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## Collège Robert Doisneau, Sarralbe (France)

# White Dome Architecture

Wide open spaces, bright classrooms flooded with light combined with an extensive array of modern media technology - the architecture of Collège Robert Doisneau, which officially opened in the Lorraine community of Sarralbe in 2013, meets the needs of a contemporary school building.

The architect Jean-Pierre Lott designed the new-build school, which is named after one of France's best known photographers, with the 437 pupils in mind, ensuring it has the unique characteristic of a community. "The school resembles a small town in which each area has its own special function," says the architect about his idea. And this is reflected in his architecture with its diverse design patterns and practices.

### Based on concrete

Concrete is the material of choice for Jean-Pierre Lott and he is constantly redefining its morphological boundaries through his architectural works. In Sarralbe, the individual buildings and areas cater for various functions and activities - sports halls, classrooms, quiet places, administrative offices or cafeteria - and are interconnected through galleries.

A main characteristic of the ensemble is the combination of various shapes and contours that permit totally new insights and outlooks over and over again.

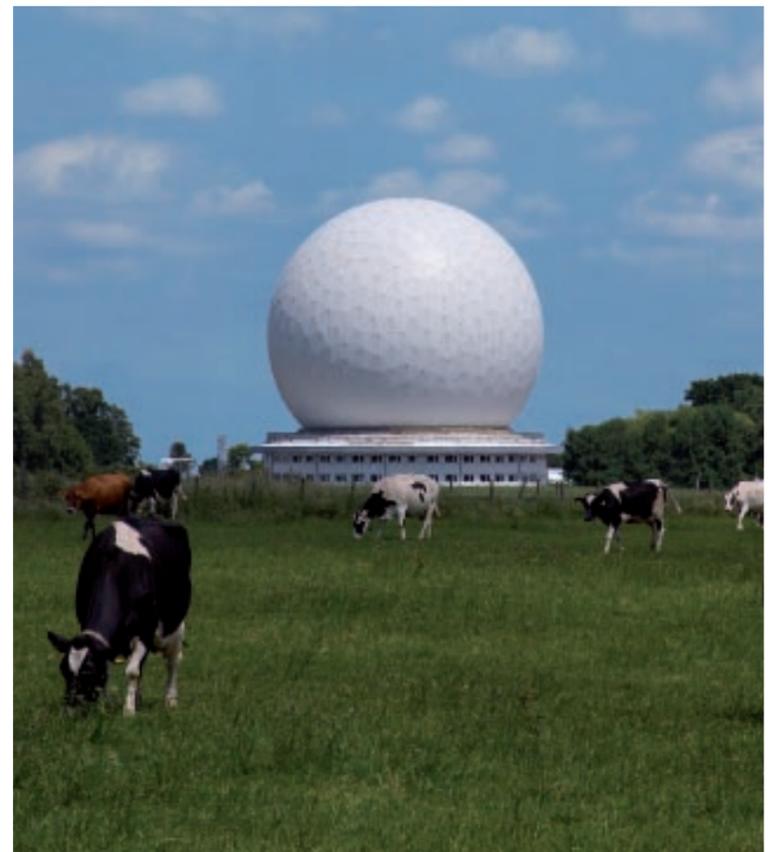
Jean-Pierre Lott is also well known outside France thanks to his special architectural style and features. His speciality is using the colour white in combination with sculptural elements. The radiance of his buildings ensures

they stand out from the local environment. To create his bright and shining works the master designer regularly applies KEMPEROL® waterproofing. He also used the liquid-applied waterproofing system at Collège Robert Doisneau to develop the two domes which rise majestically from the construction.

*continued on page 6 >*



KEMPEROL® enables secure, seamless and jointless waterproofing of the concrete domes.



The radome is still the largest of its kind worldwide.

## Waterproofing the Concrete Base of the Radome in Wachtberg (Germany)

# Tracking satellites and space debris

The Radome Wachtberg, a large golf ball-like structure, stands out from a distance. In good weather conditions, the radar's protective cover can be seen from a distance of more than 50 km away. The official name of the space observation radar is TIRA (Tracking and Imaging Radar). The gigantic parabolic reflector inside the dome monitors satellites, rockets and space debris. TIRA can detect 2 cm small particles of debris at a range of roughly 1000 km.

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 United Nations International School, Manhattan (USA)

## Roof renovation project features sustainable products

In taking on the design and administration of a \$1.8M rooftop renovation project for the United Nations International School (UNIS) in Manhattan, the team at Bone/Levine Architects (New York, NY) wanted to honor the school's tradition as a premiere learning institution. Located on the East River, the private school, completed in the early 1970s, is home to students from around the world.



The multi-purpose recreational roof serves students throughout the school year.

The renovation features a 42,000 sq. ft. recreational roof installed during summer breaks, 20,160 sq. ft. in 2013 and 21,840 sq. ft. in 2014. The finished multi-purpose roof includes basketball and tennis courts, track, and of course, soccer, or as most students at the school would call it, "football." Portable nets and goals are wheeled onto the field as needed.

Age and intense use had resulted in deterioration and delamination of the existing second-generation athletic surface which had been in place at least 15 years. Water infiltration was deteriorating support structures and crumbling the concrete support slab. The insulation below the slab was mostly intact but not compliant with the current code.

Bone/Levine Architects developed a comprehensive two-phase repair program. All repairs needed to be completed

during the summer vacation in two consecutive years. "Our approach was to create a reliable waterproofing system which incorporates all components – roofing membranes, recreational surfaces and finishes, but also all the roof structures including penthouse, mechanical bulkheads, gym and the parapets."

During both project phases, the firm also conducted reviews of the exterior façades to identify and secure cracked and deteriorated concrete at scattered locations, and addressed steel connections between precast sections of the ten-foot-high parapet.

"We removed all surfacing, topping concrete and old insulation down to the original built-up membrane attached to the structural concrete deck, and after cutting and patching of defective areas, capped it with a new layer of MBM. This was the first component of

the new system, protecting against air and vapour migration from below and protecting the roof during the work. We installed new, code-compliant insulation, and then poured a new topping concrete slab, which served as a base for the new KEMPEROL® 2K-PUR system."

A crane pumped the concrete to the fourth story, while crews worked it across the mesh, filling and levelling the deck, section by section.

### Waterproofing the roof

This was different from the original IRMA assembly, which permitted water and vapour migrations throughout the system, damaging both concrete and athletic surfacing. "We placed the main waterproofing membrane over the topping slab, therefore protecting the concrete and minimizing vapour migrations destructive to the athletic surfacing."

The KEMPEROL® 2K-PUR cold, liquid-applied reinforced waterproofing membrane system provided a firm foundation for the special sports surfacing system from USSA, Inc. (www.sustainablesurfacing.com) a subsidiary of World Recycling Surfacing Group. Recycled content was important to the school, and Bone/Levine specified the RUBBERWAY®-VersaCoat rubberized surfacing. In addition, the KEMPEROL® 2K-PUR waterproofing system incorporates renewable resources and is both solvent-free and odour-free.

Sports surfaces are notoriously high-traffic, so proper adhesion to the substrate is always important for field performance. Tests proved the spray-applied acrylic adhesive (see photo) and "pad" were compatible with the KEMPEROL® 2K-PUR membrane, which also offered a seamless foundation for adhesion.



Sports surfaces are notoriously high-traffic, so proper adhesion to the substrate is always important for field performance.

"Seamless was also important for the athletic surface since any seams would show," she said.

Because of the tight production schedule, there was no time for traditional flood testing. Before the sports surfacing was installed, the KEMPEROL® membrane was checked by (EFVM) electric field vector mapping.

The customized VersaCoat sporting system generally consists of a 4 – 6 mm poured rubber pad with a layer of coloured acrylic binding agent. The installation at the school involved at least three sizes and types of rubberized materials and adhesive layers before the final colour coatings and stripes were applied.

Unlike other recreational areas which can be more bouncy, tennis courts require the right level of force reduction, a detail the company has down to a science. USSA CEO Karoleen Alexander said, "We aimed to provide a safe and resilient surface structure that could be customized to the desired performance level across various sport activities." The company continues to develop sustainable surfacing systems.

The Bone/Levine project architect emphasized that drainage was an important consideration on the UNIS roofing project. Even on a tennis court, roof surfaces must be minimally sloped to drain. New drains were added around some doors, and doors raised because the new roof deck is higher due to the extra

insulation. The KEMPEROL® system easily waterproofed these areas, she said.

The top coping of the parapet is also waterproofed with the membrane for added protection at the most obvious place of infiltration. The entire wall was then painted with a color water-repellant topcoat for further weather protection and a unified appearance that complements the green and red roof surfaces.

"As project managers, we were on-site at least three times a week to review work in progress because everything had to be done in the correct sequence to be able to complete the project on time before the school reopened," Barbara Kucy said.

### Project data:

Project Design and Contract Administration:

Bone/Levine Architects

Contractor:

PCGNY Corp., New York, NY.

Surfacing Installer:

Hinding Tennis

Phase 1 Completed: 2013

Program: Roof slab and other concrete repairs, including parapet / waterproofing membrane system / recreational surfacing

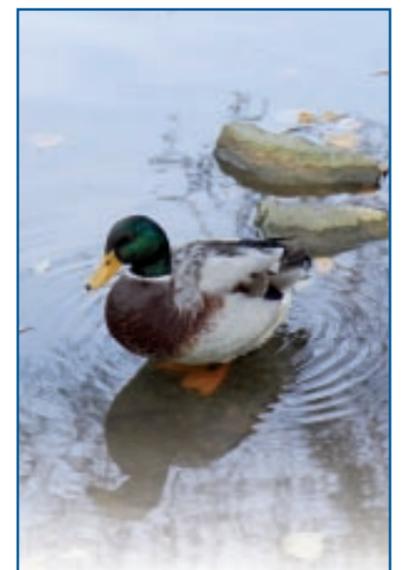
Phase 2 Completed: 2014

Program: Roof waterproofing membrane system / recreational surfacing / roof structures and concrete parapets repairs

RUBBERWAY® is a registered trademark of USSA, Inc.



