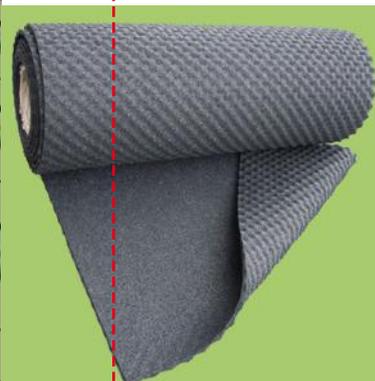
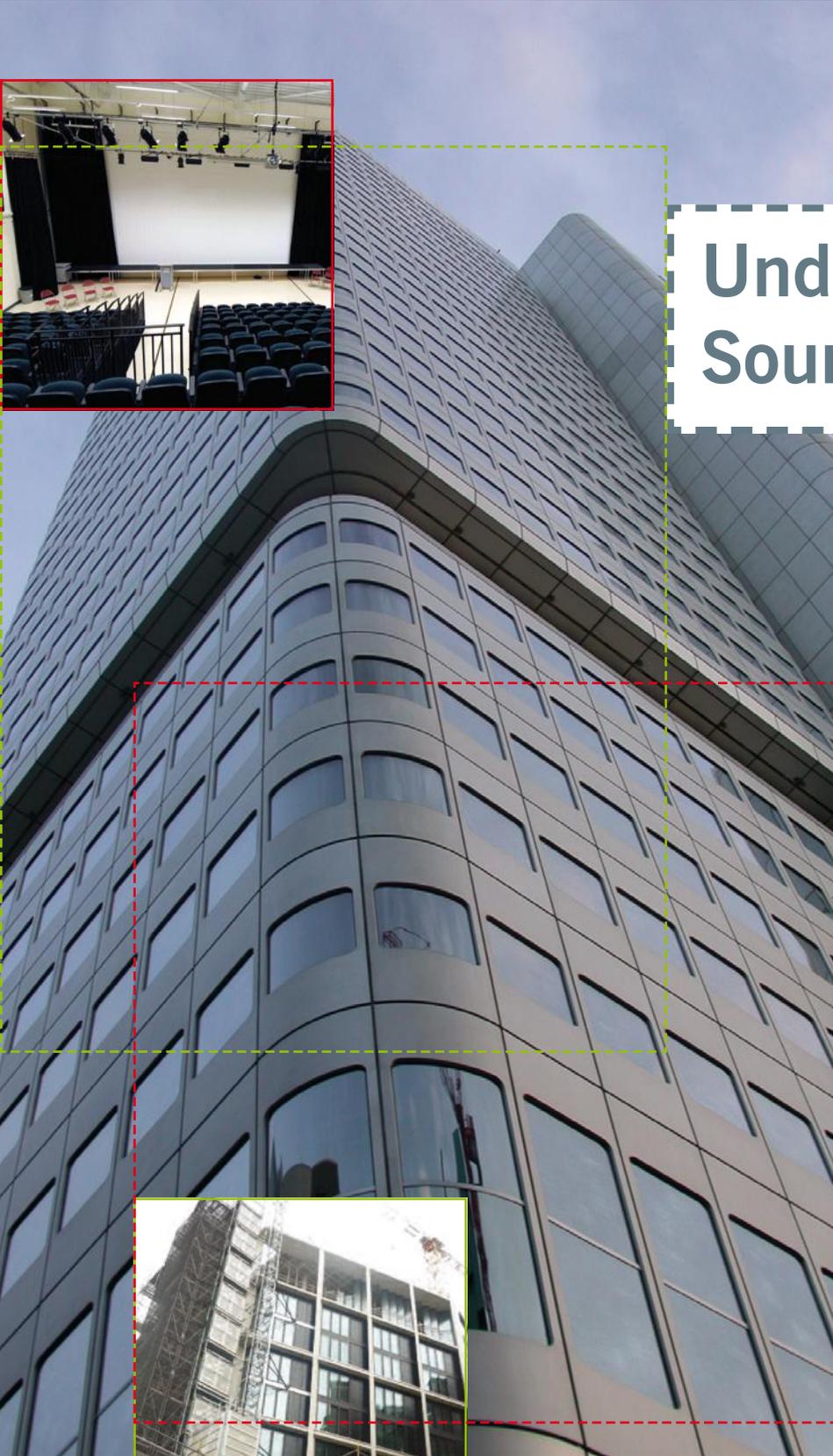




