiles used in construction at Royal projects in Bahrain were found to have a high porosity. As a result, they absorbed water from the unpolished backside causing permanent moisture stains on the top surface. After testing many different materials from several vendors, SurfaPore M was selected as the product of choice in these projects. The treatment protocol followed was quite simple as the whole granite tile was dipped in a tank with SurfaPore M for a few seconds.

The picture above indicates how the untreated sample became darker after 24 hours of immersion into water, while the SurfaPore M treated sample remained unchanged.

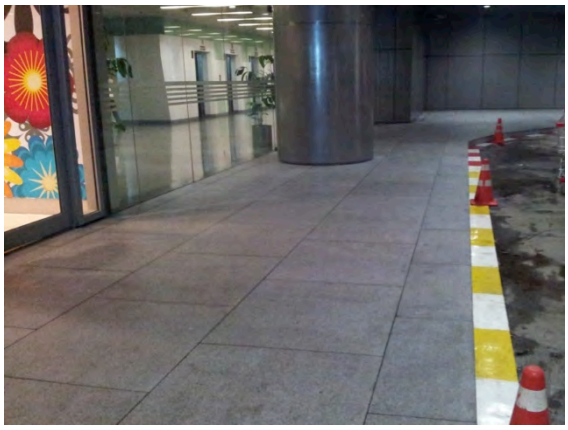


Water repellency on the unpolished backside of the SurhaPore M treated granite

SurfaPore M protects granite tiles of Silom Complex in Bangkok, Thailand

Silom Complex is a modern office building and the only shopping center on Silom Road. The 31 story building located on 11,200 square meters has been in business since 1993. Many leading firms, both Thai and international, seek the prime location of the Silom Complex.

The Silom Complex is a center for business, shopping, fashion, food, jewel and decoration, banking. In order to protect its high traffic 640 m^2 granite tile walkway and the 158 m^2 black polished granite basement floor SurfaPore M was applied using a spray gun. Prior to SurfaPore M application, stains and cement residue were cleaned using DeSalin K.



London Zoo – SurfaPore W protects Pestival's Termite Pavilion

The Pestival was held at the London Zoo in the United Kingdom from September 3-6, 2009. It showcased the Termite Pavilion outside the Royal Festival Hall in London. The timber structure is based on a three-dimensional scan of an actual termite mound in Namibia, southern Africa, scaled it up to human size. As a result, visitors can take a stroll inside the Termite Pavilion for a 'termite's eye view' of home.

The Termite Pavilion was manufactured out of sustainable Austrian spruce laminate, for reasons of sustainability, durability and cost. Inside, speakers set into the walls play sounds that were recorded in an actual termite mound in Namibia. The Termite Pavillion has impressive green credentials, winning the 2010 Observer Ethical Conservation Award. Media interest has included having the BBC weather broadcast from within it, and being featured in all four UK broadsheets as well as specialist architectural and design journals. It has now found a permanent home at Escot Park, where it will doubtless intrigue and inspire both Devonians and visitors to the region for many years to come.

The piece is in part based on the pioneering work of Dr. Rupert Soar and the 'Termes' project, a team of international experts based in Namibia who have created the first ever 3D scans of termite mounds. Their findings have been embraced by entomologists and architects alike, and have featured in Sir David Attenborough's 'Life in the Undergrowth' series.

SurfaPore W has been used to protect the Austrian spruce of this monument.

The Hakone Open-air Museum in Japan

Set in the stunning landscape of Hakone in the Kanagawa prefecture, the Hakone Open-Air Museum opened in 1969 as the first open-air art museum in Japan. Constantly changing with the seasons, the museum's spectacular grounds are the permanent home for approximately 120 works by well-known modern and contemporary sculptors. It utilizes 70,000 m^2 of land that is used as the exhibition grounds. The museum includes artworks from famous artists such as Rodin, Bourdelle, Henry Moor, Tadayoshi Sato and Pablo Picasso.

Toshiko Horiuchi MacAdam's has been creating sculptures that children could not just look at but touch, play with and experience through all their five senses. The structures are strong as well as beautiful utilizing specially constructed net, which is resilient and responsive to the slightest movement. Their innovative design allows tension to be maintained as the fiber stretches thereby enabling children to play safely. The project is engineered by Professor Norihide Imagawa, one of Japan's pre-eminent structural designers.

SurfaPore W was selected to protect this wooden monument, which was applied on a total area of 4,000 m^2 SurfaPore W was selected as the best possible solution after being placed under severe conditions and because it did not change the nature of the surface

Toshiko Horiuchi MacAdam
netplayworks.com
(installed in 2009)

Photos: Masaki Koizumi

SurfaPore W applications in traditional Japanese homes

Traditional Japanese houses are built by erecting wooden columns on top of a flat foundation made of packed earth or stones. The frame of a Japanese house is made of wood, and the weight is supported by vertical columns, horizontal beams, and diagonal braces. Diagonal braces came to be used when the technology of foreign countries was brought to Japan. One characteristic of Japanese houses is that they have a large roof and deep eaves to protect the house from the hot summer sun, and the frame of the house supports the weight of the roof.

Given the importance of protecting wooden surfaces without changing their appearance or affecting the beauty of the Japanese house, SurfaPore W was applied to all exterior wooden parts.

Nagoya University's Bicycle shed protected with SurfaPore W

SurfaPore W was used for the "Building a bicycle shed with Japanese cedar" project on the Higashiyama Campus of Nagoya University. Prof. Furukawa's class from the Graduate School of Environmental Studies, Architecture Structure and Construction Systems of the university designed this project. SurfaPore W was selected to protect Japanese cedar.

Social welfare facilities “Yoneyama-ryo” SurfaPore W in Japan

“Yoneyama-ryo” social welfare facilities are a place for disabled children, or children who cannot live with their parents for various reasons. The facility takes care and supports children in every aspect of their life and education. When Yoneyama-ryo was remodeled, SurfaPore W was applied to protect their wooden decks.

Protecting wood of “Rifugio Tolazzi” in Forni Avoltri, Italy

The “Rifugio Tolazzi” is situated in the picturesque area of Forni Avoltri (Udine) at the foothill of Mount Coglians. The particular mountain cottage is at 1500 m altitude and is exposed to extreme weather conditions: rain, sun, snow, ice.

SurfaPore W was applied in September 2010 and the pictures of the wooden railing were taken in November of 2012.

The weather conditions on the mountain vary a great deal across the year

Under dry conditions one can observe that the untreated wood has been discolored due to the sun and moisture

***U**nder wet conditions, the SurfaPore W treated wood does not absorb water and does not change in color*

Complete protection of Bagno Giulia 85 Beach in Riccione, Italy

Bagno Giulia 85 is the first Italian eco-friendly beach. It received complete protection with NanoPhos products: SurfaPore W was applied to protect all wooden structures, the walkways, that lead to the beach, were treated with SurfaShield C making barefoot walks safer, the photovoltaic system was treated with SurfaShield G, and the reception has been painted with a water-based acrylic paint using SurfaPore ThermoDry as an additive in order to maintain the interior cooler.

Romanian University students build ECO-house using NanoPhos Materials and excel at Solar Decathlon Europe

Solar Decathlon Europe promotes research regarding the development of energy efficient buildings. In 2012, 20 teams from around the world did compete (United Kingdom, France, Japan, China, The Netherlands, Egypt, Italy, Romania, Spain, Brazil, Norway, Denmark and Portugal). The houses had to be assembled in 13 days, and disassembled in 5, in Villa Solar, a building site in Madrid's largest public park, Casa de Campo.

PRISPA is the first and only Romanian team ever to participate at a Solar Decathlon. Given the intense international competition, the team succeeded in obtaining the impressive 2nd place in Energy Efficiency and 2nd at Public Choice.