The KEMPEROL® 2K-PUR reinforced waterproofing membrane and the RUBBERWAY®-VersaCoat recreational surface were tested for compatibility. An acrylic adhesive is spray applied to the KEMPEROL® membrane to adhere the first of multiple layers of the sports surfacing.



Have you ever asked yourself why KEMPER SYSTEM has a duck for its logo?

Well, nature is our role model here. And a duck, with its watertight plumage, is an ideal example of perfect waterproofing.

 One World Trade Center, New York (USA)

# Freedom Tower finally touches the sky

After nearly a decade of construction, the \$3.9 billion One World Trade Center (1 WTC) opened its doors in 2014. The challenges involved with roofing/waterproofing a high-rise are magnified with height, and at an official height of 1,776 feet, 1 WTC (formerly Freedom Tower) offers some valuable lessons.

With most new construction the building envelope, including the roof, is completed first. In this case, the main roof was one of the last structural items to be completed. (See "From the ground up.") Steve Guarino, general superintendent for waterproofing contractor, The Jobin Organization, Inc. (Farmingdale, NY), shared some experiences working on the iconic structure while, as he puts it, "A billion eyes were watching."

The Jobin Organization, originally established as Jobin Waterproofing, Inc. in 1968, is a powerhouse in the New York construction market in areas such as roofing, waterproofing, exterior restoration and construction management. The company is a KEMPER SYSTEM certified applicator and has completed scores of projects with the cold liquid-applied reinforced membrane systems.

## Flexible solution

The main roof is about 19,000 square feet. "One of the primary reasons we won the bid with the KEMPEROL® system was all the exposed steel and many penetrations. There were maybe 300 or 400 penetrations on the main roof. That included the structure for the three cooling towers above us, the spire, as well as the everyday vent pipes, drains, conduits, plumbing and other piping. There were no areas bigger than about 10 ft. x 10 ft. without some penetration." Steve Guarino, general superintendent, The Jobin Organization, Inc.

The Jobin Organization ran a 15 – 20 person crew on the job. "There were so many configurations that needed waterproofing – curbs, drains, HVAC, beams, nuts and bolts, and around

the base of the spire. There was so much steel, sometimes we were bumping heads with our hardhats."

For the main roof, insulation and pre-primed cement board are first installed and adhered with beads of foam adhesive. The cement board is staggered in a joint pattern over the insulation and sealed at the seams with beads of NP1 polyurethane sealant. The seams of the cement board are also sealed with 4-inch continuous stripping plies of KEMPEROL®.

The KEMPEROL® resin membrane was specified for the main roof and louvre areas on lower floors that are enclosed on three sides. The liquid-applied resin membrane systems are reinforced with KEMPEROL® 165 fleece and can form around any shape. Penetrations, drains, curbs and perimeters are also sealed with the system and then overlapped by the membrane in the larger expanse to provide durable waterproofing protection.

The work on the main roof membrane began in mid-June 2014 and was completed in mid-October. At nearly one-third of a mile high, the roof weather could be a surprise. "A lot of times when it was a cloudy day on the ground, it

could be foggy. Or if it was foggy on the ground, it could be raining when we got to the top. But the heat was not too bad, and there was no sweltering hot weather."

## Getting there

One obvious challenge in waterproofing a high-rise is simply getting materials to the roof. "By the time we got to the roof, the outside hoist had been taken down, which might have saved a little time," Guarino said. "But with the KEMPEROL® system, there's no heavy equipment, so we were OK. The heaviest tool we used was a hand mixer for the resin."

The trek to the 105th floor could take up to two hours because of all the trades on the site. The Jobin Organization crew would bring materials up through the building on the elevator cars, many times on Saturdays and Sundays to have all the required materials ready to go.

"We would take materials from the loading dock to the main floor elevators, up to [floor] 102, and then transfer to 105. The insulation and cement board were loaded on 4 ft. x 4 ft. skids and some stored on 104 during the job." Also easy to transport, the KEMPEROL® resin comes in 2.5 and 5 gallon buckets, and the fleece reinforcement on rolls up to 41 inches wide.

## Job-site coordination

KEMPER SYSTEM specialists were on-site weekly to inspect and advise on the job. In addition, a building envelope consultant photographed progress daily to provide feedback to the A/E/C management team. "Our goal every day was to make it watertight."

There were conversations with the management consultants every morning to make sure everything was running smoothly, Guarino said. But there was no cell phone service available on the roof during construction

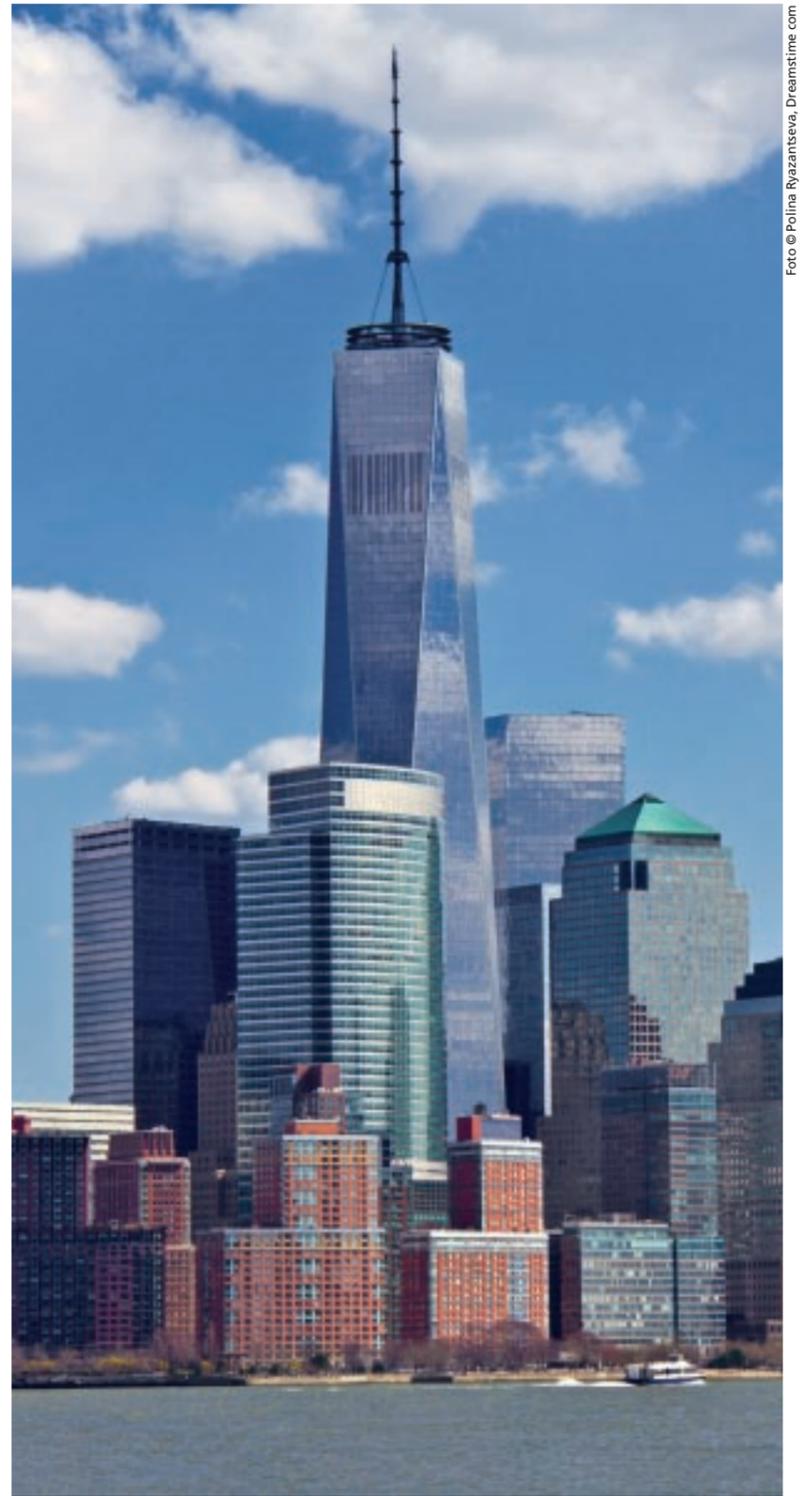
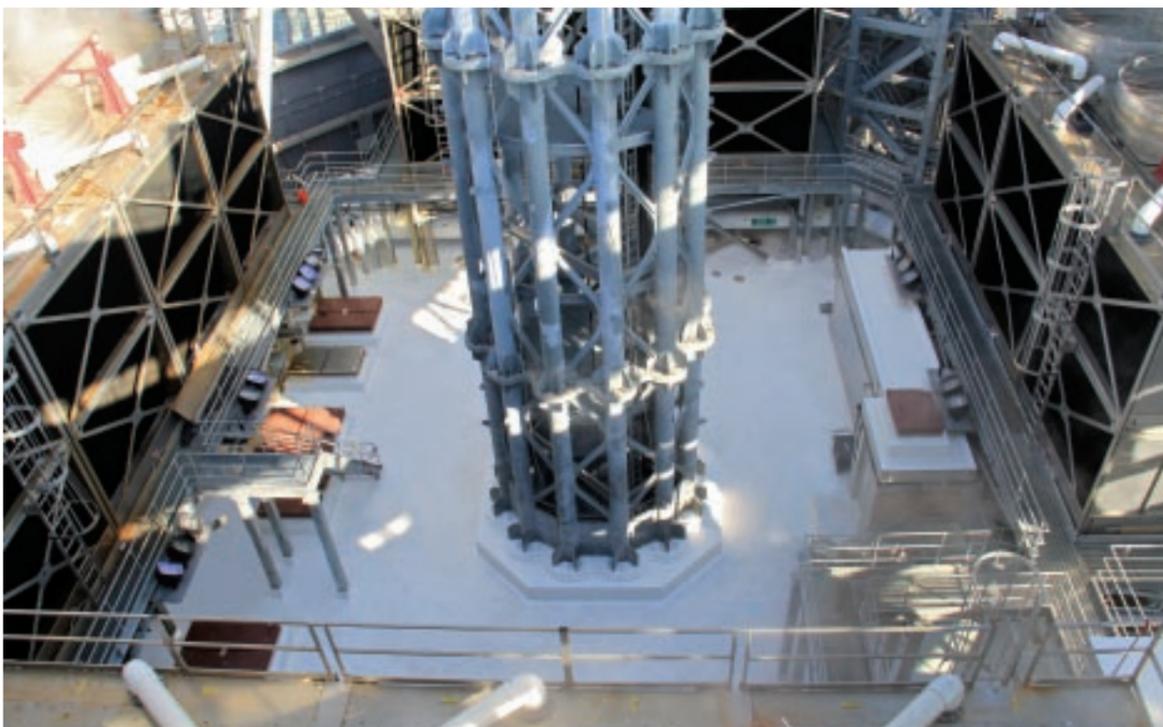


