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REPORT

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REYNAERS
aluminium

Magazine
by Reynaers
Aluminium

**PIERRES
VIVES**

Impressive
ship of a
building

FOCUS

Towards a
sustainable
urbanisation



BLOEMHOF

An example
of a generic
structure
design

PROJECT

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 *Гипердизайн*

sopharma B

sopharma A

A CONFIDENT
GREEN STEP
FORWARD

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SOPHARMA LITEX TOWERS

SOFIA,
BULGARIA

Text: Ljubo Georgiev
Photography:
Kiril Konstantinov

sopharma busine

CHO

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OTBOR



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The Sopharma Litex Towers are the first example of a large-scale project with integrated urban planning in Sofia's recent history. The project is a milestone in the developing Bulgarian construction market. In the words of Dimitar Paskalev, the chief architect of the project, close cooperation was sought with the municipality in order to integrate the project in the best way possible in the existing urban tissue while also keeping in mind future plans for the area.

The buildings interact with their surroundings by means of the lower two levels housing shops, restaurants and offices, the entrances to the towers and the parking facilities. The Towers also relate very successfully to the larger scale of the city. Their location just outside the city centre was chosen in order to avoid increasing traffic in urban zones which are already problematic. At the same time the Towers are within walking distance of Sofia's metro, due to the investor's ambition to establish Sopharma Litex Towers in Sofia's urban life in the most sustainable way possible. In this way the Towers are a well-measured urban gesture, which rather adds urban life to the city fabric, than pulls it away from it.

Not only are the Sopharma Litex Towers cleverly integrated into Sofia's urban fabric, they also utilise building technology which would be innovative anywhere in the world. The project was an experimental collaboration between the investors (Sopharma and Litex), the architect (Architectonika), the façade consultant (Dr. Helmut Koester and physicist eng. Kiril Velkovsky), fabricator (Kristian Neiko 90) and the façade system developer (Reynaers).