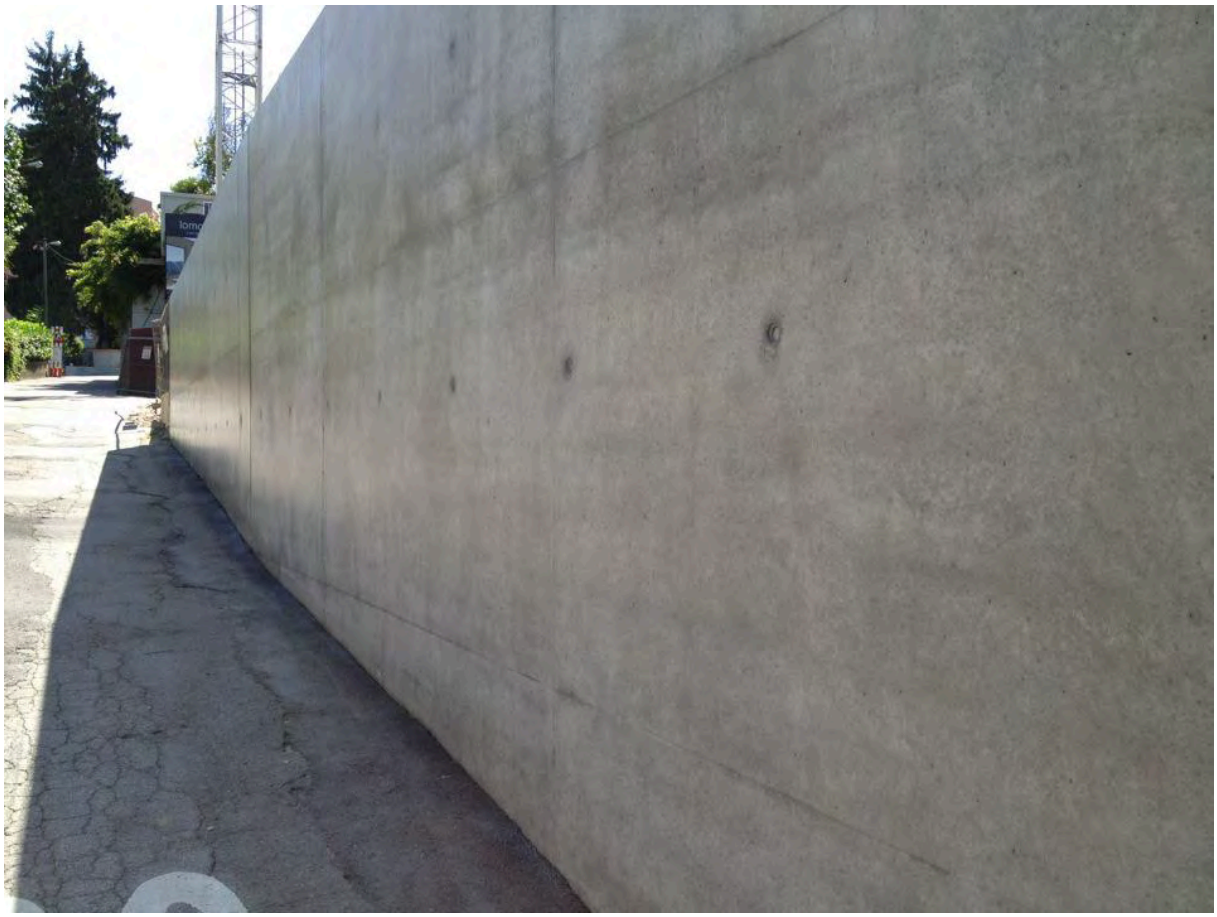
Several NanoPhos products were used in the PRISPA project:

- SurfaPore W that was used to protect and preserve the wooden structure and the terrace of the house,
- SurfaPore C water proofed the exterior walls while SurfaShield C made them self-cleaning and keeps them looking like new,
- SurfaPore F treated the interior gypsum boards, and
- SurfaPore T was used in the bathrooms.

SurfaPore AG protects walls from graffiti in Lake Lugano, Italy

Lake Lugano is a glacial lake situated on the border between south-east Switzerland and Italy. The Italian water and the Campione d'Italia enclave are considered non-territorial and therefore enjoy duty free status and are exempt from the EU VAT tax. The residents of the area also enjoy several other attractive tax advantages. One can also enjoy outdoor sports, beautiful villages, gorgeous views, festivals and delicious food in the Lugano area, which draws tons of tourists every year to its shores.

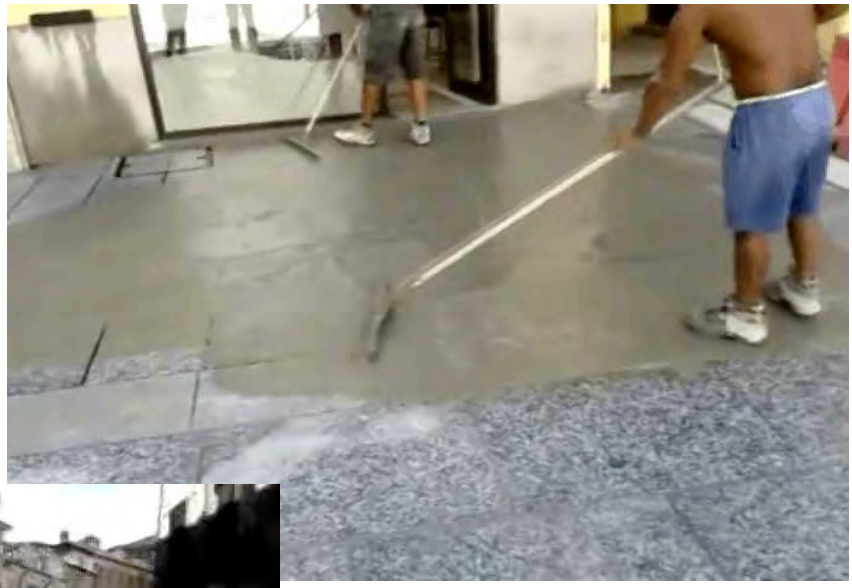
Naturally the Lake of Lugano area is home for many exclusive residences. In particular, the retaining wall of a prestigious new residential complex shown below was treated with SurfaPore AG in order to avoid being ruined by graffiti.



Enhancing cement adhesion with Surfamix C in Borgosesia, Italy

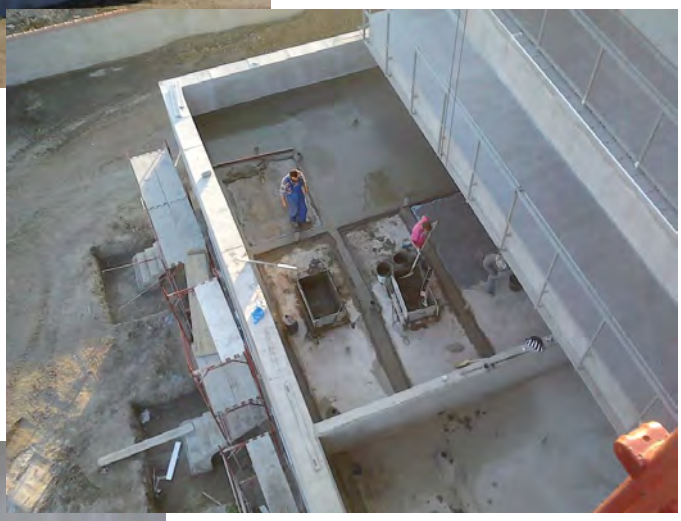
Borgosesia is a *comune* (municipality) in the Province of Vercelli in the Italian region of Piedmont, located about 80 km northeast of Turin. In the Piazza Mazzini at Via XX Settembre, applicator Mr. Varese Porfidi faced a particular problem: poor adhesion of the cement on the porphyry slabs that he was placing.

He used SurfaMix C at a rate of 8% of the weight of cement and significantly improved the adhesion of cement on the porphyry stones. At the same time, the joints resisted the harmful ingress of water.



Combining SurfaMix C and SurfaPore C for waterproofing terraces in a bloc of flats in Brasov, Romania

Brașov is located in the central part of Romania, about 166 km north of Bucharest. It is surrounded by the Southern Carpathians and is part of the Transylvania region and has cold and relatively wet weather. With an average humidity of 75%, the temperature ranges from 35 ^{o}C to -30 ^{o}C. A brand new bloc of apartments in Brasov, Romania required a solution for waterproofing their terraces. SurfaMix was chosen for the screed used on the terraces and then SurfaPore C was applied for waterproofing. SurfaMix C was also used to enhance the adhesion of tiles as well as that of the grout that was also treated with SurfaPore C.



SurfaGuard Metals protects rebars at the Sree Balaji Medical College and Hospital in India

Sree Balaji Medical College & Hospital is affiliated to Bharath University and is also recognized by the World Health Organization (WHO). Sree Balaji Medical College and Hospital is a private, non-profit, self-financing Medical Institution, pledged to the service of the community, catering to the health care needs of the people in general, and especially to the needy, under-privileged, suffering section of humanity, in particular. It is raised in a campus of 52 acres. It has 960 inpatient beds and 11 state of the art operation theatres and 60 intensive care beds.

The Bachelor of Medicine, Bachelor of Surgery (MBBS) course started in 2003-04 and has an annual intake of 100 students and is expected to increase to 150 students. Therefore the hospital is expanding its facilities to accommodate its growth.

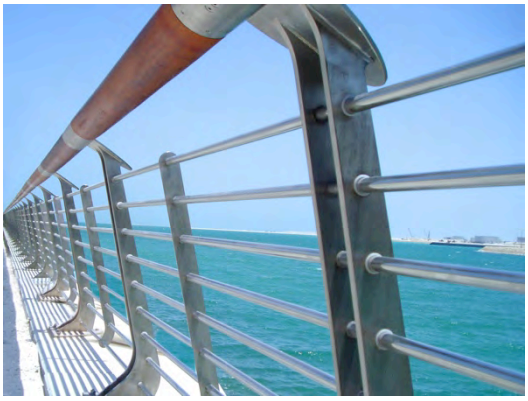
Rusted rebars are always a source of concern for engineers. The concern stems from the fact that when rebars corrode, the formation of rust leads to a loss of bond between the steel and the concrete and the integrity of the structure can be affected. Further, reduction in the cross sectional area of steel reduces its strength capacity.