Foto © Polina Ryazantseva, Dreamstime.com

*New Silhouette: One World Trade Center (1WTC) is the official name and address of the Freedom Tower. It stands where until 2001 stood the twin towers of the World Trade Center.*



*What appears to be a simple white coating is actually the top layer of the KEMPER SYSTEM. The KEMPEROL® membrane is fleece-reinforced and forms a seamless surface that is unaffected by standing water, snow or ice. It also resists chemicals and corrosives, and UV light. Huge bolts at the base of the spire were among hundreds of exposed roof details also protected with the KEMPEROL® waterproofing system.*



*The square area at the base of the spire is surrounded by a three-story framework for mechanical equipment inside the communications platform ring.*

because of the thickness of the slab, so more urgent messages were often relayed a couple of floors down the old-fashioned way – by walkie-talkie.

"The biggest challenge was coordination on the job site. There were a lot of trades there at the same time, so we had to constantly clear people out of the way. The deck needed to be prepared ahead of us. The concrete was too rough in some areas. Overpours needed grinding and debris removed, or grease needed to be cleaned off.

There was also a crew working above us on the cooling towers, so we needed to inspect if any areas had become wet before the membrane was cured. When things happened, the KEMPER SYSTEM made it possible to redo or repair small areas," he said.

## From the ground up

The waterproofing story at 1 WTC really began at the ground floor, or actually more than 30 feet below it. The Jobin Organization originally submitted bids on the 1 WTC project with KEMPER SYSTEM America circa 2004. Following the resolution of project design and financing issues, construction finally got underway in the spring of 2006. Ironworkers erected the steel at a fairly steady pace, though heavy winter storms dampened the pace toward the end. Every tenth floor required temporary waterproofing with EPDM sheet and caulking until a new slab, ten stories above, could be poured. Skyscraper cranes would lift bundles of steel and pallets of materials from the ground

up or from one completed section to the next. Month after month, the arm would swing from the outside frame of the building, and deposit bundles stories above.

The outside frame of the Tower is very slightly tapered with a notch in at several floors as the shaft rises skyward. The Jobin Organization crew waterproofed the roof perimeter and exposed steel at these levels as well as the top three floors of the main roof – 103 to 105 – which are exposed to the elements.

## Sustainability

KEMPEROL® 2K-PUR resin system is 80 percent from renewable materials, which fit with the overall design goals for the project. Nearly 75 percent of 1 WTC is made from recycled or eco-friendly building materials, and the building's green design earned LEED Gold Certification.

## Project data:

- Building owner: Port Authority of NY/NJ
- Architects: David Childs, Daniel Libeskind (2002)
- Main contractor: Tishman Construction
- Project A/E firm: Skidmore Owings & Merrill LLP
- Roof waterproofing installer: The Jobin Organization
- Products used: KEMPEROL® Reinforced Membrane



## Mao Zedong Memorial Museum, Shaoshan (China)

### The Art of Joints



village in the central Chinese province of Hunan, has become a place of pilgrimage for Chinese and foreign tourists alike. To mark the 115th birthday of the revolutionary leader, the Mao Zedong Memorial Museum opened in Shaoshan in 2008. On display across 19,000 m<sup>2</sup> of floor space are 1,008 relics which Mao once used. Today, the museum is a highlight for every visitor to Shaoshan.

The architectural ensemble is a collection of several interconnected buildings of varying height. The museum's intricate design led to the roof leaking after just a few years. The existing expansion joints were therefore sealed with KEMPEROL® V 210 during a refurbishment project in 2014. The permanently elastic, liquid-applied waterproofing is able to accommodate and compensate structural movements.



The memorial boasts a collection of more than 10,000 pieces of historical materials, including cultural relics, documents and photos detailing the revolutionary stories of Mao Zedong.

Mao Zedong (1893-1976), chairman of the Communist Party of China and the father of Maoism, was without doubt one of the most important and best known politicians of the last century. Time Magazine lists him in its compilation of the 20th century's 100 most influential people. Even long after his death, the first president of the People's Republic of China is still respected and revered. His birthplace, Shaoshan, a

## Roof Waterproofing Tata Communications Limited, Mumbai (India)

### Secure connection

Mumbai-based Tata Communications Limited belongs to the Tata Group and is a global player in the telecommunications industry. The leading Indian Internet and wholesale service provider's website proclaims: "We're proud to provide 66% of the Fortune 500 companies with our state-of-the-art solutions, including a wide range of cloud, mobility, network and data centre services".



To ensure all the offered services are delivered full availability and maximum performance of the servers and technical infrastructure are essential. They are the heart and soul of the business. Any moisture penetration could seriously damage the valuable servers. The premises in Mumbai are situated close to the Mahim

Bay area of the Arabian Sea and the company therefore decided to employ KEMPEROL® when refurbishing the roof above the server rooms in 2015. The fleece-reinforced, liquid-applied waterproofing was installed across 2,000 m<sup>2</sup>. Since it is applied as a liquid, KEMPEROL® creates a seamless

waterproofing system in which even the most complex roof connections and penetrations can be reliably and durably incorporated. KEMPEROL® additionally protects the concrete structure and provides a barrier against salt water that would otherwise accelerate corrosion.

The substructure was pretreated with KEMPERTEC® EP-Primer to ensure high bonding strength of the waterproofing. KEMPEROL® V 210 Waterproofing has been used successfully for decades to treat roofs around the world. Due to the full-surface bond with the substrate seepage underneath the concrete can be ruled out. The waterproofing material does not contain plasticisers and is permanently elastic from -30 °C to +90 °C. In other words, its elasticity is not affected by extreme temperature fluctuations.

#### Project data

Object:  
2,000 m<sup>2</sup> roof, including numerous complex detailing features  
Client:  
Tata communications Limited, Mumbai  
Products:  
KEMPERTEC® EP-Primer, KEMPEROL® V 210 Waterproofing  
Contractor:  
Kalinga coatings, Pune



The roof above the server rooms was applied with KEMPEROL®. It protects the concrete structure and provides a barrier against salt water.



After completion: The futuristic-looking main entrance of Troparevo Metro Station in Moscow.

## Waterproofing a Metro Station Roof, Moscow (Russia)

### Ensuring futuristic protection against the elements

If you have ever been to Moscow, you will know just how architecturally ornate and opulent the city's subway stations are. The Russian capital's underground network has expanded vastly since the first two lines opened in 1935. Nevertheless, the city has grown so rapidly that some of its newer districts have yet to be incorporated into the Metro network. Moscow has therefore witnessed the construction of numerous line extensions in recent years.

Today, the Metro is still regarded as a hugely relevant and influential project, even if the new stations can never compete with the lavishness of the old ones. The futuristic-looking main entrance of Troparevo Station, a modern metal-clad building covered with shiny panels of various sizes, rises up from beneath the ground. The visible architecture is a monolithic roof structure that curves gently skywards above the entrance doors, offering a stylish look and superior protection from the wind and elements. The building, just like the Metro passengers who travel from street level down to the platforms, slowly disappears into the earth.

The semi-circular arch of the Metro station above ground consists of a double-skinned metal structure. The outer surface of the bottom metal layer was fully waterproofed using KEMPEROL®. This helps to prevent water entering the Metro station.

#### Project data

Object:  
Waterproofing the base of a metal roof, new construction of Troparevo Metro Station, Moscow  
Client:  
Moscow City Government  
Product:  
KEMPEROL® 2K-PUR Waterproofing  
Contractor:  
Acrytec Plus, Moscow supervised by Eduard Zhitnik

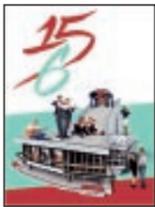


The bottom metal layer of the double-skinned metal structure was fully waterproofed using KEMPEROL®.





The roof of the National Theatre in Győr is reminiscent of a ski jump.



Poster for the season 15/16

## Roof Renovation National Theatre, Győr (Hungary) Clear the stage for KEMPEROL®

Győr, the sixth largest city in Hungary, has a long tradition of theatre. The first theatre opened there in 1798. However, today's National Theatre is a modern building constructed between 1974 and 1977. The architects came up with a bold

idea at the time: The roof of the building is a unique steel rope construction made of steel wires from Czechoslovakian ski lifts. This type of roof design was completely new and unusual. Unfortunately, its construction was not without its difficulties and moisture problems soon became evident. The roof was repaired in 1991, but any success was short-lived. A further "refurbishment" was undertaken and an additional new UV protective layer was installed across the entire roof area.