# Under-Screed Impact Sound Insulation

References



## Kaiser-Franz-Josef-Spital Vienna, Austria

Vienna – Austria's capital and, according to an international study in November 2011, the city with the highest quality of life worldwide – advocates modernity and quality also on the health sector. Generally the quality of life is primarily described as the level of well-being. Those holding positions of responsibility in the city of Vienna are aware that this well-being is also influenced by the range of health care available. And so it makes sense for Vienna's oldest hospital, the Kaiser-Franz-Josef-Spital, to be converted step by step into a contemporary, future-oriented hospital over the next few years.



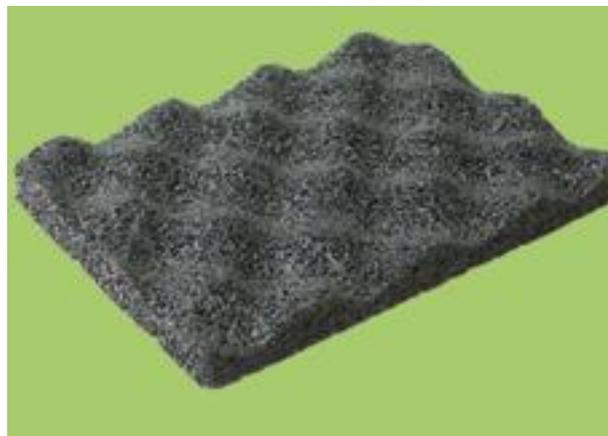
Built more than 120 years ago in Vienna's 10th district (Favoriten) and renamed as the „k.k. Kaiser-Franz-Josef-Spital“ following the imperial visit in 1889, the planned upgrade will make this one of Austria's most modern tertiary care hospitals. According to Vienna's hospital concept, the modernised hospital will join forces with six other hospital organisations to provide the medical, nursing and therapeutic care for the city's population. The new Utility Centre on the premises which in future will combine all supply and disposal areas, waste management, the new Sterilisation Preparation Centre South and the Pharmacy Partnership South under one roof, is being constructed as the modern infrastructure that is so indispensable for successful health care.



Most of the 11,000 m<sup>2</sup> total effective area of the Utility Centre will be used in future as warehouse, high-bay warehouse and workshop. The flooring in these areas has to satisfy special requirements to rule out any detrimental impact on hospital operations over a long period of time. Given the high loads on parts of the floors from forklift trucks and shelving systems (point loading), compressive strength in particular was an aspect that had to be given due consideration in selecting the products to be used for impact sound insulation. With the advice provided by the BSW consultants, it was possible to produce a convincing solution in both technical and economic terms, adapting the necessary insulation to the structure and utilisation of the specific areas.



The reinforced concrete flooring in the warehouse and workshop areas was equipped with around 7,000 m<sup>2</sup> of screed insulation matting **Regupol® BA**. The impact sound insulation made of PU-bonded rubber fibres stands out with its high load rating and high impact sound abatement. Only 17 mm thick, with impact sound insulation values of 26 dB and a maximum rolling load of 5,000 kg/m<sup>2</sup>, **Regupol® BA** is superior to many other products thanks to the particular combination of its attributes, as well as being cost effective. Prior to installation of the screed insulation matting, all rising structures were fitted with **Regupol®** insulation strips to prevent acoustical bridges. The fitted insulation matting was then covered with vapour barrier film before installing the 15 to 17 cm thick load distribution slab of smoothed, reinforced concrete.



Regupol® BA with profiled under-side

The companies responsible for installation also confirmed that **Regupol® BA** is the right impact sound insulation for high-load areas. „The compressive strength and high impact sound insulation of **Regupol® BA** together with its suitability for fast, uncomplicated and economical installation make it the right product for this application“, summarises Mario Hübler, technician with Granit-Bau.



Regupol® BA on a roll

More references can be found on our website.

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## Elbphilharmonie, Hamburg, Germany

If St. Michael's Main Church (commonly called Hamburger Michel) and the Köhlbrand Bridge are architectural landmarks of Hamburg, the Elbphilharmonie, the structure of the century, is going to be Hamburg's cultural landmark. In the middle of the Elbe River, at the centre of the Hafencity district, one of the world's best concert halls is being built on Quayside Warehouse A (Kaispeicher A) after plans by the Swiss architectural firm Herzog & de Meuron. Three concert halls, one hotel with 250 rooms, 45 flats, restaurants, bars and a car park will be housed in the future building complex that is going to put its mark on the city.