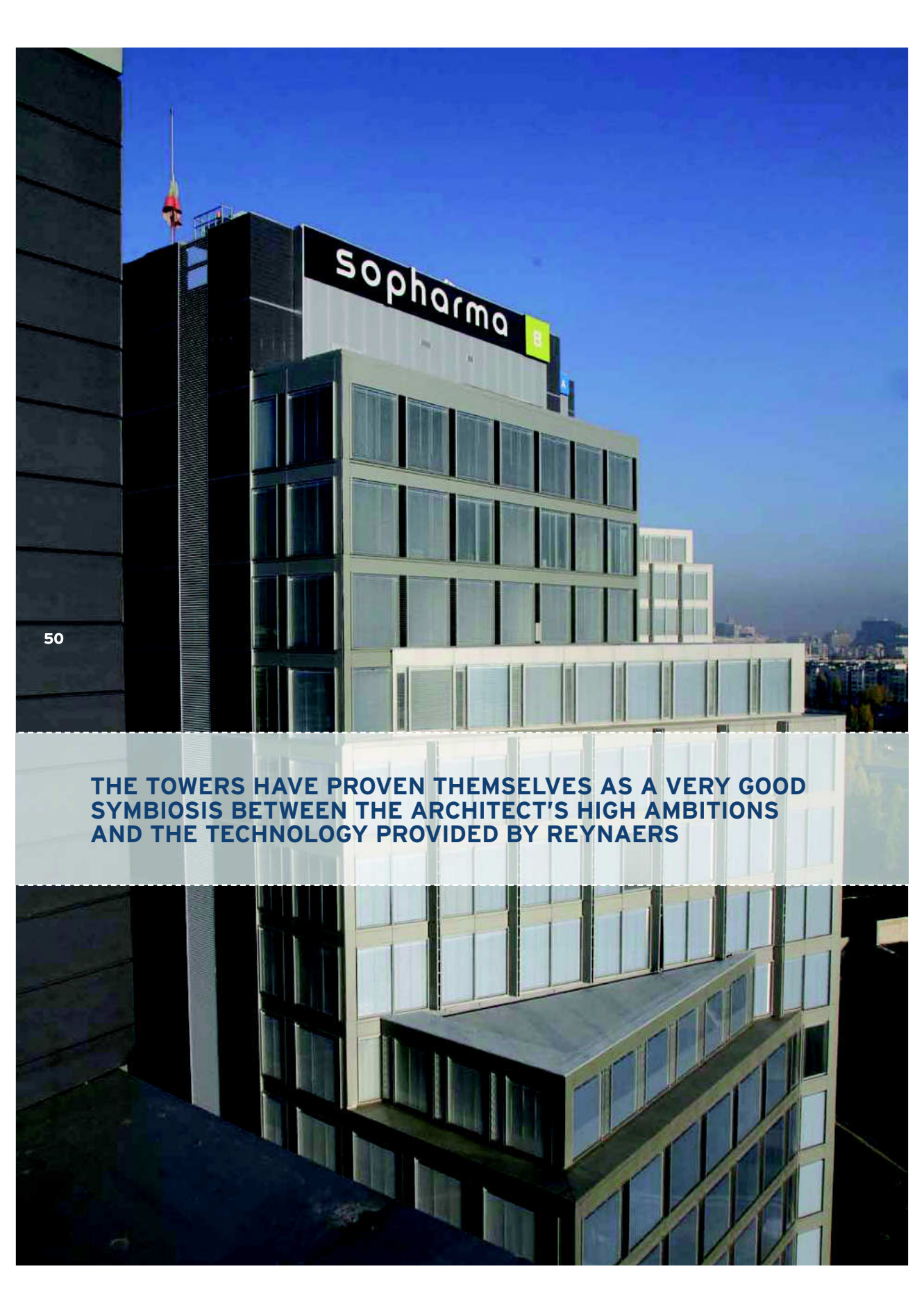


→ Located just outside the city centre, the towers are within walking distance of Sofia's metro system



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**THE TOWERS ARE A WELL-MEASURED URBAN GESTURE,
WHICH RATHER ADDS URBAN LIFE TO THE CITY FABRIC,
THAN PULLS IT AWAY FROM IT**

A photograph of a modern, multi-story office building with a glass and dark metal facade. The building is viewed from a low angle, looking up. The sky is clear blue. A flag is visible on a pole on the roof. The building has a stepped design with multiple levels of windows. The word 'sopharma' is written in white on a dark background on the upper part of the building.

sopharma

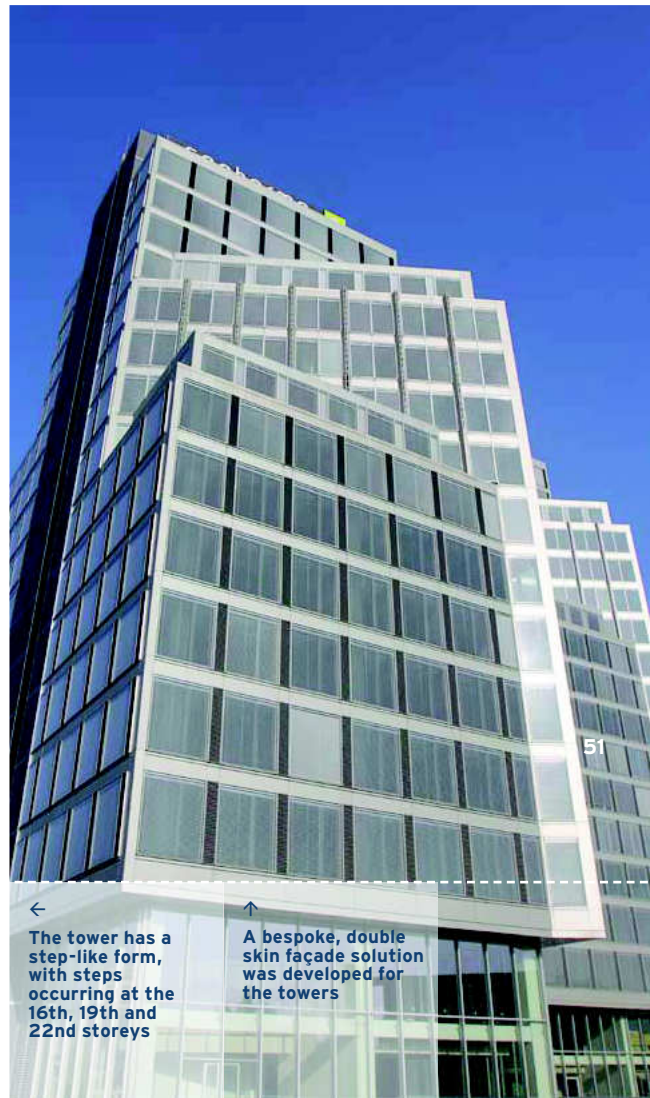
THE TOWERS HAVE PROVEN THEMSELVES AS A VERY GOOD SYMBIOSIS BETWEEN THE ARCHITECT'S HIGH AMBITIONS AND THE TECHNOLOGY PROVIDED BY REYNAERS

According to Kiril Velkovsky, the Towers proved to be a very good symbiosis between the architect's ambition for a high-performance, energy-efficient building and the technology provided by Reynaers, which backed up and strengthened the original design idea. For this project, comprising 20,000 m² of façades, a new façade system was developed, based on the CW 86-EF element façade with CS 86-HI windows, which could satisfy the requirements of the investors for a low-energy footprint and still result in an extremely flexible and comfortable building. This element façade - measuring 14,000 m² in total - is made with elements that were preassembled and glazed in the workshop.