### Extensive practical experience

Damp was once again detected inside the theatre and a thorough inspection of the roof was ordered by the technical director in November 2013. And this time it was decided to fix the problem once and for all with liquid applied waterproofing. The specifiers decided in favour of using KEMPEROL® 2K-PUR Waterproofing. The reason for this was the product's properties, which have proven their worth in years of practical use. These include, in particular:

- Permanent elasticity,

- Resistance to large temperature fluctuations,
- Resistance of the finished surface to mechanical stress,
- Vapour permeability and
- The ability to incorporate complex connections securely.

The project was carried out by Enterol, an established and experienced KEMPEROL® partner. The roofing specialists used large yard brooms to remove all dirt and debris from the surface prior to applying the primer. The entire roof was then pretreated with KEMPERTEC® EP-Primer.



With the associated aluminum ladders efficient processing on the steep roof was possible.

### Roofing problem solved by mountaineers

Work safety was of paramount importance due to the extremely steep pitch of the roof. Safety ropes and harnesses were mandatory at all times. The first question that needed to be resolved, however, was how the installers could work efficiently, safely and progressively on the steep roof without actually walking on it. Enterol came across a practical solution following consultations with mountaineers. The workers used steel cables to interconnect 14 Krause aluminium ladders onto which they built individual, angularly adjustable, moveable, small "work stations" using Krause scaffold components.

The extreme pitch of the roof can cause problems during application of the product if appropriate measures are not taken. KEMPEROL® can be applied to vertical surfaces. However, the work was carried out during the summer months and the material's rate of flow increases as the temperature rises. At the suggestion of a Kemper System specialist, the Enterol employees added KEMPERTEC® TX Thixotropic Agent to KEMPEROL® 2K-PUR Waterproofing to coat the top 20-metre section of the roof. This ensured that the required amount of liquid applied protective coating bonded to the surface for embedding



The roof was refurbished using KEMPEROL® 2K-PUR.

the reinforcing fleece. The project was completed successfully and on time.

### Project data

Project: 2.400 m<sup>2</sup> roof area  
 Client: Györi Nemzeti Színház (National Theatre Győr)  
 Products: KEMPERTEC® EP-Primer, KEMPEROL® 2K-PUR Waterproofing, KEMPERTEC® TX Thixotropic Agent  
 KEMPER SYSTEM Contractor: Enterol-B KFT, Telki

## Refurbishing the Supreme Administrative Court Roof in Warsaw (Poland)

# Sealed three times in just five years

Using the wrong materials to repair a leaky roof frequently results in more damage. The unprofessional waterproofing of complex detailing, i.e. structural connections and roof penetrations, in particular, results in high consequential costs. In 2014, the two 600 m<sup>2</sup> roofs of the Supreme Administrative Court in Warsaw were refurbished using KEMPEROL®. This was in fact the second time the roof sections had had to be re-coated, in spite of them being only five years old.



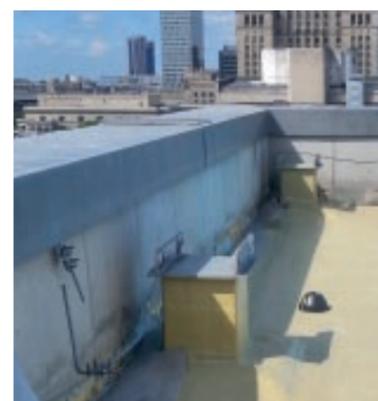
The two 600 m<sup>2</sup> roofs of the Supreme Administrative Court were refurbished using KEMPEROL®.

The Supreme Administrative Court is housed in a modern building in the heart of Warsaw. Professionally speaking, it has an inverted roof system finished with a gravel ballast layer. The roof area features air-conditioning units, vent pipes and other fittings and penetrations. Before attempting to seal the roof for a third time, the specifier decided to use KEMPEROL® liquid-applied waterproofing, as it offers installers special specific advantages.

### The art of detailing

The more complex and detailed the roof design, the more complicated the waterproofing project. The art of waterproofing is best shown by great attention to detail where complex forms, small gaps between roof penetrations, areas of limited access with a large number of fittings and penetrations have to be sealed properly.

The main advantage of KEMPEROL® is its liquid application. It makes it much easier to waterproof complex detailing than with traditional products. The



The liquid application of KEMPEROL® makes it easy to waterproof complex detailing.

innovative system ensures seamless incorporation of structural features and, once cured, forms a highly durable and flexible waterproofing membrane. KEMPEROL® offers high bonding strength on the substrate, meaning the waterproofing properties remain intact even if the surface becomes slightly damaged. And this obviously means less potential damage. Designed for the harshest conditions, KEMPEROL® products are used where traditional materials are inadequate.

KEMPEROL® 2K-PUR is solvent free and odourless. It can be applied without any problems while air conditioning units are still running. Eighty percent of the resins used in this sustainable product

innovation are made from renewable raw materials (Ricinus communis, tropical castor oil plant).

### Project data:

Project: 1,200 m<sup>2</sup> roof area  
 Product: KEMPEROL® 2K-PUR Waterproofing  
 KEMPER SYSTEM Contractor: Warbud, Warsaw

## THE DUCK Magazine for Waterproofing and Coating Systems

Published in 2016 by KEMPER SYSTEM GmbH & Co. KG

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> Continued from page 1:

 Collège Robert Doisneau, Sarralbe (France)

## White Dome Architecture



For purely visual effects the KEMPEROL® surface is covered with a colour-stable white KEMPERDUR® finishing coat.



The waterproofing is applied as a liquid.

### Invisible waterproofing

Since it is applied as a liquid, the fleece-reinforced waterproofing generates a seamless and jointless system that adapts homogeneously to the shape of the concrete domes. Furthermore, KEMPEROL® can be used on almost any substrate and offers a full-surface bond, so that moisture seepage underneath the concrete can be ruled out. And KEMPEROL® V 210

waterproofing has been demonstrating its amazing longevity for over 50 years.

It is particularly important to Jean-Pierre Lott that the waterproofing system offers invisible protection, in other words cannot be seen. He achieves this by subsequently covering the KEMPEROL® surface – for purely visual effects – with a colour-stable white KEMPERDUR® finishing coat.

The white dome covers blend in perfectly with the white façades of the surrounding buildings. The architecture thus provides a fresh, crisp and clear design language.

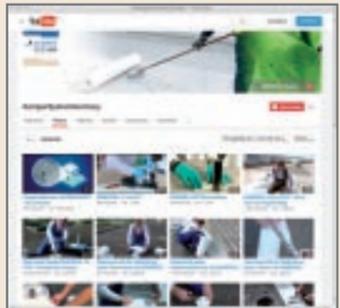
### Project data

Object:  
Two semi-domed roofs  
(600 + 250 m<sup>2</sup>)  
Client:  
Conseil général de Moselle  
Architects:  
Jean- Pierre Lott, Paris  
Products:  
KEMPERTEC® EP-Primer  
KEMPEROL® V 210 Waterproofing  
KEMPERDUR® AC-Finish  
Colour white  
General contractors:  
Cari Fayat  
KEMPER SYSTEM contractor:  
EMAT



For current information visit us at the social media network

YouTube   



 Villas of the "Buttes Chaumont" in Paris (France)

## Waterproofing under asphalt for a plaza

Close to the famous fifth-largest Parisian park, Buttes-Chaumont, the common courtyard of the buildings that constitute the Villas named after the park, benefits from a whole new waterproofing system whose characteristics are durable and highly resistant. The chosen solution combines the KEMPEROL® resin with an asphalt protection for most of the work, a unique combination of high performance.



The KEMPEROL® + asphalt is a unique but proven technology.

### An existing waterproofing system leaked

The Buttes-Chaumont Villas is made of apartment buildings which are built on car parks. So is the same for the esplanade that inhabitants share. It consists in a plaza square with few trees and an access for firemen. In 2013, the existing waterproofing system became defective in some places. It caused significant leaks into the basement and in some apartments. Renovation was also necessary on the pedestrian walkways and vehicular access. These correspond to the upper slab of the underground parking.

The choice of an adequate waterproofing system was linked to the use of the plaza and its requirements :

- The esplanade and its ramp must accommodate current pedestrian traffic as well as heavy vehicles, including those of the fire and emergency services,
- The job must be carried out without risks for the inhabitants and with limited disturbance arising from a construction site,
- Finally, the aesthetic final appearance is required, especially for the courtyard.

In agreement with the architect, Yann Casanova from the architect studio Atelier AERE in Paris, the managing facility office of the villas decided to use liquid-applied waterproofing because of the technical qualities of the process: sustainability, continuous membrane and application on any substrates.

### The solution provided

From a technical point of view, KEMPEROL® 2K-PUR meets all the requirements and even offers a large choice of final finishes including resin coatings, bonded aggregate or paving.

Like all products in the KEMPEROL® range, KEMPEROL® 2K-PUR has the advantage of withstanding high temperatures, up to 250 °C. It can therefore be coated by hot-poured asphalt which is adapted to the mechanical loads of trucks.

Moreover, KEMPEROL®, thanks to its characteristics (on-site application and fleece-reinforcement) cures to form a homogenous, watertight and seamless membrane that will adhere to any substrate. It has here allowed an "efficient treatment of details of the car-park slab, such as expansion joints or flashings," so



KEMPEROL® 2K-PUR has the advantage of withstanding high temperatures, up to 250 °C.

says Pascal Lepage, managing director of Sofrares, a French company specialized in resin applications and a CSFE member (French National Union for Waterproofing). KEMPEROL® which is classified W3 according to the E.T.A. offers then a lifespan of 25 years, "thus meeting fully the management facility office's expectations."

KEMPEROL® + asphalt, which gathers the best of both materials, is a unique but proven technology based on thousands of square meters applied, especially in Germany.

Another argument given by Pascal Lepage is people's safety. Indeed, KEMPEROL® is cold applied, flameless, avoiding any risk of fire. Moreover, the disturbance caused by any construction site was kept to a minimum for the inhabitants.

Firstly, thanks to KEMPEROL® 2K-PUR's properties ; a solvent-free product, so no olfactory impact. This is noteworthy in an occupied area.