If the brick façade of the old warehouse, which was built between 1963 and 1966 after a design by Werner Kallmorgen, has an almost stoic appearance, the glass façade of the new structure on top looks lively and audacious. Separator and at the same time joint between old and new is the approx. 4,000 m<sup>2</sup> plaza at an elevation of 37 metres. From here Hamburg residents, tourists, concertgoers and hotel guests can enjoy a unique 360° panorama of the Hanseatic city. The undulating silhouette of the roof emulates the constant movement of the Elbe River. In wide inverted arcs it rises up 30 m from the eastern façade to reach an elevation of 110 m, the highest point of the Elbphilharmonie, at the tip of the quay.



The large concert hall with its approx. 2,150 seats is at an elevation of 50 metres inside the building. It constitutes an architectural feat. For reasons of sound protection, the 12,500-tonne hall rests on spring packages. Its walls are decoupled from all other parts of the building. To make sure that the acoustics will be perfect throughout the concert hall, one of the world's best acousticians, Yasuhisa Toyota, has developed a concept whose measurements were checked using a model of the concert hall which was built true to detail at a scale of 1:10. Thanks to 10,000 individually treated wall and ceiling panels with a surface that is unique in the world and a sound reflector suspended in the centre of the tent-shaped ceiling vault, the sound of the orchestra is distributed evenly throughout the hall.



However, the planners have made sure that the acoustics will not only be perfect in the Large Hall. In the Little Hall and the Quay Studio – music rooms which are intended for chamber music, contemporary and experimental music, children's concerts and choir rehearsals – all sound technological requirements of concert halls were met as well. Thus the use of impact sound insulation mats in the construction of the floor slabs from the manufacturer BSW ensure that there will be minimum sound transfer. In the Quay Studio, two layers of **Regupol® BA** and one layer of **Regupol® E48** were put on top of one another to adjust to the required construction height.



Regupol® E48

Since the Quay Studio is directly above the car park, an approx. 100 mm thick screed slab was installed to reduce the air-borne sound on the **Regupol®** screed insulation mats. The insulation mats made of PU-bonded rubber fibre with national technical approval stand out for their high load-bearing capacity, their minimum compressibility and a high resilience level. Prior to the installation of the screed insulation mats in the Quay Studio of the Elbphilharmonie, the walls and columns were covered with **Regupol®** perimeter insulation strips. After they were installed butt to butt, they were connected with adhesive tape and finally covered with a 0.2 mm thick PE foil. The PE foil prevents the screed from penetrating the porous structure of the **Regupol®** and thus the formation of acoustic bridges and the resulting transfer of structure-borne sound.



Regupol® BA

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## Central Bus Terminal, Munich, Germany

When the central bus terminal (Zentraler Omnibusbahnhof, or ZOB) was built in Bavaria's state capital, it was not only to be a hub for the international scheduled buses in Europe; Munich was also enriched by yet another architecturally sophisticated project. Due to its proximity to the central railway station, the ZOB, which covers a downtown area of about 6,000 m<sup>2</sup>, is the preferred stop for approx. 30,000 motor coaches carrying some 2.5 million passengers a year and at the same time for 30,000 rapid transit commuters a day. Consequently, it seemed sensible to create a concept for the ZOB Munich with its 27 bus terminals that would allow it to serve as a traffic, service, and retail centre. About 5,500 m<sup>2</sup> of office space, 3,900 m<sup>2</sup> of retail, service and restaurant business space as well as approx. 3,200 m<sup>2</sup> of event space were constructed in the seven-story building with the futuristic design.



The main access to the area is provided via the terminal lounge in the east and the ZOB Passage in the west, which leads visitors inside the building without any obstacles on the same level as the Hacker Bridge. On this level – the first floor – travellers, but also the visitors of nearby neighbourhoods, find 24 shops offering a rich variety of products. Not only the high standards of functionality, comfort and profitability had to be met in the design and construction of the building; the different types of utilisation of the available space and the heavy strain put on all construction elements due to the 24/7 operation had to be considered as well.