The building's skin consists of a Reynaers aluminium double-glazed, close cavity façade, with RETROSolar blinds incorporated in the cavity. The façade breathes, allowing humidity to escape, but does not generate an airflow. The outside layer of the façade is a single layer of transparent glass. On the inner side of the façade, a completely transparent layer of tempered double glass is used. No solar protective layers were applied to the glass. Between the inner and outer layer, the specially designed by Köster blinds are placed.

The art of the design was made applying a synergetic effect between the systems and the construction of the towers, which step back at the 16th, 19th and 22nd storeys. The façade package provides optimised heat transmission in every season. It has already proven to be very suitable for Bulgaria's continental climate. Even in the cold winter of 2011-2012, the façade made use of solar radiation to help heat the interiors, says Dimitar Paskalev. The blinds, combined with the Reynaers façade package, successfully control UV rays, reflecting them in the summer and using them to help heat the building in the winter. The building's energy consumption last winter was valued at 70 kWh/m²/year. In milder seasons it has been as low as 40 kWh/m²/year, while the average energy consumption of an office building in Bulgaria is 150-200 kWh/m²/year. The building has been labelled class A.

The RETROSolar blinds, integrated in Reynaers' façade were a crucial element in achieving not only high energy-efficiency, but also a pleasant working environment.



They reflect daylight in such a way that the interiors are lit by diffused natural light, which has greatly reduced the use of artificial light during the day. In addition, light reaches farther into the building's interior (8-9 m instead of the usual 5-6 m), providing more usable square metres.

The efficiency of the building's climate control is also reinforced by the use of a Building Management System (BMS), a network of computers, which monitor and control all heat, light, energy and waste processes. The concept, called 'adaptive façade', comprises five working regimes. Because the build-

ings have their own meteorological station that reports the changing climate conditions, the system can decide which of the possible scenarios will be most effective. The façade solution was extensively tested in the Reynaers Institute and in CSTB in France.

This system makes it possible to adjust the building's behaviour individually in different parts of the building, in relation to the outside climate conditions and the use of the interior. At the same time users have direct control over the environment of their office in terms of light, ventilation and heat. In the words of the architect Paskalev this is one of the factors, which have led to tenants' and users' great satisfaction with the building. ■

SOPHARMA LITEX TOWERS

Architect: **Architectonika Ltd.- Dimitar Paskalev, Sofia**
 Client/Investor: **Sopharma properties REIT; Litex Tower JSC**
 Contractor: **Telecomplect JSC; Markan Ltd., Sofia**
 Façade consultant: **Dr. Helmut Köster - Köster Lichtplanung, Frankfurt**
 Fabricator: **Kristian Neiko - 90 Ltd., Sofia**
 Reynaers systems: **Double skin breathing element facade bespoke solution based on CW 86-EF & CS 86-HI**

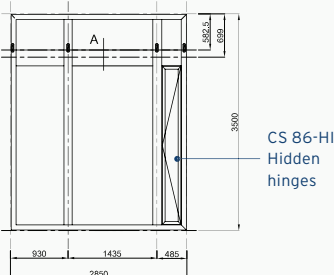
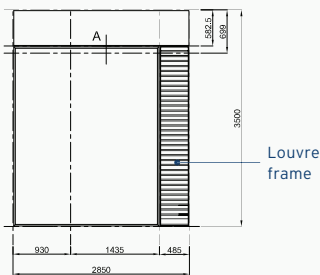
For more information about this project, please visit us at www.reynaers-solutions.com



Interior view;
the RETROSolar
blinds are visible
between the
CS 86-HI profiles
↓

Outside single
glazing façade
↓

Inside double
glazing façade
↓ ↓



PROJECT SOLUTION

System:

- Closed double skin breathing element façade with integrated sun blinds: bespoke solution based on CW 86-EF and CS 86-HI, based on French technology *façades respirantes*
- To obtain improved thermal values, the double skin isn't ventilated but a vapor pressure equilibration is created through openings covered with filters in the bottom of the frames, to avoid unacceptable condensation of the single glass
- AWW tests according to EN 13830:2003 in the Reynaers Institute, including the static seismic tests according to AAMA 501.4-00
- Determination of the condensation risk of the double façade following the French CSTB method

Energy-efficient solution:

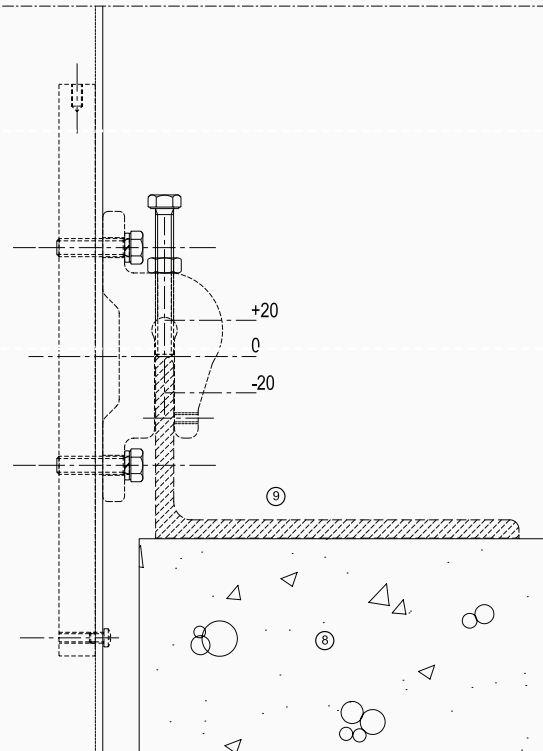
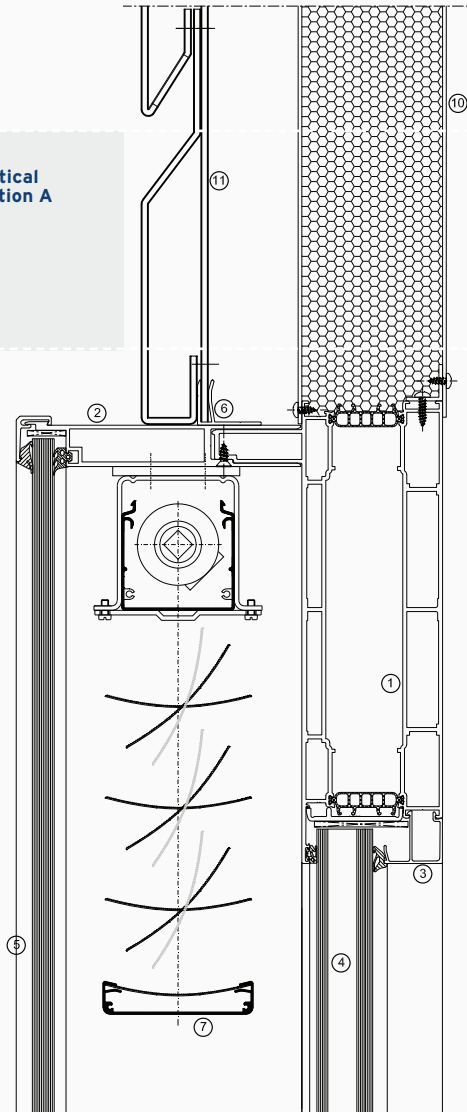
- Buildings have a yearly energy consumption about 60 kWh per m²/year (average for such kind of buildings is 150-200 kWh/m²/year)
- German DGNB* certificate for sustainable construction
- Thermal permeability coefficient of the entire construction: 1.15 W/m²K

Elements:

- Over 1400 elements
- Combined elements of CW 86-EF with opening parts CS 86-HI
- Integrated RETROSolar blinds between the inner and outer façade, and a fixed louver system in front of the ventilation windows (CS 86-HI)
- Weights up to 1000 kg, main elements weigh 772 kg
- Storey high elements: max. dimensions 2800 x 4400 mm
- Special insulation panels with aluminium cladding on the outside and air intake in front of the raised floor

* DGNB Deutsche Gesellschaft für Nachhaltiges Bauen

Vertical
section A



1. Thermal broken T profile
2. Glass frame
3. Glazing bead
4. Vision glass
5. Single glass
6. Screw fixation
7. Sunscreen
8. Concrete floor
9. Bracket
10. Insulation panel
11. Ventilated aluminium cladding