Surfaguard Metal was coated on all the rebars used in the construction of the basement of the hospital.

SurfaGuard Metals protects stainless steel railing on Reef Island, Bahrain

Reef Island, at the heart of Manama, is one of the pioneering real estate development projects in Bahrain. This man made island with its carefully studied area of 579,000 m2 is conceived and styled along a fusion of contemporary designs following traditional patterns. Reef Island is being developed by the Lulu Tourism Company, which was established in March 2002 as a result of a joint venture between the Government of Bahrain and the Mouawad Group Inc. It includes 39 residential buildings with a total of 1217 apartments, a residential Icon Tower, 49 stylish chalets, and 67 luxurious individual villas all overlooking private lagoons. It will also have its own private Marina & Yacht Club, Spa Village, an aquarium, a medical center, shopping mall and a multi-function exhibition center, as well as a five star 300-room hotel with 42 serviced apartments, restaurants, gym and shopping arcades.

A 4500m stainless steel railing was placed all around the island. However, the company quickly found out that the stainless steel was not able to withstand the corrosive environment along the coastline of Bahrain: temperatures as high as 50 ^{o}C, high levels of moisture and visible salt accumulation. The result was that a crew of two would need one hour per meter to remove the rust using a chemical rust remover and steel wool! Given the 4.5km of railing, this is a major and very costly effort, with some section of the railing always being rusted.



After several months of application one can easily observe the great performance of the SurfaGuard Metals application on the railing. For the treated part (on the left), only a piece of cloth is needed to clean the surface.

Saving Energy in Bangalore India with SurfaPore ThermoDry

With the sun striking buildings all day long, changing the structure of these buildings and adding insulation is most frequently impractical and costly. The use of our SurfaPore ThermoDry® additive in paints makes paint reflect 92.35% of the solar infrared radiation, "blocks" the thermal transfer by changing the paint's conductivity and by exhibiting a very high emissivity. These effects lead to Solar Reflection Index (SRI) of more than 117 significantly surpassing the LEED requirement of 75!

In an application in Bangalore India the temperature difference of a SurfaPore ThermoDry painted & uncoated interior surface was measured at 3:30pm. More specifically, the temperature of the interior surface of the painted roof was measured i.e. the ceiling of the top floor.

	Top Floor Ceiling (^{o}C)
Single Coating with SurfaPore ThermoDry	30.9
Uncoated Surface	45.7
Difference	**14.8**

The temperature difference of 14.8 ^{o}C on the internal side of the roof is quite dramatic leading to a significantly improved comfort and energy savings.

Energy savings reconstruction test project: SurfaPore ThermoDry in the cold winters of China's Shandong province Weihai City

Project: Five Buildings in Weihai city, China built in the 1980s and 1990s with high energy consumption.
The test project was initiated prior to the winter of 2011. Five buildings (6399 m^2) were painted only externally using SurfaPore ThermoDry (HeatStop Paint powered by ThermoDry). For comparison purposes, 5 buildings painted with regular paint were selected to serve as the control/untreated group. The following buildings were painted using ThermoDry:


Minzhu St. No. 68


Hongguang St. No. 21


Garden St. No. 10


Shengli St. No. 13


Shengli St. No. 14

Test Conditions

External Temperature

- Winter of 2011 (Dec 2011 to Feb 2012) with a temperature range from -10 °C to 0 °C.

Heating system

- Heating provided by a coal power plant.
- Heat flow into each apartment was the same and was centrally controlled i.e. the apartment residents did not have control of the time their heater was turned on.

Temperature collection method

- 6 people from the local community, employees of the Heating Power Plant, and Liontrunk recorded the temperature of selected apartments.
- 35 apartments were selected in ThermoDry treated buildings and 35 apartments were

selected in untreated buildings.

- Measurements took place in the 3 months between Dec2011 to Feb2012 on 14 different dates.
- Collection times included morning, afternoon and evening.
- Two teams separately recorded each data point: each record was confirmed by the apartment's resident.
- More than 500 temperature data points collected (missing points were due to residents not being available during the data collection time).

Test Results

The ThermoDry treated buildings demonstrated a temperature higher than 3.84 ^{o}C on average when compared with the untreated/control buildings during the 3 winter months of the test.

Meas. Date	3/12	22/12	24/12	2/1	3/1	6/1	11/1	18/1	31/1	1/2	2/2	7/2	15/2	25/2	Average
ThermoDry Apt. Average	21.4	20.2	20.6	21.2	20.7	21.8	21.3	20.1	20.3	20.4	19.5	19.7	20.5	19.6	**20.52**
Control Apt. Average	16.9	17.4	17.1	16.5	16.3	16.5	16.2	16.4	17.1	17.6	16.0	16.2	16.7	16.6	**16.68**
Difference	+4.5	+2.8	+3.5	+4.7	+4.4	+5.3	+5.1	+3.7	+3.2	+2.8	+3.5	+3.5	+3.8	+3.0	**+3.84**

Apartment Temperature Comparison between ThermoDry Treated Buildings and the Control/Untreated Buildings (in ^{o}C)

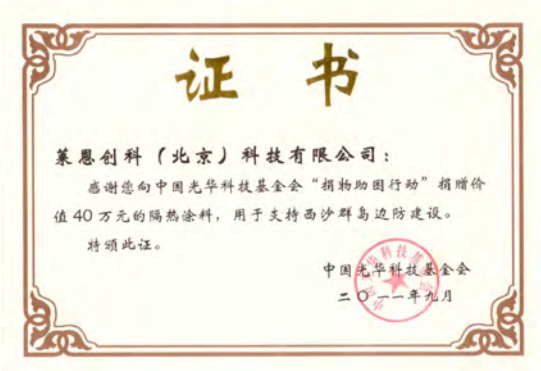
Based on the data provided by the U.S. Energy Information Administration (www.eia.gov), in winter heating months, lowering the thermostat by 1 ^{o}F (1 degree Fahrenheit = 0.556 ^{o}C) the resulting energy saving can range from 4-6% depending on fuel used (natural gas, electricity, fuel oil). This is equivalent to 7.2-10.8% energy savings per 1^{o}C reduction in thermostat setting. Using an average of 9% as the energy savings per 1^{o}C, the total energy savings due to the 3.84 ^{o}C difference observed in the case of the Weihai City effectively indicates that 34.6% of energy was saved by painting with ThermoDry only externally during winter months!

http://www.eia.gov/emeu/consumptionbriefs/recs/thermostat_settings/thermostat.html

SurfaPore ThermoDry Protects China's Navy South Sea XiSha Island Frontier Defenses Barracks

Paracel Islands, also known as Gem Island, is one of the four major islands in the South China Sea. It is rich natural resources and is a key strategic location for Chinese national security. Along with China's recent rapid economic development and opening-up policy, numerous illegal activities from neighboring countries have been on in increase, and a lot of resources have been looted, becoming a big threat to the national security of China. The South China Navy, maintains its military bases on the Paracel Islands that are very far from the mainland. However, besides the regular difficulties in a soldier's daily life while stationed in a remote location, the hot and humid climate has a major effect on living conditions.

In September 2011, Nanophos China distributor Lion Trunk (Beijing) Technology Co., Ltd. provided the China South Sea Paracel Island Frontier Defenses Constructions a ThermoDry based paint in order to insulate the barracks against heat in the summer and cold in the winter but also to keep them drier. The whole project was organized and executed by the China Guanghua Science and Technology Foundation.



证 书

莱恩创科（北京）科技有限公司：

感谢您向中国光华科技基金会“捐物助困行动”捐赠价值40万元的隔热涂料，用于支持西沙群岛边防建设。

特颁此证。

中国光华科技基金会

二〇一一年九月

SurfaPore ThermoDry across China

Vanke Group Container House
The Vanke Group is the largest residential real estate developer in China. SurfaPore ThermoDry was used on a container house surface to block heat transfer. As a result, the air-conditioning requirements were reduced by 30%.

The Phoenix Water Town
In Hainan province, SurfaPore ThemoDry was used on a project called The Phoenix Water Town. In this project the use of SurfaPore ThemoDry replaced the traditional ways of thermal insulation such as expanded polystyrene (EPS) or thermal insulation mortar.

Mission Hills Resort Haikou

Mission Hills Resort Haikou is the ultimate destination for visitors seeking world-class sports, entertainment and wellness facilities. Consistent with Mission Hills' reputation as the destination of choice for professional golfers and celebrities, the Haikou courses offer near-endless experiences for the golfing enthusiasts. The luxurious houses in Mission Hills Haikou were painted using SurfaPore ThermoDry. The first phase of 100,000 square meters of surface has been painted and another 300,000 square meters will be painted before the completion of the project.