Consequently, the building owner and the planner decided to use impact sound insulation mats manufactured by BSW for the construction of the ceilings in the building's service and retail areas. After all, when dealing with highly resistant screeds which are exposed to great static and dynamic loads, especially in the area of retail floor space where lift vehicles such as pallet lifting carts are used, you need impact sound insulation whose stability and impact sound insulating properties are guaranteed for the long term.



These requirements were precisely met by installing the **Regupol® E48** screed insulation mat. The impact sound insulation with national technical approval, consisting of rubber fibres and a special bonding agent, stands out for its high load-bearing capacity and high impact noise reduction. Having a thickness of just 8 mm, an impact noise reduction of 20 dB and a maximum traffic load of 3,000 kg/m<sup>2</sup>, **Regupol® E48** is ideal for full-surface installation under heavy-duty screeds, e.g. in supermarkets, production halls, warehouse areas, canteen kitchens and schools. When professionally installed, the low load deflection of only 1.6 mm and the high resilience level of at least 95% ensure that neither the screed nor connection joints crack.

Prior to the installation of the **Regupol® E48** screed insulation mat, the adjoining vertical parts of the building were covered with **Regupol®** perimeter insulation strips. Then the **Regupol® E48** sheets were installed butt to butt and subsequently connected with adhesive tape. After the installation of the screed insulation mats was completed, they were covered with a 0.2 mm thick PE foil whose butts and overlaps were taped together with suitable adhesive tape. Finally the total area of approximately 4,500 m<sup>2</sup> of screed was covered with tiling.

#### BSW products

Approx. 4,500 m<sup>2</sup> of **Regupol® E48** screed insulation mat

- PU-bonded rubber fibre rolls
- Dimensions 13,040 x 1,150 x 8 mm
- Temperature resistance from -20 °C to +80 °C
- Sound reduction value 20 dB
- Load deflection 1.6 mm (with 30 kN/m<sup>2</sup>)
- Traffic load up to 3,000 kg/m<sup>2</sup> maximum
- Fire classification B 2 / Class E



Additional references are listed  
on our website.

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## Opera House, Frankfurt on the Main, Germany

### Description of the project

Elastic bedding of floor constructions

### Load range

up to 0.01 N/mm<sup>2</sup>, point loads partially up to 0.10 N/mm<sup>2</sup>

### Material

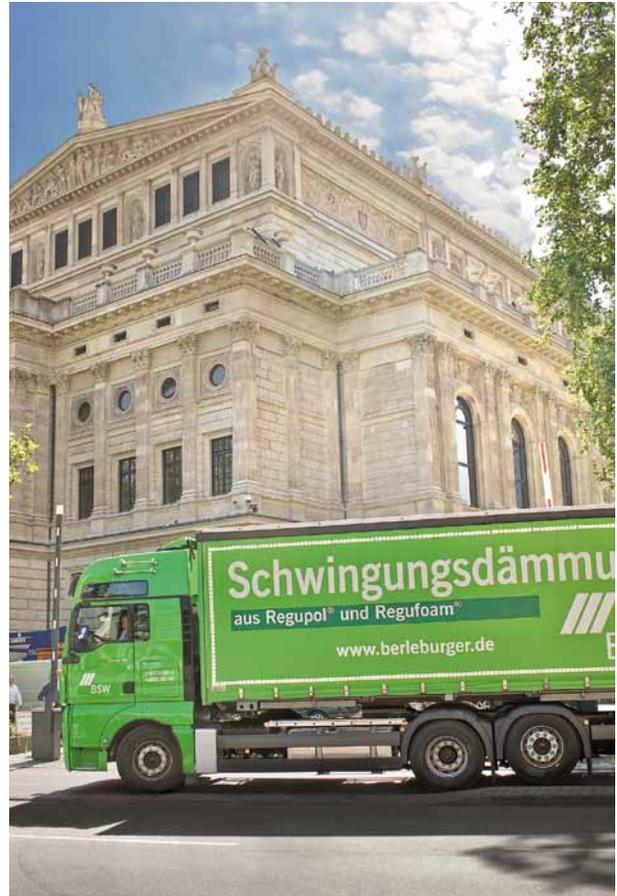
**Regupol® BA, Regupol® SH**

### Requirements

Impact sound insulation up to  $\Delta L_w$  30 dB, vibration isolation

### Quantity

approx. 900 m<sup>2</sup>



Additional references are listed on our website.