Secondly, the application work was carried out in phases, so that inhabitants could freely come in and go out.

Finally, KEMPEROL® meets the aesthetic requirement. KEMPEROL® is highly polyvalent and accepts all kind of protection. Thus, flashings were sanded in a stone-colour close to the one of the stone-clad building. In the courtyard, there was an alternating protection of asphalt and granite slabs to enhance the green "island" in the yard. This gives, as a final result, a neat and aesthetic appearance, particularly valuable for residential schemes.

### Project data

Object:  
3,000 m<sup>2</sup> common courtyard  
Architect:  
Architect studio Atelier A.E.R.E., Paris  
Building owner:  
IMMO de France, Ile de France  
Product:  
KEMPEROL® 2K-PUR  
Waterproofing  
Contractor:  
Sofrares,  
St Arnould en Yvelines



 800 m<sup>2</sup> of waterproofing immersed (France)

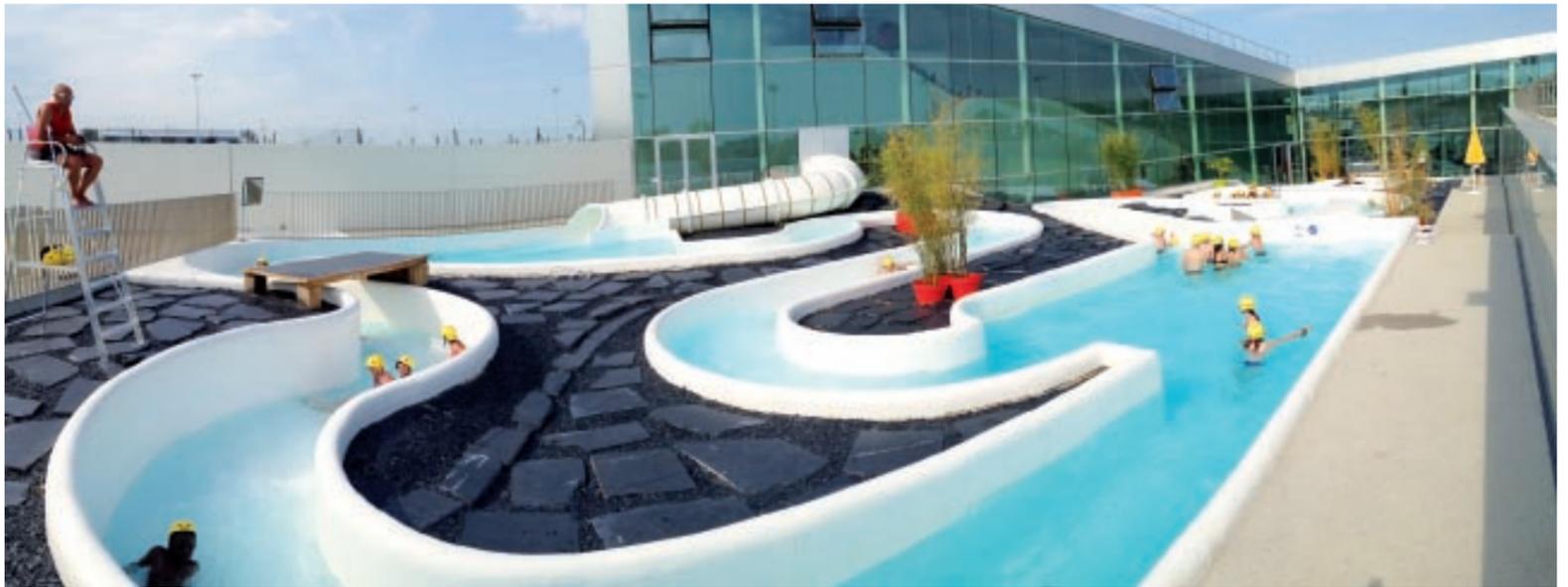
# A challenge faced in the AquaVita center of Angers

Open 2014 in Angers, the AquaVita resort offers 5,000 m<sup>2</sup> of aquatic spaces to the public which are dedicated to balneotherapy, relaxation and sport. This is a major achievement that required the application of a high-performance waterproofing system since it had to be emerged in a chlorinated water and be applied on various shapes.

## A huge building site, with many specific requirements

Since the opening of the resort, the people of Angers have been enjoying the pools, the jet-massages, the slides, the fun areas, the lagoons and the wading pools within the gigantic water park complex. It has a capacity for 1,900 people simultaneously. Among its star attractions, there are a Nordic pool and an open-air torrent that cascades over 150 meters long.

The former mayor of Angers, Frédéric Béatse, launched the project within the frame of an economic revitalization policy; the project has resulted in a total investment of nearly 34 million euros. The project, whose management was entrusted to architect Jean Guervilly, took place over a year and a half. Ivebat company, an approved contractor, which is also specialized in application of special processes (concrete repair and reinforcement, resin floorings and resin waterproofing), started on site in January, a few weeks before the opening to carry out the 800 m<sup>2</sup> waterproofing. It included the famous torrent, an



The waterproofing system had to be emerged in a chlorinated water and be applied on a various shapes.

outdoor boot bath and water play areas. Given the particular configuration of the place, the material and process choice was thoroughly written in a demanding specification. The waterproofing membrane had of course to ensure a perfect and sustainable water tightness in submerged areas and other technical characteristics were sought:

- The ability of the waterproofing to match all forms perfectly, particularly those of the laces and multiple basins of the torrent;
- Its resistance in permanent contact with chlorinated water;

- Its adaptation to an area open to the public, where the disturbance must be limited;

- Its aesthetic character, with an expected white appearance and no visible junctions.

Meeting all the required performances, the liquid waterproofing system KEMPEROL® 2K-PUR, along with an adapted KEMPERDUR® coating, was selected for these works.

Based on the application of the cold liquid resin, KEMPEROL® 2K-PUR forms, once applied, a watertight membrane,

fully fleece-reinforced, with a lifespan of over 25 certified years. The highly absorbent reinforcement fleece easily handled the complex shapes of the horizontal and vertical surfaces of the AquaVita torrent. The concrete substrate was thus covered with a homogeneous membrane of 2 mm thick at all points without any joints or mechanical fastening. Furthermore, the characteristics of KEMPEROL® 2K-PUR include a proven efficiency in permanent water immersion and a good resistance to many aggressive substances such as chlorine; a key asset for this site.

Another advantage that favoured KEMPEROL® 2K-PUR: it is a solvent-free product, like the chosen coating, KEMPERDUR® Deko 2K, both being adapted to green buildings and sensitive environments, where solvent vapours would be disruptive.

Finally, all the means were deployed to optimize the final aesthetic of the waterproofed areas. Hence, Ivebat used an "ironed"-fleece (no slight pilling effect) and a special fleece overlapping technique: instead of having a 5 cm fleece overlap, the 2 fleece panels are placed edge to edge and joined by an overlapping strip to prevent thickness excess. A slight abrasion was also carried out on top of the KEMPEROL® membrane. It thus removed any impurities and created a neat membrane, ready to receive a final embellishment. The solvent-free white coating KEMPERDUR® Deko 2K was then applied added with glass beads for a rough finishes in boot baths, or pure, for a perfectly smooth result.



KEMPEROL® 2K-PUR is a solvent-free product, like the chosen coating, KEMPERDUR® Deko 2K, both being adapted to green buildings and sensitive environments, where the solvent vapours are not wished. The waterproofing has to be able to match all forms perfectly.

## Project data

- Object: 800 m<sup>2</sup> complex shapes and curves of the AquaVita open-air torrent
- Building owner: SARA (Company for the Development of the Region of Angers)
- Architect: Jean Guervilly, architect, St. Brieux
- Products: KEMPEROL® 2K-PUR Waterproofing, KEMPERDUR® Deko 2K
- Contractor: Ivebat, La Roche-sur-Yon



## Italian Flair

An extensive refurbishment project involved applying a new waterproofing to a 420 m<sup>2</sup> roof terrace on the eighth floor with solvent-free KEMPEROL® 2K-PUR. The decision to use this liquid waterproofing was based on the property owner's positive experiences with the German manufacturer's products in the past. The former roughly 20-year-old waterproofing system had never caused any problems at all.





In Liverpool's UNESCO designated World Heritage Maritime Mercantile City (UK)

## KEMPEROL® protects Royal Liver Building

Part of Liverpool's UNESCO designated World Heritage Maritime Mercantile City, the Grade I listed Royal Liver Building is one of the city's 'Three Graces' and an iconic waterfront landmark.

The building's imposing façades are crowned by a cupola in each corner, each forming the roof of a feature boardroom office below. The huge clock towers either side of the building mirror this pattern, with a 'mini' cupola on each of their four corners. All 12 cupolas direct the eye upwards to the summit of the building where a verdigris Liver Bird perches eternally on each of the final, central cupolas.

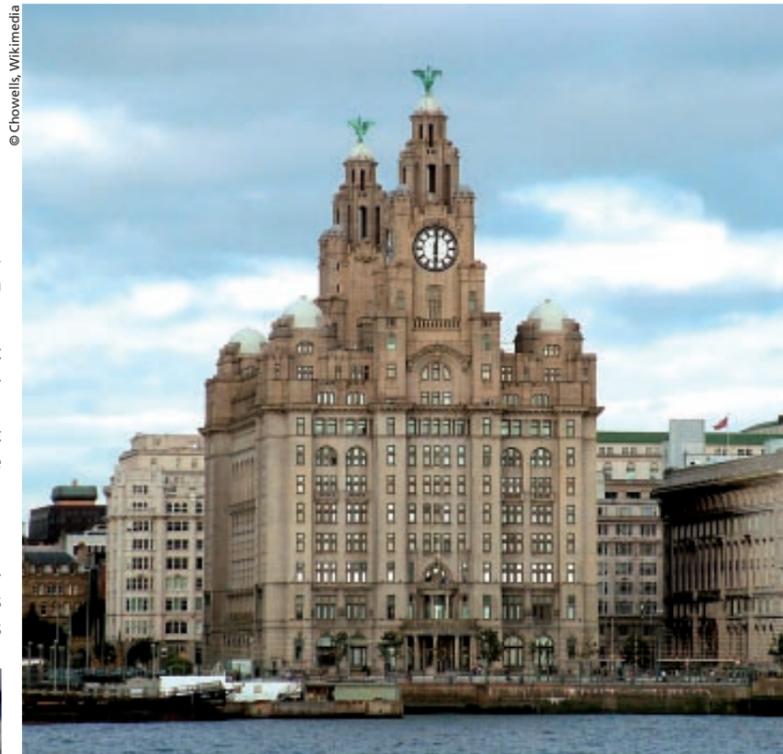
With Cunard, one of Liverpool's greatest companies, celebrating its 175th anniversary this year, it was time to refurbish the distinctive cupolas of one of its most famous buildings in the world in time for a celebratory flotilla.