Welfare houses in Hainan Wenchang

In the area of Hainan Wenchang, the government built many welfare houses. SurfaPore ThermoDry was used as paint additive in order to provide thermal insulation and reduce energy costs. Several similar projects like this have been completed in Hainan province.

SurfaPore ThermoDry featured at the Zero Energy Development Pavilion of the World Expo in Shanghai, China

The Shanghai World Expo 2010 was visited by more than 73 million visitors, occupied a space of 5,28 square kilometers and took place from May 1st till October 31st. The theme of the Shanghai World Expo 2010 was “Better City, Better Life” expressing the desire of humanity for a better life in the urban areas of the future.

The innovative paint additive, SurfaPore ThermoDry, received an award in Shanghai on November 6th, 2010 for its participation in the ZED (Zero Energy Development) Pavilion of the Shanghai World Expo. The material was selected as the standard for the new energy efficient buildings of China since when it is added in any common water based acrylic paint it transforms them into a thermal insulator. Therefore, it saves energy by simply painting! The triple action of SurfaPore ThermoDry, thermal radiation reflection, thermal transfer blocking and waterproofing, contributes in the protection of surfaces and in building energy efficiency. Further, it prevents water condensation and the development of mould on walls. The effectiveness of the product has been validated by a number of research international labs.

Cognizant Technology Solutions saves energy based on SurfaPore ThermoDry emulsion in Chennai, India

Cognizant is a leading provider of information technology, consulting and business-process outsourcing services. Cognizant Technology Solutions at SIPCOT, Siruseri, Chennai is one of the many offices having a total built up area of 2,000,000 square feet. The total value of the project is 5.66 billion Indian rupees (about $105 million). Larsen & Toubro Ltd., ECC Division, Chennai was the total turnkey contractor for the project.

Surfapore ThermoDry mixed with an acrylic emulsion was applied on the terrace cement tiles for an area of 170,000 square feet. Surfapore ThermoDry was used in this application in order to receive the Green building LEED certification since the SRI (Solar Reflective Index) achieved was 113.

Cement tile without any coating

Cement tile with one coat of ThermoDry based emulsion coating

Cement tile with two coats ThermoDry based emulsion coating

Terrace Surface Temperature (in ^{o}C)			
	Untreated Tile	Tile with 1 coat	Tile with 2 coats
Average Temperature	63.4	46.6	41.4

SurfaPaint ThermoDry Elastomeric Roof Application in Craiova, Romania and the Island of Aegina, Greece

Poorly insulated roofs are a major source of heat transfer in building structures. This results in large amounts of energy to be required for cooling in the summer or heating in the winter. Further, flat roofs suffer from prolonged exposure to heat, moisture and frost that very quickly lead to surface corrosion. The uneven and poorly insulated surfaces also absorb moisture especially in ponding areas where water collects.

SurfaPaint ThermoDry Elastomeric has been used in the cases below in order to both thermally insulate and to create an impermeable elastic film that has excellent adhesion even on aged roof surfaces.

Before **After**

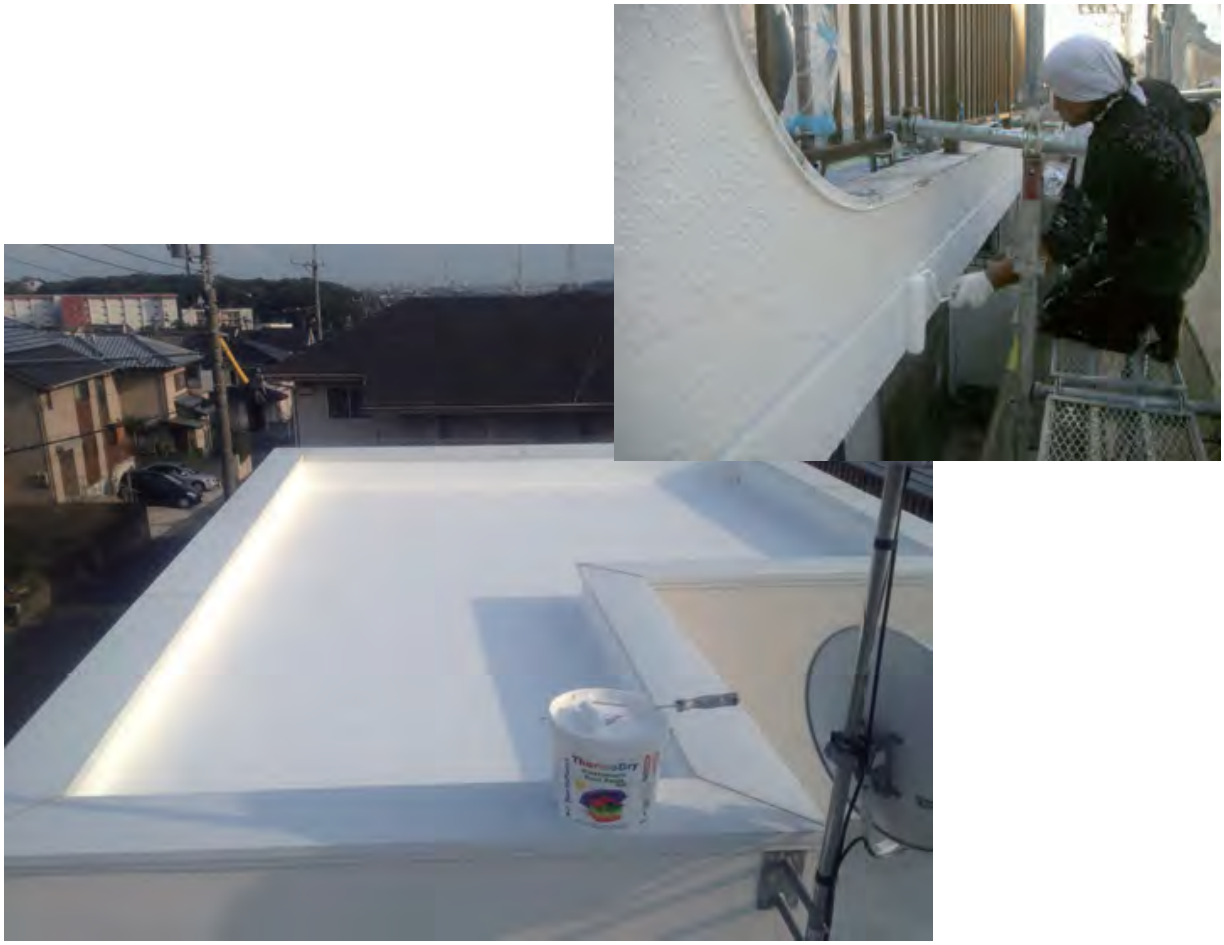
Rooftop in the island of Aegina, Greece

160m^2 rooftop in Craiova Romania *requiring waterproofing and thermal protection. On top of this terrace, the owner will arrange a roof garden to make the most of the space.*

SurfaPaint ThermoDry Interior & Exterior in private Japanese homes

Given the energy shortage in Japan, energy costs have skyrocketed and thermal insulation has become of greater importance. Thermal insulating paints have received considerable attention. With this segment increasing rapidly, SurfaPaint is positioned as a high quality product that is cost effective. As a result, SurfaPaints are chosen by many consumers who own houses and apartments.

Sample Japanese homes that have applied SurfaPaint ThermoDry inside and outside



SurfaPaint ThermoDry Elastomeric Roof application

SurfaPaint ThermoDry Elastomeric insulates and SurfaShield C keeps metal roof of storage warehouse clean in Hamamatsu, Japan

Hamamatsu (浜松市) is a city located in the Shizuoka Prefecture on the western coast of Japan. Hamamatsu has been a famous industrial city, especially for musical instruments and motorcycles. Honda Motor Co. was founded Hamamatsu, while famous companies such as Yamaha Corporation, Suzuki Motor, Roland, Kawai Musical Instruments, Tokai Guitars, and Hamamatsu Photonics K.K. maintain their headquarters in the city.