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## Sky Bar, Liverpool, UK

Liverpool's tallest building, Beetham West Tower, is a 40-storey mixed-use development, incorporating commercial office spaces, residential apartments and Sky Bar. Located on the top floor, Sky Bar is a luxury restaurant and bar providing excellent views of the city.

At specification stage it was discovered that with no acoustic treatment, the impact sound generated in Sky Bar would be heard in the offices and apartments below. Low frequency noise that would be produced from the extraction system in the kitchen area also caused particular concern. As such, an acoustic solution was required to address the potential impact energy and maintain the premium status of the development by preventing disturbance to residents.

**Regupol® Screed Insulation**, a recycled rubber granulate underscreed acoustic system, was identified as the most cost effective impact sound solution. The material undergoes minimal creep and will retain these high performance levels for the lifetime of the installation, even under high loads.

Compatible with all types of screed, **Regupol® Screed Insulation** is ideal for use in new build developments where pre-completion testing is preferred to the standards or demands.



Regupol® Screed Insulation was installed to help prevent impact energy from travelling out through the 'party floor' of the bar and into the apartments and offices below.

**Regupol® Screed Insulation** was used to cover the entire 375 m<sup>2</sup> flooring area of Sky Bar. Quick and easy to install, the material does not require separate perimeter strips to achieve complete isolation as the sheets are simply turned up at the edges and the screed laid directly on top.

The specification of **Regupol® Screed Insulation** at Sky Bar effectively prevented the impact sound generated from the bar and kitchen areas from travelling into the offices and apartments below.

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## Luxury New Build Apartment Project, Idle, UK

When constructing a new build luxury apartment development in Idle, West Yorkshire, it was chosen to follow the Robust Detail (RD) route to project completion, aiming to provide future occupants with optimum standards of living. Although strictly a pre-completion testing project, as not all internal walls were continuous from the foundations to the roof, it was built to RD guidelines to maximise the acoustic performance of the apartments. With beam and block floors being used at the development, it was needed to source an impact sound solution that was approved by RD for this construction.

As the only RD-approved system for beam and block floors (E-FC-6), **Regupol® Screed Insulation** was selected.

Compatible with all types of floor screed, **Regupol® Screed Insulation** is suitable for use in most new build constructions. A simple fitting procedure ensures that the material is quick and easy to install. At the Oak Tree apartments, **Regupol® Screed Insulation** was used to isolate 200 mm-deep Collier and Henry beams from the main structure of the building.



Oak Tree Developments exceeded Robust Detail requirements by installing **Regupol® Screed Insulation** at its new build apartment project.

To achieve the overall high performance that Oak Tree required, BSW also recommended the installation of **Regupol®** acoustic isolating strips. Designed to sit beneath blockwork walls to reduce structure borne noise, these strips offer long term performance and benefit from minimal creep. At the apartments, **Regupol®** acoustic isolating strips were used to prevent flanking sound transmission by isolating the internal blockwork and perimeter construction from the structural steelwork.

Significantly exceeding the minimum requirements set by Robust Details (50 dB airborne, 62 dB impact), the Oak Tree apartments obtained an airborne rating of 57 dB and impact of 47 dB. Under the Code for Sustainable Homes, this would have achieved four points – the maximum the code permits for sound insulation performance.

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## Priory Community School, Western Super Mare, UK

When the development of three new school buildings at Priory Community School, Western Super Mare, was undertaken it was necessary to make adequate provision for noise control to ensure optimum teaching and learning conditions post completion.

A two-storey block was constructed to hold an assembly hall, music performance suites and classrooms, whilst a further two singlestorey extension blocks were built to offer more teaching space. In the two-storey building, classrooms were situated directly above music rooms and an assembly hall. As such, the high noise levels generated from the ground floor needed to be attenuated. To minimise the passage of impact and airborne sound between rooms, it was necessary to isolate screeds from the main structures of the three new school buildings.

Consequently, a high performing under screed acoustic treatment was needed. **Regupol® Screed Insulation** was selected. Compatible with all types of floor screeds, **Regupol® Screed Insulation** offers a flexible isolation system for any development. Supplied in easy to handle sheets, **Regupol® Screed Insulation** is quick and simple to install. Furthermore, it does not require separate perimeter strips or any fixing prior to the casting of the screed.