### Limited Access

The cupolas are of concrete construction and have been protected by various waterproofing systems over the years



The large cupolas have a two metre high vertical surface before the structure starts to curve. KEMPEROL® 1K-PUR was ideal for this unusual project.



Royal Liver Building is one of the city's 'Three Graces' and an iconic waterfront landmark.

but water ingress was becoming an issue and in some areas the concrete was failing and had to be repaired to return the surface to its original domed shape.

Roofing contractor, K Pendlebury & Sons Ltd were appointed by main contractor Quadriga Ltd, specialist restoration contractors, to carry out the challenging task of working at height on the roofs in an exposed waterfront location. Comments Neilan Symondson from Pendlebury: "Scaffolding was erected on a small area of the roof at a time and an upgrade to localised areas of the roof beneath each cupola, along with a larger stretch on the Strand elevation, was incorporated into the scheme to capitalise on the accessibility we had to those locations while the scaffolding was in place.

"For these areas, we installed an inverted insulated roof build up, using KEMPEROL® V 210 cold applied waterproofing system to waterproof the substrate, followed by insulation and then paving."

### Specialist Approach

For the cupolas Pendlebury selected the KEMPEROL® 1K-PUR systems following trials carried out prior to commencing the project to ascertain the best approach to delivering the project with the level of finish required by the building's management company, CBRE, and English Heritage while managing the time constraints of the project. The challenging weather conditions of the building's waterfront location and the need to identify a system that

was suitable for the varying surfaces on and around the cupolas also influenced the specification. The method of fleece application and ease of use of the KEMPEROL® system was ideally suited to meeting these criteria on a scheme that involved working up to 14 storeys high. The large cupolas have a two metre high vertical surface before the structure starts to curve and gradually become flat over the top. Pendlebury used a combination of KEMPERTEC® EP5-Primer and quartz sand to create a key on the substrate before applying the liquid KEMPEROL® 1K-PUR resin with brushes and rollers. KEMPEROL® Fleece 120, cut to size and shape on site, was then laid onto the wet resin. Finally, further resin was immediately applied over the top to allow complete saturation of the reinforcement fleece in a single wet-on-wet process to provide a totally seamless, monolithic membrane.

For the larger cupolas, the scheme also involved scroll features and termination details and the installation team also painstakingly applied the system around the solid granite mini scroll features that surround each of the smaller cupolas.

CBRE's Simon Hepple adds: "In terms of surface area, the Royal Liver Building scheme was not large but it was extremely challenging and required both a specialist approach and careful product selection. "KEMPEROL® 1K-PUR was ideal for this unusual project."

### Project data

Object:  
12 cupolas, flat roof  
Specifiers:  
CBRE and English Heritage  
Products:  
KEMPEROL® 1K-PUR Waterproofing (cupolas) and KEMPEROL® V 210 Waterproofing (flat area)  
KEMPER SYSTEM Contractor:  
Pendlebury & Sons Ltd



Barnsley Town Hall, Yorkshire (UK)

## How to keep heritage intact

With its Portland Stone façade and its classical architecture, Barnsley Town Hall is one of South Yorkshire's most distinctive landmarks and best loved buildings.

When Barnsley Council commissioned a project to refurbish the roof as part of a programme of improvements to the building, KEMPER SYSTEM not only had to ensure that the roof was upgraded successfully without any disruption to council services but also had to complete the scheme without any impact on the rest of the building.

Explains Victoria Ramwell, technical sales representative of KEMPER SYSTEM: "The project involved installation of a new warm roof system to enhance the thermal performance of the building as well as providing a new waterproofing surface."

The existing roof build up consisted of asphalt, followed by a screed and a further layer of asphalt. Barnsley Council were keen to reduce the weight on the roof and so the top two layers had to be removed before installing the new roof.

The remaining asphalt surface varied in condition and a new vapour control layer had to be installed over large areas of the roof surface before installation of KEMPER SYSTEM's KEMPERTHERM insulation board. A tapered insulation scheme was chosen to aid with rainwater drainage.

Stuart Hicks, marketing manager from KEMPER SYSTEM explains: "The Stratex system is designed to enable the installer to choose between mechanical



Barnsley Town Hall is a distinctive landmark in South Yorkshire.



The solution from KEMPER SYSTEM conformed to the environmental objectives of Barnsley Council.

or adhesive fixings for the insulation and initially the contractor planned to use mechanical fixings. However, it was clear when the installation team started to drill pilot holes that the vibration could cause damage to the internal décor and potentially the ornamental glass dome inside the building. As a result, adhesive was used to fix the insulation." As the level of the new insulation was above the lower edge of the glass on the large lantern

rooflight, and so as not to interfere with the structure, a drainage channel was created around the roof light and lined with the KEMPEROL® 2K-PUR membrane. Stuart continues: "The complexity of the roof meant that it would have been extremely difficult to install a new waterproof surface with anything other than a liquid membrane."

The KEMPEROL® 2K-PUR liquid system enabled the contractor to install the waterproofing to the exact contours of these roof details and seamlessly incorporated all adjoining areas and drainage channels into a single monolithic membrane. Applied wet-on-wet in a single process, the liquid resin saturates a reinforcement fleece and cures to form a tough, flexible substrate that cannot delaminate. After completing the entire roof, red aggregate surfacing was applied to designated areas to create non-slip maintenance walkways.



Red aggregate surfacing was applied to designated areas to create non-slip maintenance walkways.

"We needed a roof refurbishment that would improve the town hall's thermal performance and protect against water ingress" comments Tony Taylor from Barnsley Council. "The solution from KEMPER SYSTEM not only answered these requirements but, being sustainably sourced and solvent-free, also conformed to our environmental objectives and ensured that we could carry on using the building as normal without any unpleasant odours or disruption."

### Project data

Object:  
1,800 m<sup>2</sup> roof  
Specifiers:  
NPS (Norfolk Property Services) and Barnsley Metropolitan Borough Council  
Products:  
KEMPEROL® 2K-PUR Waterproofing and Stratex Warm Roof System



 Berthold Lubetkin's Tecton concrete structures, Dudley, West Midlands (UK)

# KEMPEROL® preserves Tectons at Dudley Zoo



Dudley may not be a location that would spring to mind when making a list of the world's most remarkable architectural landmarks but it has some hidden treasures so precious that they were granted World Monuments Fund status in 2009.

The structures in question are the Tecton buildings at Dudley Zoological Gardens (DZG). There are 12 of them in total, each designed by Bethold Lubetkin and his Tecton practice. They are the world's largest single collection of Tecton buildings and some of the few remaining UK examples of this innovative and influential architectural movement from the 1930s and 1940s.

Explains recently retired DZG CEO Peter Suddock who led the programme: "Tecton was a radical architectural movement that used pre-stressed concrete to create striking curved structures. When Dudley Zoological Gardens was first planned and built, this radical, ultra-modern approach to design and construction enabled the architects to work with the challenging slopes and underground limestone caverns on the site to create a visitor attraction full of visual appeal that looked completely new and exciting."

Over the years, trends in zoo best practice have meant that some of the structures are no longer in use as viewing enclosures. Time has also taken its toll on the wear and tear too. The DZG Tectons were put on the World Monuments Fund's watch list of world class buildings threatened by neglect, demolition or disaster in 2010.

## Impact on Entry

Among the Grade I and Grade II\* Tecton structures that have so far been refurbished at Dudley Zoological Gardens, under the watchful eye of English Heritage, are the entrance canopy and ticket kiosks, concession stands, and the impressive 'Bear Ravine' which was once used to allow zoo visitors to view the bears from above at close range.

One of the main priorities of the refurbishment programme is to protect the structures from water and environmental damage due to rainfall, which led to the specification of a cold liquid-applied waterproofing system from KEMPER SYSTEM.

Explains Stuart Hicks from KEMPER SYSTEM: "As a result, the KEMPEROL® system and aggregates used for the entrance canopy, kiosks and the Bear Ravine provide the least obtrusive



The ticket kiosk was originally constructed without any waterproofing protection at all.



The entrance canopy consists of five horizontal 'S' shapes, each overlapping the one before to create a wave like ripple.



KEMPEROL® provides the least obtrusive solution to ensuring long-term protection for the structures without any significant changes to their appearance. The liquid system is ideal for following the individual contours of the concrete surface.

solution to ensuring long-term protection for the structures without any significant changes to their appearance." The first project of the refurbishment programme to be delivered was the entrance canopy, undertaken by G Cooper Ltd, which consists of five horizontal 'S' shapes, each overlapping the one before to create a wave like ripple that announces the word 'ZOO' in big white letters below.

## Just the Ticket

The KEMPEROL® system was also used to waterproof the roofs of the four ticket kiosks that are located beneath the entrance canopy, which were originally constructed without any waterproofing protection at all. This was because the structural concrete was perceived to be robust enough to withstand weather conditions, especially given the shelter afforded to the kiosks by the entrance canopy.