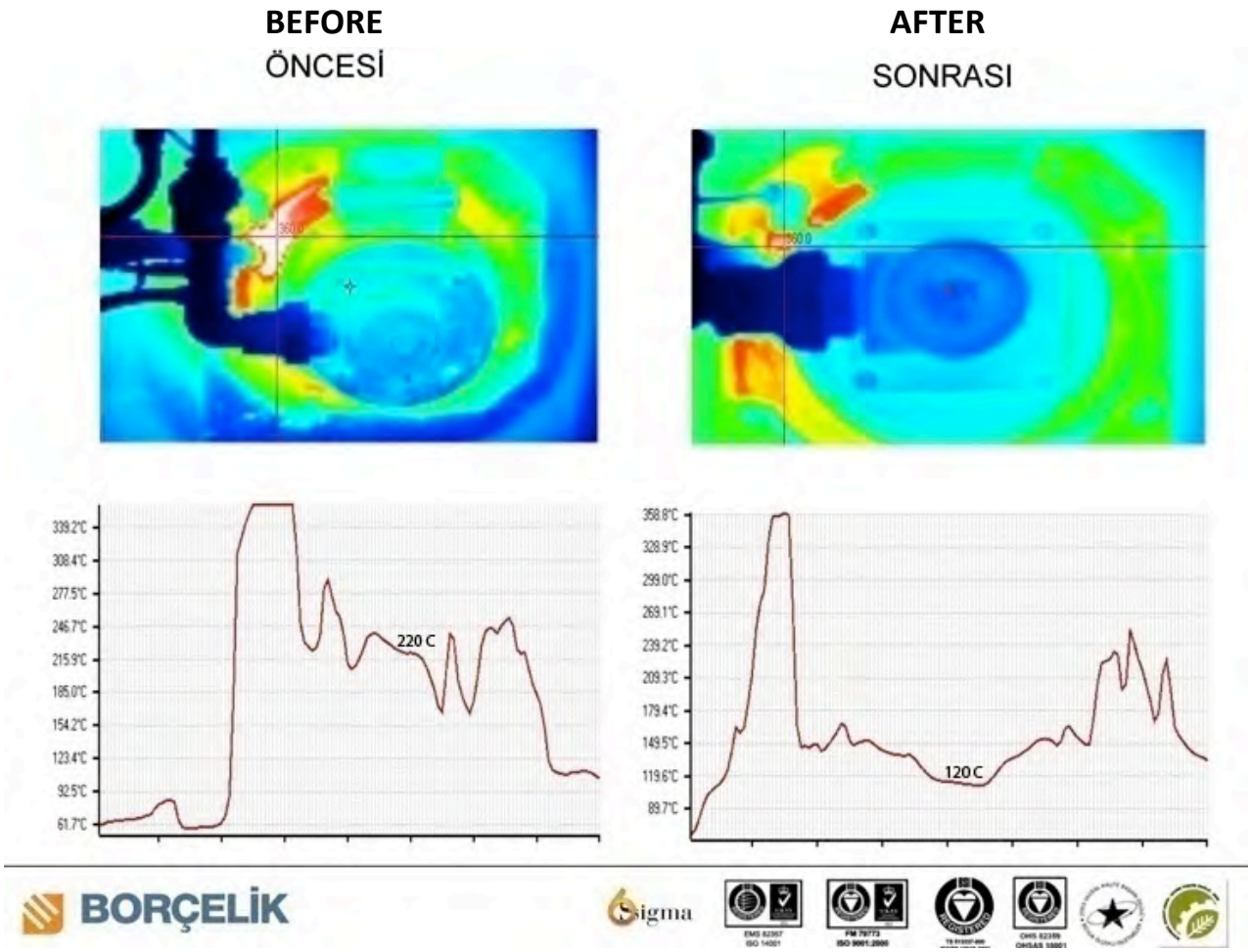
In the case shown below, the corrugated metal roof of a company's warehouse was firstly insulated using SurfaPaint ThermoDry Elastomeric. Although this paint has a low dirt pickup, the surface was then treated with SurfaShield C ensuring that the roof will remain super-clean and highly heat reflective.

SurfaShield C actively keeps the roof bright and clean from stains

SurfaPaint ThermoDry Metals thermally insulates metal components in Borçelik factory in Turkey

Thermal insulating metal surfaces in factories is a critical issue. The problem stems from the need for energy savings and the requirement for personnel safety. Energy savings are sought in a wide range of cases such as in the case of insulating metal tanks and pipes that hold hot liquids. Further, it is also quite important for personnel safety that the temperature of surfaces is reduced at a level that is safe for contact.

In the case below, part of a metal component was treated with SurfaPaint ThermoDry Metals at Borçelik, the first private and the second largest flat steel manufacturer in Turkey. The temperature profile was examined using an infrared camera. It should be apparent from the photos below that before treatement the component had a tempetarure in the range of 220 ^{o}C and after treatment around 120 ^{o}C. This is a dramatic 100 ^{o}C surface temperature change simply by painting!



SurfaPaint ThermoDry Metals thermally insulates industrial tanks in Emin Tekstile factory in Turkey

For the last 50 years, Emin Tekstil has been in the forefront of innovative textile solutions in Turkey and has a capacity of 1,600,000 meters a month. The company is committed in preserving the local environment and has a refining facility that can purify 2000 tons a day of by-products a day.

The tanks below recycle caustic soda used in the manufacturing process and a water heating tank used for denim textile washing and painting factory. More specifically, originally in order to reach the required temperature of 135-140 ^{o}C, 5 bars of pressure were applied and 45 minutes were required. After SurfaPaint ThermoDry Metals application, the same temperature was reached in 15 minutes using only 3 bars. Overall, 42% energy savings were achieved.



The temperature reduction also increased safety as the water heating tank could now be even touched by bare hand

SurfaPaint ThermoDry insulates internally and externally the Poti Cathedral in Georgia

The Poti Cathedral (Georgian: **ფოთის საკათედრო ტაძარი**), or Poti Soboro Cathedral, is a Georgian Orthodox church in downtown Poti, Georgia. The cathedral was modeled after Hagia Sofia in Constantinople, and it was built in 1906-07 with the great contribution of Niko Nikoladze, the mayor of Poti. Notably, Niko Nikoladze chose the location of the cathedral in the center of the town to make it viewable from every side of Poti. A. Zelenko and M. Marfeld were the architects of this Neo-Byzantine cathedral and the capacity of the church is 20,000 people. The ornaments and decorations are taken from the medieval Christian cathedrals in the Trabzon mountains. In 1923, after the Red Army invasion of Georgia, the Communist government turned it into a theater and the bells were donated to the industrialization foundation. In 2005, the cathedral was restored back as a Georgian Orthodox Church.

The Cathedral was painted internally and externally with SurfaPaint ThermoDry

SurfaPaint ThermoDry Metals and Exterior Protect Dubai Airport Freezone Area (DAFZ) Warehouse from Heat

Dubai Airport Freezone, was ranked the Top Free Zone in the World by the Financial Times' fDi Magazine. Dubai Airport Free Zone was established in 1996 as part of Dubai Government's strategic plan to host foreign investments and facilitate both local and foreign investors' business opportunities. Located within Dubai International Airport boundaries, the Free Zone is at present hosting over 1300 companies operating in various activities including aviation industry, pharmaceutical products, logistics & freight, jewelries, IT and mobile phones accessories. DAFZ offers its investors a number of incentives ranging from 100 per cent foreign ownership to 100 per cent tax exemption in addition to other incentives.

Given the weather condition in the United Arab Emirates and the increased sensitivity towards reducing energy consumption and CO_2 footprint, SurfaPaint ThermoDry Metals and Exteror were used in the DAFZ facilities to protect the complete exterior of a logistics warehouse including exterior walls, the metal roof, and metal rolling entrance. Initial energy measurements indicate that DAFZ has been able to significantly reduce energy costs with a very quick return on investment.

Italian Pizza on a Stick prevents condensation and achieves energy savings with SurfaPaint ThermoDry Interior

PIZZA M.E.G.I.C. was founded in 1999 by a Neapolitan pizzaiolo (pizza chef) and his father at Grado, the „island of sun“, next to Venice. It was a lucky coincidence when the Neapolitan tradition and modern industrial manufacturing met together. Today they are a company with over a decade of experience in the industrial production of fresh, precooked pizza.

ASTA LA PIZZA Is the new and funny way to conceive pizza. M.E.G.I.C has patented and has the exclusive rights as the only pizza on a stick. Perfect for children, but also for those, who even in a rush, want to eat a quick and delicious snack. It is available in the classic Margherita flavour, precooked or frozen.

Asta la Pizza has applied Surfapaint ThermoDry Interior in its new factory in Mariano del Friuli in the northeast commune of Udine. The application solved the condensation problems the company was facing while maintaining a healthy environment free of microorganisms and mold that could compromise the quality standard of the finished product. At the same time, it led to energy savings given that the same area is hosting pizza ovens and large refrigeration units.

Nanophos helps leading food manufacturer in the Middle East tackle a number of challenges

Technical Food Industries Company is located in Damascus, Syria and is widely recognized in its home market along with the many countries it exports to for its world-class manufacturing facility and its stringent quality and environmental standards. The company offers a wide range of refrigerated and canned halal meats and a variety of canned vegetable products available in the brands: Hana, Bavaria, Laziza, Halal, Al-Marai and Home Pantry. Technical Food faced a number of challenges that it was able to find sustainable and practical solutions by using NanoPhos products.

Condensation & Molding in production area and energy savings for cold storage areas

The high moisture levels during the steam decontamination process within the meat preparation area lead to excessive fungus growth on painted columns. As a result, Technical Foods had to repaint these columns 2-3 times a month to avoid fungus growth. Application of Surfapore Thermodry with an overcoat of Surfapore C took place on July 2011. To date (Jan. 2013), none of the columns have been repainted and fungi growth was completely eliminated.

Before application: columns had to be repainted 2-3 times a month!

