

## Case Study

### **Westarkaden Heidelberg**

#### **Sophisticated detailed planning using the Passive House standard**

**In Bahnstadt Heidelberg, the largest Passive House community in the world, a neighborhood and community shopping center is being built called the Westarkaden. The Westarkaden was developed and built by the company Unmüssig from Freiburg together with the project management agency mdbm from Karlsruhe. In order to meet the energetic specifications of a Passive House standard regarding mixed use for residential, commercial and gastronomy applications, a detailed plan for each individual thermal bridge was required. The participants in the construction process found the structural solution for thermally separating the balconies and loggias in the Schöck Isokorb CXT with the Combar glass fiber composite material.**

Bahnstadt Heidelberg sits on an area of 116 hectares in south western Heidelberg. It emerged in 2017 from a design concept from WWA Architekten in Munich. The area was formally used as a railway center for loading goods and assembling rail cars into new trains. The US Army also had some units stationed there for a while. Approximately 5000 people already live and work in the world's largest Passive House community. This number will grow to over 6000 with the Westarkaden. The Passive House idea is to use construction concepts that save energy: because of its energy-efficient components and ventilation technology, a passive house requires 90 percent less heat energy than current as-built buildings. Therefore, passive houses represent an active contribution to protecting the climate and ensuring sustainability.

### **Mixed use for residential, commercial, gastronomy**

A three part building ensemble between Gadamerplatz and Eppelheimer Straße will form the new entrance gate to the Bahnstadt and will take on the role of a traditional marketplace, i.e. the center of commercial life. Situated on a two-story underground parking garage, the concept provides 540 parking spaces for tenants and customers. It has approx. 11,700 m<sup>2</sup> of retail space for stores/businesses and restaurants on the ground floor, approx. 300 family-friendly, barrier-free rental apartments on the upper floors as well as office space and a kindergarten, providing mixed use for residential, commercial and gastronomy. "The challenge with this mixed use concept was to design a private residential area and still ensure simultaneous access to public life," reports Project Manager Björn Fenske from WWA Architekten. The architects solved this issue via the divergence in the façades as well as the balconies and loggias. Thus balconies in building area 1 were designed with a cantilever of up to 2.70 m. In building areas 2.1 and 2.2, which are positioned on the square in a southerly direction, loggia solutions were developed to create a retreat space for residents in the interior and at the same time absorb the noise: in building area 2.1 with folding slide elements made of glass, in building area 2.2 via an open balcony situation with glass railings and ceiling high glass structural elements, which rest approx. 1.50 m in front of the façade. "Three, a maximum of four balconies are the same. Otherwise, all others are different," reports André Kappes from archis Architekten, who are responsible for the design.

### **Sophisticated detailed planning**

The varied design of the balconies and loggias required very detailed planning for all possible thermal bridges in order to be able to meet the Passive House standard, which was specified for Bahnstadt. "The planning effort was extremely high," reported Marcel Schütze, Project Manager at Schreiber Ingenieure from Stuttgart. "Structurally, it was energetically difficult to get a handle on the very different geometric designs of the balconies and loggias. For example, the energy consumption

requirements for passive houses is very different for residential spaces and for commercial spaces." Precise energy calculations also had to be performed for adjacent building sections such as the underground parking garage and staircases as well as the structural design of the thick concrete components.

### **Advantage of a glass fiber composite material: energetic thermal bridge-free**

The participants in the construction process found the solution to connect the balconies and loggias in a manner that is thermal bridge-free in the Schöck Isokorb CXT: for this component, the "C" stands for Combar, a glass fiber composite material which makes up the tension rods. "The glass fiber composite material is characterized by a thermal conductivity that is so low that it carries no weight with regards to the calculations," explains Markus Heck, Product Engineer at Schöck.

Along with its many other properties, Combar also features the highest thermal insulation performance because its thermal conductivity is 15 times lower compared to stainless steel.

Using the Isokorb CXT, thermal bridges can be reduced to a minimum. In addition - and this was crucial for the Westarkaden project - the Isokorb CXT has also been certified by the Passive House Institute. "This was especially important because the city was very meticulous during planning and installation that the requirements of the Passive House standard were met. And this could only be achieved using the Isokorb CXT," reports Marcel Schütze.

### **Precast elements with the quality of exposed concrete**

In order to produce the balconies and loggias with the quality of exposed concrete required by the design, they were largely manufactured as fully precast elements at the Pies concrete plant in Andernach-Miesenheim. At the plant, the Isokorb was inserted into the formwork, the gaps filled with insulation and the butt joints sealed with adhesive tape. Then the fully precast element was covered in concrete and compacted. On site, the completed balconies could be covered in concrete with the floor slab.

### **A neighborhood center as a model**

The strict specifications of the Passive House standard required the close coordination of all participants in this building project and in some situations this also required highly detailed planning with time constraints. The successful implementation now validates the idea behind the project. The first tenants already started to move into building area 1 in December 2019. "The close coupling of modern apartments with shopping and dining opportunities using the Passive House standard as was created here in the Westarkaden could become a type of model," says André Kappes from archis Architekten.

#### **Construction site sign**

**Property developer:** Unmüssig, Freiburg

**Project management:** mdbm Karlsruhe

**Construction company:** Peter Gross Bau GmbH, Karlsruhe

**Architect (concept):** WWA Architekten, Munich

**Architect (realization):** archis Architekten + Ingenieure GmbH, Karlsruhe

**Structural engineering (realization):** SCHREIBER Ingenieure, Stuttgart

**Structural engineering (concept):** THEOBALD + PARTNER INGENIEURE mbB, Kirchzarten

**Prefabricating plant:** Pies Betonsteinwerk, Andernach-Miesenheim

**Building physics:** Bayer Bauphysik, Fellbach

**Construction period:** 2017 - 2020

**Schöck products:** Isokorb CXT

## Captions

**[Schoeck Westarkaden HD PL 01.jpg]**



*Gap-free balcony parts of various lengths were designed in building area 1 of the Westarkaden Heidelberg. Photo: Moritz Bernouilly*

**[Schoeck Westarkaden HD PL 02.jpg]**



*The balcony overhangs in building area 1 of the Westarkaden were also designed across corners. Photo: Moritz Bernouilly*

**[Schoeck Westarkaden HD PL 03.jpg]**



*Cold loggias in building area 1 provide residents with a quiet and calm retreat area. Photo: Moritz Bernouilly*

**[Schoeck Westarkaden HD PL 04.jpg]**



*To ensure good exposed concrete quality, the balconies were made in a prefabricating plant. The Schöck Isokorb CXT load-bearing thermal insulation element was set in place and integrated. Photo: Schöck Bauteile GmbH*

**[Schoeck Westarkaden HD PL 05.jpg]**



*The striking feature of the three buildings of the Westarkaden include, among others, the different geometrically designed balconies, several of which have lengths up to 21 m. Photo: Schöck Bauteile GmbH*

**[Schoeck Westarkaden HD PL 06.jpg]**



*On site, the precast elements including the Isokorb were sealed with the floor slab. Photo: Schöck Bauteile GmbH*

**[Schoeck Westarkaden HD PL 07.jpg]**



*The tension bars of the Schöck Isokorb CXT load-bearing thermal insulation element are made of a glass fiber composite material that is characterized by the lowest thermal conductivity. Photo: Schöck Bauteile GmbH*

**Please direct any questions to:**

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