However, the risk of leaks to buildings of such architectural significance, which are built from concrete that is now almost 80 years old, prompted DZG to incorporate the ticket kiosks into the roofing programme.

Specialist contractor, Dent Roofing, was tasked with carrying out this aspect of the project, installing the KEMPEROL® system to two kiosks at a time in a phased programme to enable the Zoo to keep the remaining two kiosks operational and thereby avoid any business interruption during the works.

## Bear Ravine

Dent Roofing has also been responsible for waterproofing the Bear Ravine; a much larger and more complex structure which has not been used as an animal enclosure for several years.

The design of the Bear Ravine includes a central bear pit with a raised walkway

and viewing platform that also forms a partial roof to a largely open building. This is accessed by a set of concrete stairs. There is also a viewing pier that extends out at a right angle beneath the main walkway.

Julian Dent from Dent Roofing explains: "The curved lines that make the Bear Ravine such an iconic structure also make it a challenging waterproofing project. Fortunately, the liquid KEMPEROL® system is ideal for following the individual contours of the concrete surface and we simply used smaller brushes to apply the resin to awkward corners."

Once the waterproofing system to the walkway and staircases of the Bear Ravine was complete, the Dent Roofing team applied a quartz aggregate laid into the coating to create a non-slip surface.

Julian continues: "KEMPEROL® 2K-PUR provides a high level of waterproofing performance, and is BBA-Accredited with a 25-year service life, ensuring that the Bear Ravine is protected and preserved for the next generation just as effectively as the Tecton structures at the Zoo's entrance."



The impressive Bear Ravine was once used to allow zoo visitors to view the bears from above at close range.

## Project data

Object:  
Entrance canopy, kiosks and the Bear Ravine  
Specifiers:  
Dudley Zoological Gardens / English Heritage  
Product:  
KEMPEROL® 2K-PUR Waterproofing  
KEMPER SYSTEM Contractor:  
G Cooper Ltd and Dent Roofing Ltd





The villas in Tutzing are characterised by clear lines, large window spaces and spacious (roof) terraces.

## Waterproofing the Roofs and Roof Terraces of a Group of Villas in Tutzing (Germany)

# Flat in place of gabled

Lake Starnberg is one of the most attractive residential areas in Germany. And the municipality of Tutzing, situated on the west bank of the lake, is one of the most sought after addresses. Whoever builds a home here is investing in innovative and, more often than not, modern architecture.

A group of villas, consisting of two semi-detached houses and three single-family detached houses constructed in 2013/2014, shows exactly what the contemporary home of today can look like. The residential houses planned by the architectural firm Bembé Dellinger and implemented by the consulting engineers from Twiehaus show a traditional Bauhaus style. The buildings are characterised by clear lines, large window spaces and spacious (roof) terraces.

### Zero-degree roof as an alternative

A special feature is the architectural design of the attic storey, which resulted from the creative way in which the planners applied the specifications of the development plan. The plan specified a maximum building height similar to that of existing surrounding residential buildings, mainly built with gabled roofs. This more or less meant the loss of a full storey at attic level. The architects

looked for ways to meet the requirements of the building regulations while using a modern flat roof instead of a traditional pitched one. To achieve their goals they split the roof into three sections and designed the middle section as a flat roof utilising the permitted height limit. The sections to the right and left were incorporated as stepped storeys. These low "roofs" were transformed into large terraces that are well hidden from prying eyes.

Utilising every last centimetre of height, the planners chose a zero-degree roof with an eight centimetre high parapet. "Due to the low installation height of the parapet, KEMPEROL® was the only waterproofing system we could use. And with liquid applied waterproofing it was possible to integrate all the structural connections securely and seamlessly," explains Bernhard Nowosad. The master panel beater specialises in waterproofing flat roofs with liquid applied protective coatings and is totally convinced

of the benefits of this waterproofing system. "When I need to waterproof a roof, I use KEMPEROL®. That way I know for sure that it works." Bernhard Nowosad has carried out many projects over the years with the engineering firm run by Dipl.-Ing. Jochen Twiehaus. As a well-oiled team, they always look for the best solution for their joint projects. Jochen Twiehaus has also been a long-standing fan of the liquid applied waterproofing system from Vellmar: "We've had nothing but good experience with the product. When you know what you're doing and you can trust the installer, there aren't any problems."



Details are integrated securely and seamlessly into the surface using liquid applied waterproofing. Fittings are not required

### Liquid applied waterproofing as a problem solver

The substructure of the flat roof consists of ESB and Kerto boards equipped with a separating layer. They were pretreated with KEMPERTEC® EP-Primer and sanded to enhance bonding of the KEMPEROL® 2K-PUR Waterproofing. The solvent-free and odourless product is permanently elastic and bonds to the substrate over the entire area. This is particularly important on a zero-degree roof where rainwater has to dry off. The homogeneous, seamless surface prevents moisture seeping underneath the layer. To ensure the roof gullies are not the highest points, they were embedded in the substrate.

Prior to commencing the work, Bernhard Nowosad and KEMPER SYSTEM specialists identified which requirements need to be met for a completely flat roof. The applicable standards are applied. The layer thickness was increased to a minimum of 2.1 mm. The amount of KEMPEROL® waterproofing installed by Bernhard Nowosad was 3.6 kg/m<sup>2</sup>.

### Visible waterproofing

The large roof terraces on both sides of the attic storey are a characteristic element of the residential property. Bernhard Nowosad initially installed a vapour barrier and a 16 cm thick layer of insulation consisting of rigid foam boards. He then applied a bituminous separating layer which was waterproofed with KEMPEROL 2K-PUR. For reasons of visual appeal, parapet upstands were not capped with sheet metal. The waterproofing in the bottom section of the parapet wall is therefore 15 cm high and visible. The colour of the KEMPEROL® surface was adapted to tie in with the colour scheme and painted white.

### Project data

#### Object:

Waterproofing of an approx.

1,300 m<sup>2</sup> roof area and roof terraces

Architects (planning):

Bembé Dellinger architects,  
Greifenberg

Architects (constructing):

Twiehaus consulting engineers,  
Tutzing

KEMPER SYSTEM contractor:

Flachdach Oberland GmbH & Co. KG,  
Fischbachau  
Master panel beater  
Bernhard Nowosad

Products:

KEMPERTEC® EP-Primer  
KEMPEROL® 2K-PUR  
Waterproofing



A special feature is the architectural design of the attic storey. Instead of a gabled roof in keeping with surrounding properties, the architects chose a zero-degree roof and designed the roof sections to the right and left of it as stepped storeys.



The low "roofs" were transformed into large terraces that are well hidden from prying eyes.

 Refurbishing the Observation Deck of the Hamburg Michel (Germany)

## The city's "balcony" resealed professionally



The Hamburg Michel is one of the Hanseatic city's most famous buildings. The 132-metre-high spire of the protestant St. Michaelis Church has been a highly visible landmark for ships sailing up the River Elbe for hundreds of years. The observation deck at a height of 106 m is popular with locals and tourists alike and provides a fabulous panoramic view across the city. In May/July 2014, the specialist roofing contractor Bade Dächer was appointed to re-waterproof the roughly 100 square metre "balcony" using KEMPEROL®. An anthracite-coloured KEMPERDUR® coating was chosen as the heavy duty wearing layer, which has to withstand the footfall of more than one million visitors a year.

### Waterproofing 106 metres above ground level

The church, which was finished in 1669, is considered one of the finest baroque churches in northern Germany. The original building was destroyed by fire (lightning strike) in 1750 and its replacement suffered the same fate in 1906 after a fire started during construction work on the roof. The Michel was then built for a third time. Although it kept its familiar outer form, the original timber structure was replaced with a steel and concrete design. The red brick-work of the baroque church gives it its characteristic look.

Master roofer Hermann Bade, whose 94-year-old family-run business specialises in complete solutions for historic and modern buildings, was entrusted with carrying out the project. The company is a member of the German cooperation "100 Top Dachdecker"

(100 Top Roofing Contractors) and is certified by external bodies to ensure "the outstanding quality of our work is always maintained". Due to the complex round shapes and many structural details it was decided to use liquid applied waterproofing as it offers long-term sustainable performance even in confined spaces and on almost any substrate. Furthermore, KEMPEROL® is a cold applied liquid waterproofing, meaning there were none of the risks associated with hot works. Consequently, it minimised the risk of fire.

### Observation deck remained open

It was also important for the client that the observation deck remained partially open due to the large number of people wishing to take in the fantastic view across the city. The idea was that visitors could still climb to the top of the church and enjoy the breathtaking scenery



The observation deck was refurbished in May / July 2014.

without too many restrictions even while the works were being completed. This was why the final decision fell in favour of solvent-free KEMPEROL® 2K-PUR. The odourless product can be applied in sensitive areas with a fair bit of visitor foot traffic without causing unpleasant odours. The roofing specialists carried out the refurbishment project progressively during May and July of 2014. The parish requested a break in work over the Whitsun holidays. Luckily, longer periods of downtime are not an issue for the liquid applied waterproofing. New KEMPEROL® can be applied to a cured layer of KEMPEROL® without any negative impacts.

Site preparation initially required the milling of the old bituminous substrate, followed by the application of KEMPERTEC® EP-Primer to enhance bonding and then the scattering of KEMPERTEC® Natural Quartz NQ 0408. KEMPEROL® waterproofing was carried out in line with the standard procedure: a waterproofing layer of KEMPEROL®, a reinforcement fleece and a hard-wearing sealing coat of KEMPEROL®. Since KEMPEROL® achieves a full-surface bond with the substrate, it forms an impenetrable

surface after fully curing. This surface is additionally characterised by its permanent elasticity.

### Heavy-duty wearing layer for over one million visitors

While the waterproofing protects the church against penetrating water from above, the top coat protects the sealant against mechanical loads. The vast number of visitors to the observation deck each year meant that a heavy-duty wearing layer was required.