After application: no signs of molding to date

Repainting exterior walls of all cold stores and dry storage buildings resulted in significant cooling cost savings.

Efflorescence on exterior painted wall surfaces

Exterior façade paint showed extreme signs of efflorescence. White spots were removed by spray applying Desalin C while Surfapore C prevented efflorescence from returning.

Self-Cleaning Pedestrian Road Markings in Greece

Road marking paints lose their contrast due to heavy traffic loads. Tire markings, dirt, pollution, weathering and intense UV radiation fade the intensity or cover the paint, resulting poor identification from drivers and raising significant safety concerns. SurfaShield C is an environmentally friendly solution that absorbs light and transforms its energy into chemical power. In this way road markings are transformed to self-cleaning. All organic stains and pollutants are continuously decomposed, just by using surrounding light. The action of SurfaShield C is photocatalytic, meaning that it works continuously, without being consumed. It adheres permanently on the surface of the paint and preserves its high contrast.

SurfaShield C was applied 30 min after the application of the marking paint on the right half of the crosswalk using a hand-held spray gun.

Three months after the original application of SurfaShield C, the treated areas of this pedestrian crossing remain cleaner and whiter. One can detect the contrast between treated and untreated areas.

Mall and Park in Cha Am, Thailand: Keeping areas around ponds clean with SurfaShield C

A theme park inspired by the Greek island of Santorini has opened in Thailand's holiday district of Cha-am, two hours from capital Bangkok. Developed by garment retailer and manufacturer Pena House Group, Santorini Park is designed to attract tourists as well as shoppers in the area. The 80,000 square meter mall features little white houses with blue-painted windows, windmills and stone-paved streets as well as shops, restaurants, a double-decker carousel and a 40-meter tall ferris wheel.

This impressive project features ponds that as soon as the park opened had visible signs of staining right at the edge of the watermark. SurfaShield C has applied on the area that is now keeping the area surrounding the pond clean from organic stains.

Before SurfaShield C treatment there is evident staining around the pond's edge

After using SurfaShield C there is no stain accumulation

Protection & Self Cleaning for the Bicentennial Monument in Monterrey, México

The Bicentennial Monument was created to commemorate the 200 years of the Independence of México. The monument is a series of interlocking triangular forms that create a spiraling column symbolizing growth. The form connects directly to both national and local history through six lines drawn over the surface of the structure and through the plaza. The growing columnar form is a statement of pride, representing the achievements of the city's industries and connecting with the greater history of Mexico.

The Monument stands in the plaza at the intersection of Morones Prieto and the end of the Zaragoza Bridge, and is directly across the Macroplaza at the entrance to the historic Colonia Independencia. Due to its unique location, high visibility and dynamic sculpture presence, it is a new landmark for the city. The bicentenary Monument is made from materials that symbolize Monterrey city: Concrete, Steel and Glass.

All concrete surfaces, including a waterfall in the front, were protected with SurfaPore C and SurfaShield C in order to preserve the monument's appearance.

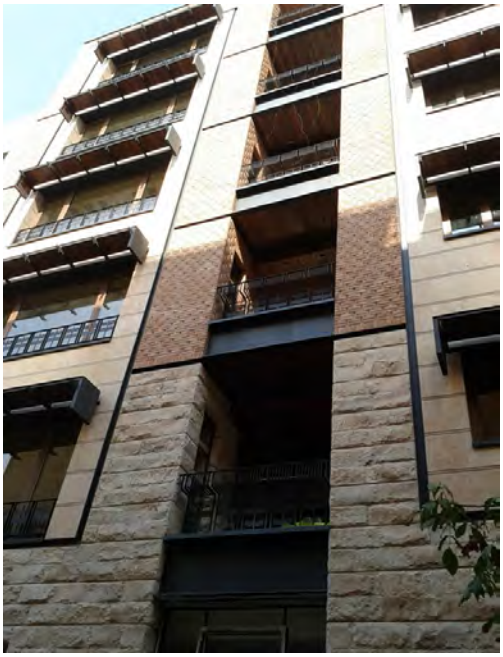
Combining SurfaPores and SurfaShield C for creating Self-cleaning surfaces that fight pollution in Tehran, Iran

Tehran suffers from severe air pollution and the city is often covered by smog making breathing difficult and causing widespread pulmonary illnesses. It is estimated that about 27 people die each day from pollution-related diseases. Pollution Indicator Boards all around the city monitor the current level of particulate matter (PM10), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), and carbon monoxide (CO). It is therefore not a surprise that external building surfaces require frequent cleaning from the smog related deposits.

Surface in Niavaran after being cleaned with DeSalin, SurfaPore C and then SurfaShield C were applied

SurfaPore C and SurfaShield C treated Sonbol tower located on west Arghavan St.

IranZamin restaurant is a new restaurant in Tehran protected by SurfaPore C and SurfaShield C



Apartment building in Kamsaaee St. on Darous local; SurfaPore R and SurfaShield C were used for bricks and SurfaPore C and SurfaShield C for the stones

In this Nakhjavaan project SurfaPore R and SurfaShield C were applied in order to decrease the cost of maintaining outdoor surfaces. After 1 year the surface remains bright and clean.

Before

One year after application

In this project located in front of the Kordestan highway the environment is so polluted that every building suffers from high outdoor cleaning costs. It was therefore protected from dirt and dust by SurfaPore R and SurfaShield C and it has remained very clean even after 2 years.

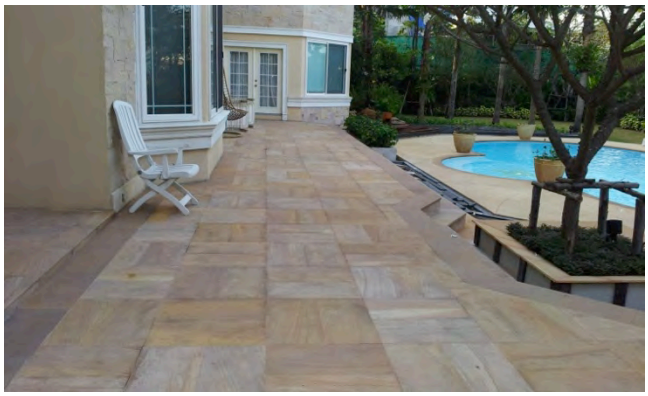
Luxurious restorion villa at Nantawan Srinakarin, Bangkok, Thailand

Thailand has a warm, tropical climate affected by an annual monsoon, with a rainy season from June to October and a dry season the rest of the year. Temperatures normally range from an average annual high of 38 °C to a low of 19 °C. The warm and humid climate makes it ideal for mold and fungi to grow on building surfaces.

The luxurious villa shown below required cleaning and restoration all around. The 520 m^2 consisted of a sandstone balcony, swimming pool area, walls, decoration fences and cement block paving. All surfaces were cleaned from fungi and mold with DeSalin K, DeSalin AM and were protected with SurfaPore C and SurfaShield C coating on top by using spray gun

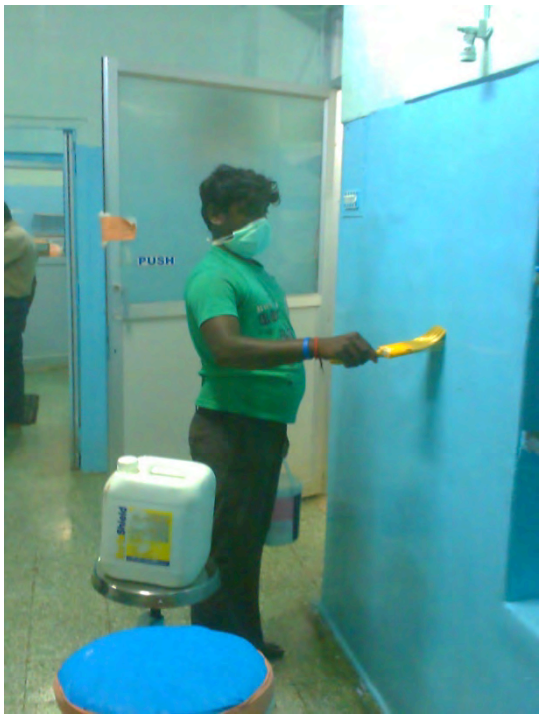
DeSalin AM was used in order to remove mold and kill its spores

After cleaning with DeSalin K and mold with DeSalin AM, surfaces were treated with SurfaPore C and SurfaShield C



Surfashield in the operating theatre walls of Southern Railway Headquarters Hospital, Perambur, Chennai, India.