With a material thickness of just 5 mm, **Regupol® Screed Insulation** helps to reduce construction heights. The system also benefits from minimal creep properties, even under high loads. Manufactured to an exact process, **Regupol® Screed Insulation** is constructed of a high density recycled rubber compound. This guarantees the consistency of physical properties between sheets and delivers an environmentally sound acoustic solution.



Since the completion of the three new school buildings at Priory Community School, sound transfer between rooms has been minimised, ensuring that lessons remain undisturbed.

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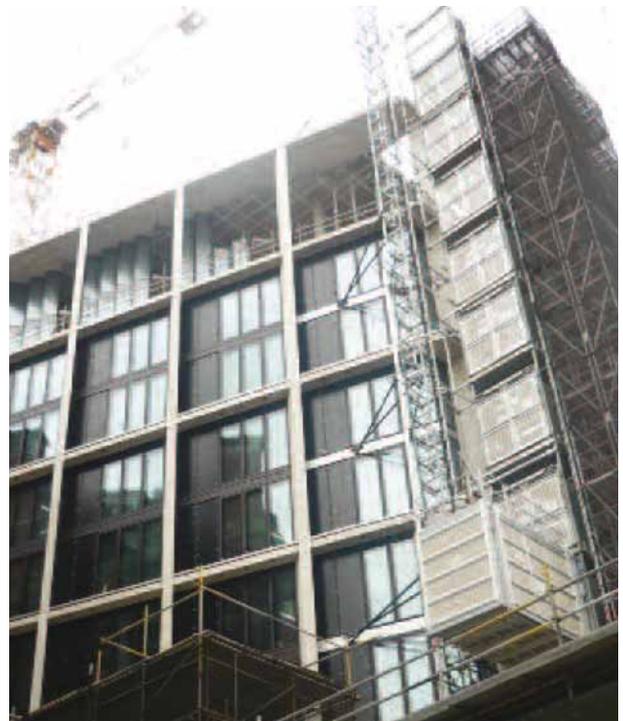
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## One Hyde Park, London, UK

Candy and Candy's One Hyde Park is the UK's most exclusive apartment scheme, and set a new world record when one of the apartments was sold for a figure in excess of £100m. Comprising four 'pavilion towers', named A to D, with four apartments on each pavilion floor, minimum Part E standards had to be significantly exceeded to ensure the scheme was delivered 'fit for purpose' by providing only the highest quality residential environment.

In addition, to maximise return on investment for the developers and ensure all the apartments could be handed over at the same time, the site programme was scheduled at an optimum pace. The acoustic consultants had to consider all of these factors when evaluating how to control impact sound in the exclusive development, leading to the specification of **Regupol® Screed Insulation**, a high performance acoustic underscreed system.

**Regupol® Screed Insulation** is a highly sustainable acoustic product. Made from recycled tyre crumb, it offers zero Global Warming Potential (GWP) and zero Ozone Depletion Potential (ODP). **Regupol® Screed Insulation** was specified for all apartments, with the material controlling impact sound in areas where a stone or marble floor finish was to be used.



Regupol® Screed Insulation was specified for One Hyde Park based on its superior sound insulation performance and sustainable credentials.

Throughout the entire scheme, this equated to approximately 16,000 m<sup>2</sup> of **Regupol® Screed Insulation** being installed. As a high load bearing product, **Regupol® Screed Insulation** delivers excellent impact and airborne performance while withstanding loads of up to 50 kN/m<sup>2</sup>. Offering long term performance without risk of collapse under high point loads, **Regupol® Screed Insulation** is also resistant to ageing and deformation, which means it will continue to deliver superior sound insulation for the lifetime of its installation.

Significantly exceeding the maximum Part E requirement of 62 dB, **Regupol® Screed Insulation** can achieve impact sound values as low of 38 dB, making it ideal for the isolation of floor screeds in luxury new build apartments.

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## SWR TV-Studios, Stuttgart, Germany

### Description of the project

Insulation under surfaces that are being used by vehicles.