Hermann Bade and his team therefore applied KEMPERDUR® TC Coating, another solvent-free system, to the fully cured waterproofing layer. The universal wearing and protective layer is designed for surfaces subjected to high mechanical stresses such as car park decks, entrances, covered walkways, balconies or, as in Hamburg, observation decks. The surface was resealed with KEMPERDUR® Deko Transparent and then scattered liberally with anthracite coloured Colour Quartz, grain size 04 – 08 mm. The final task was to sweep of any excess quartz sand and to re-coat the surface with KEMPERDUR® Deko Transparent.

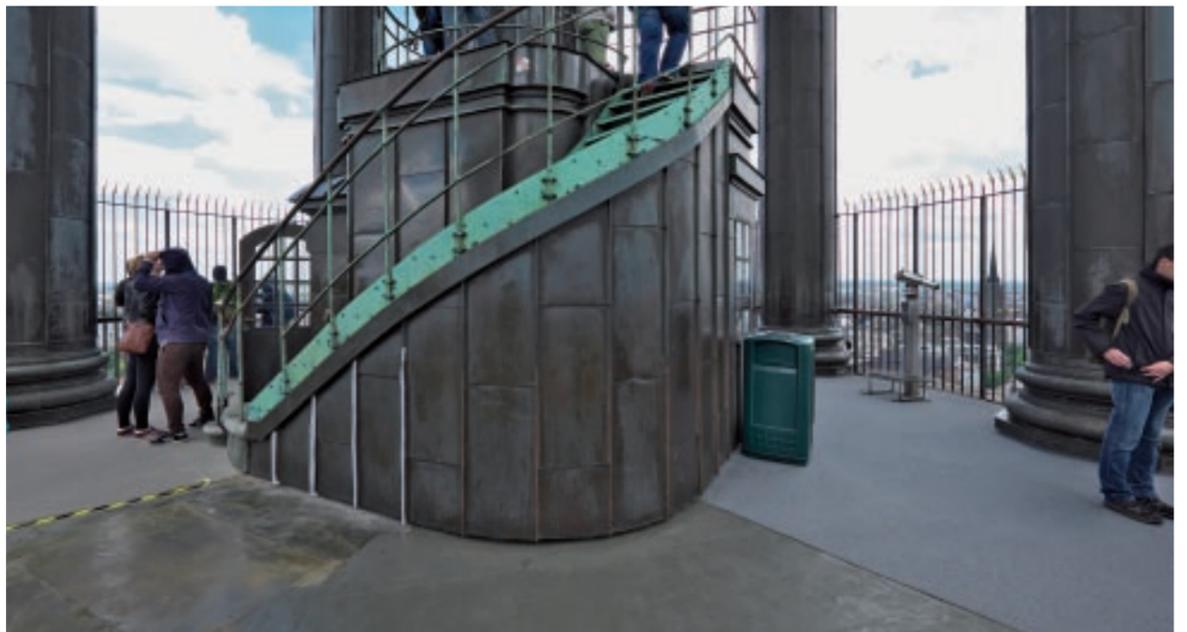
The finished surface structure is as follows:

- Bituminous substrate (milled)
- KEMPERTEC® EP-Primer
- KEMPEROL® 2K-PUR Waterproofing
- KEMPERDUR® TC Coating
- KEMPERDUR® Deko Transparent
- KEMPERTEC® CQ 0408 Colour Quartz
- KEMPERDUR® Deko Transparent

The Michel reopened with unrestricted visitor access and new waterproofing in mid July.

### Project data:

Object:  
Waterproofing and coating of a 106-metre-high observation deck  
Client:  
St. Michaelis Turm GmbH, Hamburg  
KEMPER SYSTEM contractor:  
Bade Dächer, Bad Bevensen  
Products:  
KEMPERTEC® EP-Primer  
KEMPEROL® 2K-PUR Waterproofing  
KEMPERDUR® TC Coating  
KEMPERDUR® Deko Transparent  
KEMPERDUR® CQ 0408  
Colour Quartz



The observation deck of the Hamburg Michel was effectively waterproofed using KEMPEROL® and given hard-wearing-coating using KEMPERDUR®. Round shapes and many complex details-ideal for the application of liquid applied waterproofing



The radome has become the symbol of Wachtberg. The white dome can be seen from miles around.

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## Waterproofing the Concrete Base of the Radome in Wachtberg (Germany) Tracking satellites and space debris

According to the Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, the space observation radar TIRA is one of the few systems outside the USA that offers space agencies all over the world the possibility to measure the orbit with high precision or produce a high resolution image of objects such as satellites. The system is therefore used, among other things, to gain precise measurements of space debris, prevent collisions of operative satellites with other objects or create an image of and analyse objects that have gone out of control.

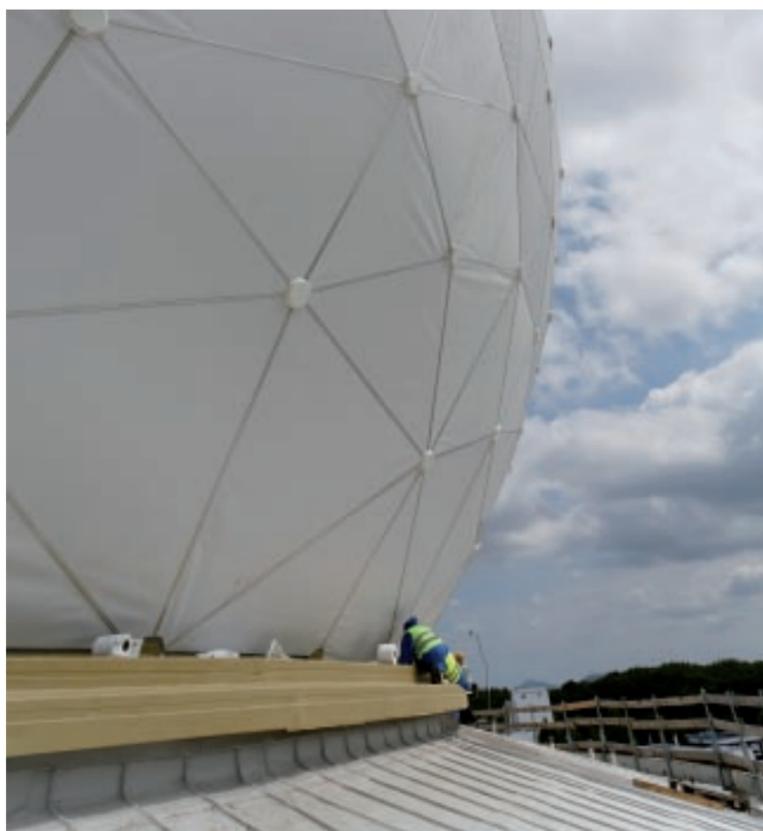
### New cover for TIRA

In 2014, almost 50 years after it was first constructed, the ageing cover of the space observation radar – consisting of a steel structure and plastic coated fabric – was fully refurbished. Although the diameter was reduced slightly from 49 to 47.5 metres, the radome is still the largest of its kind worldwide. The horizontally and vertically adjustable

parabolic reflector inside the dome measures 34 metres in diameter and weighs 240 tons.

As part of the refurbishment project, a new support surface first had to be created to facilitate the construction of the new cover. The actual size of the concrete base needed to be reduced to accommodate the radar dome. The engineering firm responsible for the project, Wallerich Ingenieurtechnik GmbH u. Co. KG, specified liquid-applied waterproofing as the sealant of choice. This waterproofing system was chosen as its liquid application ensures a smooth finish and secure waterproofing of all structural connections.

The concrete base was waterproofed using odourless KEMPEROL® 2K-PUR. The solvent-free product bonds to the substrate over the entire area, meaning that even if the surface becomes slightly damaged the structure is protected against moisture seeping underneath the waterproofing. Installation was carried out by the specialist roofing contractor Körner + Körner Bedachungsgesellschaft from Bonn, Germany.



The concrete base was waterproofed using KEMPEROL® 2K-PUR.

### Liquid applied waterproofing

KEMPEROL® Waterproofing only came into contact with the special plastic fabric at the junction points, which were waterproofed separately. The seal coating was applied all the way around up to a metal rail. The work additionally involved incorporating a circumferential drip plate with a circumference of approx. 120 metres

into the homogeneous waterproofing protection on the roof side. KEMPEROL® is permanently elastic and flexible at temperatures between  $-30^{\circ}\text{C}$  and  $+90^{\circ}\text{C}$ . The liquid applied protective coating is also able to absorb the thermal expansion behaviour of various materials. This means its installation on different materials, in this case concrete and metal, is unproblematic.

The roofing specialists initially cleaned the concrete substrate and sanded down the metal plate. They subsequently applied KEMPERTEC® EP-Primer to the surface and then scattered Natural Quartz. Surfaces pretreated in this manner ensure a strong and secure bond of the liquid applied protective coating. The installers then used KEMPEROL® 2K-PUR.

### Project data:

Object:

Waterproofing of the radar dome concrete base (approx. 210 m<sup>2</sup>)

Client:

Federal Republic of Germany;  
represented by: German Federal Ministry of Defence;  
represented by: Regional Finance Office Münster;  
represented by: Bau- und Liegenschaftsbetrieb NRW Cologne Office

Project management:

Wallerich Ingenieurtechnik GmbH u. Co. KG, Kassel

KEMPER SYSTEM Contractor:

Körner + Körner Bedachungsgesellschaft mbH, Bonn

Products:

KEMPERTEC® EP-Primer  
KEMPEROL® 2K-PUR  
Waterproofing



The horizontally and vertically adjustable parabolic reflector inside the dome measures 34 metres in diameter and weighs 240 tons.



KEMPEROL® Waterproofing only came into contact with the special plastic fabric at the junction points, which were waterproofed separately. Application: The first layer of KEMPEROL® is applied, a reinforcing fleece is then embedded within this base coat, a second layer of KEMPEROL® is immediately applied as the top coat to fully saturate the wet fleece.