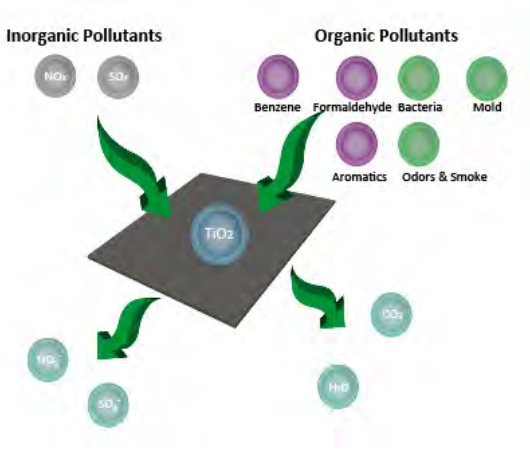
Southern Railway Hospital in Chennai is one of the oldest and most famous hospitals in India especially renown for its cardiac surgeries. It utilized SurfaShield in order achieve anti-fungal and anti-bacterial surfaces of the operating theatre walls (both tiles and painted walls).



Spanish Tile Giant Keraben Makes its Tiles Self-Cleaning with SurfaShield T

NanoPhos SA and the leading ceramic tile Spanish manufacturer KERABEN co-developed LIFEKER an innovative line of ceramic tiles. LIFEKER tiles have become self-cleaning and self-sterilizing based on the SurfaShield coating technology from NanoPhos. The SurfaShield layer is activated simply by utilizing surrounding light and not by the use of dangerous chemicals. The photocatalytic action of SurfaShield continuously decomposes organic stains and environmental pollutants without being consumed.

Keraben estimated that 1000 square meters of the SurfaShield treated Lifeker tiles have the same ability to decompose pollutants as 60 trees! The use of this technology safeguards us from infectious microbes, eliminates fungus growth and minimizes the use of cleaning chemicals. It is really impressive to see that the destruction of microbia (E-coli, Listeria, Staphylococcus) ranges from 98.92% to 99.89% in 4 hours! It also degrades the toxic NOx to non-toxic nitrates and reduces volatile organic compounds (VOCs).



The Keraben Group is a multinational ceramic tiles company that manufactures and sells ceramic tiles, special pieces, accessories, hydromassage systems and shower solutions. The Group's international growth has been accompanied by the creation of a vast distribution network based on its own stores and distributors as well as sales offices abroad, placing its products in more than 120 countries.

SurfaShield G treated photovoltaic panels in Ravenna, Italy remain cleaner

The concept of self-produced electricity is expected to change how electricity users perceive, understand and think about their electricity use and has the potential to change electricity demand requirements. Households, especially in Europe, are increasingly placing solar panels on the roofs for their own use or for selling it back on the grid.

The photovoltaic panels shown below were placed on a roof in Ravenna. Ravenna is the capital city of the Province of Ravenna in the Emilia-Romagna region of Italy. Before installing this photovoltaic system on the roof of the house, SurfaShield G was applied on all panels except one. The photo below was taken only 3 month after installation. One can easily identify the difference between the untreated panel (on the top left side) and treated panels (all the rest). The tests in an Italian laboratory also demonstrated that SurfaShield G increased light transmittance and decreased reflectance while the coating remained unaffected after the ageing tests performed.

Therefore, SurfaShield G delivered tangible and measurable performance benefits, by transforming surfaces into self-cleaning.

Solar panels of Hirosaki City Hall in Aomori, Japan produce more power by using SurfaShield G

Hirosaki (弘前市) is a city located in Aomori Prefecture, Japan. The city is currently a regional commercial center and the largest producer of apples in Japan. Hirosaki's cherry blossoms put on the finest show in the nation. About 2 million visitors from all over Japan flock to the Cherry Blossom Festival that is held in Hirosaki Park from April 23 to May 5. Hirosaki has short, hot and humid summers, and heavy snowfall during winters.

The City of Hirosaki has been working on energy generation planning as a part of smart city project. The first step of city planning is not to depend on the power company for energy generation. Therefore, the city installed photovoltaic panels and wind power generators on the roof of the city hall.

In order to enhance the effectiveness of the solar panels, SurfaShield G was applied on their glass surface. As a result, the surface is remaining cleaner while reflectiveness was decreased. All in all, the panels are producing more electricity for the city hall of Hirosaki.

SurfaShield G keeps glass façade clean at Arslan Aluminyum's Headquarters in Istanbul, Turkey

Istanbul is the largest city in Turkey and is the country's economic, cultural, and historical center. With a population of 13.5 million, the city forms one of the largest urban agglomerations in Europe and is among the largest cities in the world by population within city limits. As a result, air pollution is quite a problem and its effects can be visible on building surfaces.

Established in 1970, Arslan Aluminyum is the leader in the aluminum profile business in Turkey. Mr. Mehmet Arslan, the chairman and owner of the company, was quoted to say: "Our head office and showroom are in the center Istanbul where there is a lot of car traffic. Every year, we would have to clean our glass windows at least 2 times. After application of Surfashield G, it has been a year and our windows look clean like the first day of application. As a result, we plan to use all your products in new construction program next season."

Self-cleaning skylight windows with SurfaShield G in Râmnicu Vâlcea, Romania

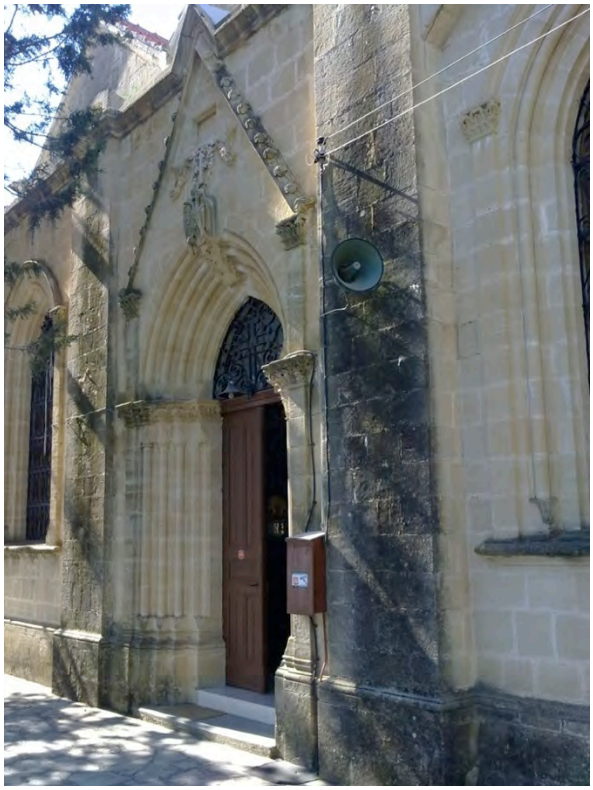
Skylight windows are quite attractive as they bring in a great deal of light. However, given that they are located on the roof were access might be limited; cleaning them can be a difficult task.

Râmnicu Vâlcea is situated in the central-south area of Romania and is set at the foothills of the Southern Carpathians. The owner of the house below in Râmnicu was no different: his windows required frequent cleaning while access was limited. As a result, the skylight window was treated with SurfaShield G. After treatment, the glass became hydrophilic and self-cleaning remaining clean as the rain could easily wash away any dirt particles.

Untreated **Treated**

Cleaning and protecting chapel in Dora, Cyprus

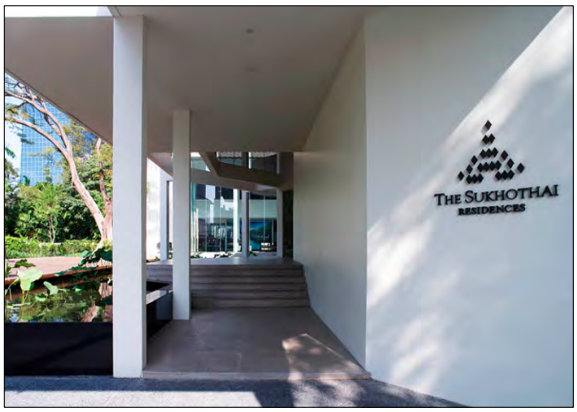
Algae need moisture in order to grow, but they also need suitable conditions of light and temperature. Walls surfaces that remain wet for long periods of time are likely to be more hospitable for algal growth than those that are totally dry. DeSalin C was used to remove algal greening and restore the surfaces of this chapel in Dora, Cyprus. The porous walls were subsequently protected with SurfaPore C that keeps the surface dry and unfriendly for algae.

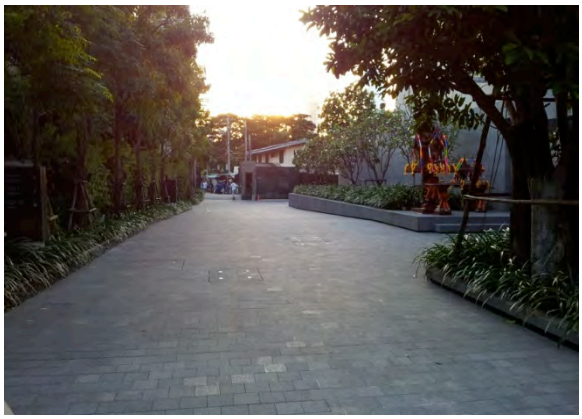


DeSalin C was diluted at a 1:3 ratio and used for the power washing of the chapel's surfaces. This greatly facilitated the cleaning of these heavily soiled surfaces.