### Load range

up to 0.01 N/mm<sup>2</sup>, high peak loads from forklifts category G1-G3

### Material

**Regupol® BA**

### Requirements

Impact sound improvement  $\geq \Delta L_w$  26 dB

### Quantity

approx. 2,000 m<sup>2</sup>



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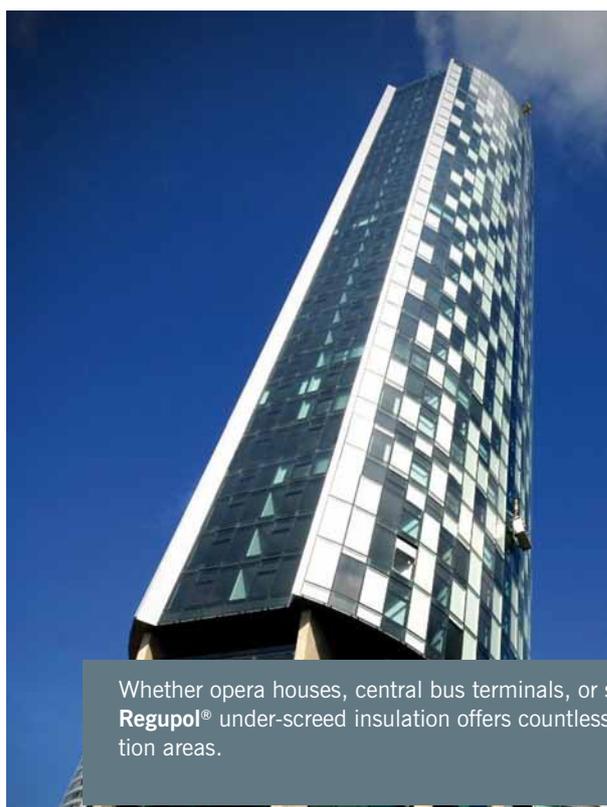
These references constitute only a small selection of all buildings which have been equipped with **Regupol®** under-screed impact sound insulation.

#### Germany

Central Bus Terminal, Munich, Germany  
 Clinical Centre, Minden, Germany  
 Commercial Park Laim, Munich, Germany  
 Commerzbank Tower, Frankfurt, Germany  
 Deutsche Bank Building, Frankfurt, Germany  
 Elbphilharmonie, Hamburg, Germany  
 Frankfurt Airport, Frankfurt, Germany  
 Hesse State Parliament, Wiesbaden, Germany  
 Imtech-Arena (Stadium), Hamburg, Germany  
 Nuremberg Trade Fair Centre, Nuremberg, Germany  
 Opera House, Frankfurt, Germany  
 RTL Studios, Cologne, Germany  
 Scandic Hotel, Berlin, Germany  
 University Clinic, Regensburg, Germany

#### Worldwide

Adnoc Hospital, Ruwais, Abu Dhabi, United Arab Emirates  
 Al Menera, Al Raha Beach, Abu Dhabi, United Arab Emirates  
 All England Tennis Club, Wimbledon, United Kingdom  
 Audi Production Plant, Gyár, Hungary  
 Burj Khalifa, Dubai, United Arab Emirates  
 Business Garden, Warsaw, Poland  
 Crowne Plaza Hotel, Yas Island, Abu Dhabi, United Arab Emirates  
 Cultural & Conference Centre, Istanbul, Turkey  
 D1 Tower, Dubai, United Arab Emirates  
 Doha Convention Center, Doha, Qatar  
 Dubai Healthcare City, Dubai, United Arab Emirates  
 Dusit Hotel, Abu Dhabi, United Arab Emirates  
 Leeds Grand Theatre, Leeds, United Kingdom  
 Luxury Apartment Project, Idle, United Kingdom  
 Monoprix supermarkets in France  
 Multiplex Cinemas, Dublin, Ireland  
 Nation Towers, Abu Dhabi, United Arab Emirates  
 One Hyde Park, London, United Kingdom  
 Palazzo Versace Hotel, Dubai, United Arab Emirates  
 Priory Community School, Western Super Mare, United Kingdom  
 Qatar National Convention Centre, Doha, Qatar  
 Ramada Encore, Chatham, Kent, United Kingdom  
 Sainsbury's, Farnborough, Hampshire, United Kingdom  
 Sharjah Palace, Sharjah, United Arab Emirates  
 Sky Bar, Liverpool, United Kingdom  
 Sofitel Dubai Jumeirah Beach Hotel, Dubai, United Arab Emirates  
 Warsaw University of Technology, Warsaw, Poland  
 Yas Marina Hotel, Yas Island, Abu Dhabi, United Arab Emirates



Whether opera houses, central bus terminals, or sky bars – **Regupol®** under-screed insulation offers countless application areas.

# Notice

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