Cleaning Sukhothai Residences Condominium with DeSalin K in Sathorn Bangkok, Thailand

Sukhothai Residences Condominium was the most highly anticipated residential development in Bangkok, located next to the Sukhothai Hotel on Sathorn Road Downtown and Business center. Its 1,200 m^2 granite paved driveway, suffered from cement residue and efflorescence. Cleaning took place with DeSalin K and high-pressure spray.





Cleaning and protecting fountain from hard water deposits in Al Khobar, Saudi Arabia

Al Khobar is a large city located in the Eastern Province of the Kingdom of Saudi Arabia on the coast of the Persian Gulf. It has a population of over 500,000 and forms part of the greater Dammam metropolitan area along with Dhahran, which together have a combined estimated population of over 2,500,000 reaching 3,000,000. Many of Al Khobar's residents work for Saudi Aramco, the world's largest oil company, but also hosts a many of the most important regional and international companies.

The fountain in the round about shown was suffering from major calcification problems. The reason for this is the fact that the water used is very hard and salty. The first point of action was using DeSalin K to clean the hard calcification stains. Then SurfaPore C was applied creating a super hydrophobic surface that is not allowing for water to remain on the surface and therefore avoiding calcification while the same poor quality water is being used.

Pool surfaces would continuously stain from the hard water used in the fountain

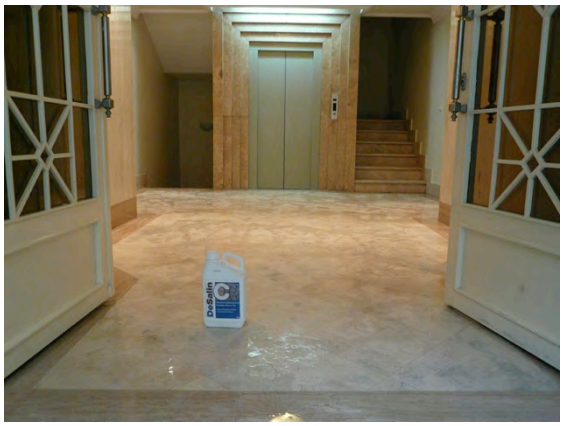
After cleaning with DeSalin K, pool surfaces have become super hydrophobic with the use of SurfaPore C and as a result they remain clean

Cleaning stones in apartment buildings in Tehran, Iran

Travertine is a limestone, formed by the precipitation of carbonate minerals from solution in ground and surface waters, and/or geothermal hot springs. The relative softness of the stone, combined with its holes and troughs, make travertine difficult to finish and maintain.

DeSalin K proved to be very effective for removing the dirt and stains from the antique travertine stone mosaic on each floor of an apartment building located in Gheytarieh, Tehran.

The polished stone below at the lobby of an apartment building in Darous, Tehran, exhibited very high levels of efflorescence that had accumulated for 10 years. The salt deposits were so extensive that they had completely changed the look of the surface. Desalin C was able to restore the polished stone to its original look.



Cleaning paan stains with DeSalin T Avani Riverside Mall at Howrah, West Bengal in India

Paan is a popular after-dinner treat in India. It is made by folding dried fruits, nuts and pastes into a betel leaf, a member of the pepper family. It freshens one's breath or if swallowed helps digestion. Whatever the mix, paan loses its flavor in a matter of minutes — leading to a messy end – people frequently spit half-chewed betel leaves onto sidewalks and public areas. Paan dyes the saliva a reddish brown making the stains on surfaces nearly impossible to remove. In fact cleaning these stains is such a big problem that the Mumbai Railway Vikas Corporation chose to dark shade of purple on areas of their new trains to ensure that paan stains will not stand out.

Over the past few years, Kolkata has offered more choices in shopping, dining and entertainment than any other city in the region. With the arrival of Avani Riverside Mall these choices are gaining new momentum in exciting people's taste for better things in life. With 450,000 square feet of retail space the Avani Riverside Mall offers unique forms of enjoyment, culture and lifestyle. In the test case below, Microtrack Business System Pvt. Ltd. used DeSalin T and successfully removed the difficult old Paan stains from surfaces found at the Avani Riverside Mall.

Cleaning mold with DeSalin AM in Scandinavia

Concern about exposure to mold has been increasing as the public becomes aware that exposure to mold can cause a variety of health effects and symptoms, including allergic reactions or even asthma attacks. Molds can be found almost anywhere, as long as moisture and oxygen are present. When excessive moisture accumulates in buildings or on building materials, mold growth will often occur, particularly if the moisture problem remains undiscovered or unaddressed. Molds reproduce by making spores that usually cannot be seen without magnification and are transferred through the air continually. When mold spores land on a damp spot, they may begin digesting whatever they are growing on in order to survive. Molds gradually destroy the things they grow on.

The pictures below taken in Scandinavia, show DeSalin AM being very effective in cleaning and preventing mold, algae and microorganism growth from surfaces. It is a powerful water-based fungicide and bactericide that can exterminate mold spores

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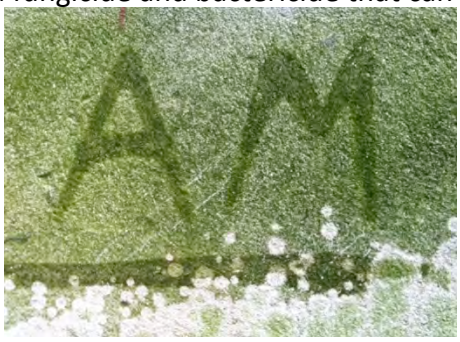
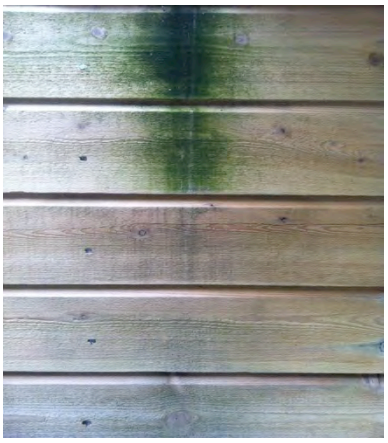


Desalin AM placed on moldy concrete (wet mark)

Desalin AM cleaned mold on concrete surface it was placed



Desalin AM placed on lower part of moldy wooden surface

Desalin AM on moldy painted surface

Result after using AM as a soap by wetting a sponge. The black fungus came right off!

NanoPhos products in Retail Chains

The Praktiker Group is one of the leading companies of the European home improvement and DIY sector. It operates around 440 stores in nine countries, including about 330 stores in Germany. With about 20,000 employees the company achieved net sales of about € 3,2 bn (2011).	Praktiker
LOWE'S Home Improvement Warehouse	Lowe's has been helping customers improve the places they call home for more than 60 years. Founded in 1946, Lowe's has grown from a small hardware store to the second-largest home improvement retailer worldwide.
The Maxmat is the result from a partnership between Sonae and the Irish group CRH. It has been present in the Portuguese market since 1994, where it maintains 32 stores with 500 employees.	Maxmat
S:T ERIKS	S:t Eriks AB manufactures and markets concrete products for land, water, and sewage systems applications. Its customers include large and small contractors in the construction industry and municipalities, government agencies, and retailers in Sweden, Norway, and Finland. S:t Eriks has more than 400 retailers around Sweden.
Modena Tiles chain was established in August 2000. The objective of the chain is to be the best Norwegian chain in tile and tile related products. The company has steadily increased their market share, and is experiencing significant growth and currently consists of the 26 stores.	modena FLISER

NanoPhos Awards and Recognitions

In 2005, Dr. Arabatzis and his team under the supervision of Dr. Theoharakis receive the 1st prize at the European Business Plan of the Year Competition that led to the creation of the company	
	NanoPhos was recognized by Bill Gates as one of the most innovative companies at a special event organized by the Federation of Greek Industries in January of 2008.
NanoPhos received the 1st prize of Innovativeness and Sustainability at the 100% Detail Conference that took place between 24-27 September, 2008 at the Earls Court of London. The 100% Detail Show is the most important international exhibition for construction material in London.	
	The innovative paint additive, SurfaPore ThermoDry, received an award in Shanghai on November 6th, 2010 for its participation in the ZED (Zero Energy Development) Pavilion of the 2010 Shanghai World Expo.

SurfaShield C received the GAIA award at the International Building and Construction Show BIG5 in Dubai. SurfaShield C, a product unique in its category, received the GAIA award at the International Building and Construction Show BIG5 in Dubai on November 21st, 2010 for its ability to transform common porous surfaces like walls and cement, in self-cleaning and self-sterilizing.	
	NanoPhos founders were awarded the "Green Dreams" award by the Entrepreneurship Club during the event of Kouros Award 2012.
NanoPhos received Product Award for Sustainable Development for SurfaShield. This award is sponsored by the European Commission Environment Directorate with an aim to recognize and reward European companies that set an example by successfully bringing together innovation, economic viability and environmental concerns.	

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