LINUM

Kuurne

Building an office with a stacking warehouse

Status
2018 - 2020

Services:
Building Services, Industrial MEP, Structural

Sectors:
Industry: Logistics

Client:
Linum NV

Architect:
BVBA V2-ARCHITECTEN

Area:
21291 m²

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General

To proactively anticipate the further growth of its four companies, Linum Group built a new headquarters with a centralized storage warehouse at Kortrijk-Noord. Visually and functionally, the limits of concrete were pushed, and energy management and comfort were also at the top of the client's wish list.
By centralizing the dispersed activities on one site, Linum Group aims to work more efficiently. According to the sublime design by V2-architecten, the project comprises an office building with showroom consisting of three floors of 1,000 m2 each, and a second building with a stacking warehouse of 14,000 m2, workspaces on a mezzanine, social areas for employees, and garages for delivery vans and vehicles for logistics transport in the warehouse.

Industrial construction with exposed concrete

The eye-catchers on the new site are the two tall facades of the office building, constructed in exposed concrete. The challenges were diverse. Aesthetically, the client expected a perfect execution with a minimum of air bubbles and hairline cracks, beautifully continuous lining of the formwork panels, and as few visually visible fixing points for the formwork as possible. On a practical level, there was the fact that the fourteen-meter-high walls were cast in place before the structure behind them was erected. This meant that temporarily very heavy shoring was needed to keep this wall stable. During the construction of the structure behind it, a connection was made with these walls on each floor, so that in their final state they are horizontally supported by the structure behind them. Inside the office, standard prefab was not chosen, but rather Deltabeam steel-concrete beams from Peikko. This eliminates the need for sagging beams below the floor slab, allowing free passage of services in the false ceiling.

Perfectly flat floors in the warehouse

The warehouse was built entirely in prefab. Due to the poor quality of the subsoil, pile foundations were necessary. For the partition walls at the front and rear of the building, a possible future expansion was already taken into account. Special attention was paid to the floors. The warehouse operates semi-automatically. Narrow-aisle trucks operating at heights of more than 10m transport goods between different points. They are guided via wiring embedded in the floor. To function optimally, the surface must therefore be and remain perfectly level. That is why the floors in this section are founded on piles, but placed on a sliding support, so they can freely expand and contract to avoid shrinkage cracks. They are industrial floors with Dramix steel fibers replacing standard reinforcement meshes. The floors in the rest of the warehouse were cast conventionally on a crushed stone base on solid ground. In zones where warehouse racks are movable via a rail system, the floor slab was made twice as heavy as normal to counteract differential settlement.

Sun ensures low E-level

On the roof of the warehouse, 854 solar panels are installed, together providing 272 kWpeak. However, the solar yield is distributed via a cascade system. If the offices and showroom in the main building do not fully consume the designated 128 kWp, the remaining capacity is made available to the warehouse and added to the 144 kWp reserved for it. If that sum is not fully consumed in the warehouse, the remainder is fed into the public electricity grid. This splitting of generated power has an important advantage for the client. Because the E-level drops to E-20 in this way, no property tax needs to be paid for the first five years after the building is put into use.

Geothermal energy and thermal inertia for the main building

Under the warehouse and in the designated expansion zone, 112 ground boreholes of 70 meters provide the base temperature for heating and cooling of the main building. Only after those boreholes were the pile foundations installed, which required considerable coordination work. For the showroom, cooling in summer also makes use of the building's inertia, with large surfaces of unclad

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concrete walls and ceiling. Through passive night ventilation, the building's structure is cooled down, reducing the need for active cooling during the day. Flexibility and optimal comfort in the offices. For the layout of the office space, the client expected maximum flexibility. The modularity of the facade determines where partition walls can potentially be placed inside. The services are aligned accordingly and divided into controllable zones. Via the management system, the different zones are grouped into rooms. Each room has a space sensor to keep the temperature comfortable, with the option to choose between cooling and heating. In the offices, this is done via 4-pipe climate ceilings. The main pipes are integrated into the (passive) ceilings in the corridors. By providing all the valves there – separate from the collectors – they are easily accessible. The need for cooling is also reduced through the architecture. This is achieved by the walkway with vertical louvers at the front of the building. In the showroom, the floor provides base heating and cooling. To quickly respond to temperature fluctuations depending on the actual occupancy of the space, this is supplemented with air distributed via textile ducts from Xilio, one of the companies in the Linum Group. Perforations on the bottom and top of the textile ducts, and where necessary jet nozzles on the underside, are intended for cooling and heating respectively. A motorized internal membrane provides the switchover between cooling and heating. The air heating is also necessary to prevent condensation on the showroom windows. The air flow rate is optimally adjusted to the season.

Comfort and safety in the warehouse too

In the offices in the warehouse, fan coil units provide heating and cooling. In the rest of the warehouse, gas-fired air heaters provide a base temperature of at least 5 degrees. Destratification fans create a homogeneous temperature throughout the building by mixing existing and heated air. In the manned zone, radiant panels can provide local heating from 5 to 16 degrees. The warehouse is equipped with an ESFR sprinkler system, in accordance with FM Global regulations. This latest generation of sprinklers works much faster and has a greater water output. Under the warehouse, a 600 m3 water buffer was provided with a suction pit and above it a sprinkler room with a vertical shaft diesel pump that can pump 10,000 liters per minute. In the office, optical point detectors provide fire detection, while in the warehouse this is done via aspiration detection.

Construction partners:

- Linum Group nv (Linum Europe, Plastibac, Xilio, Fermod) (Kuurne) - client
- V2-Architecten (Roeselare) – architect
- Alheembouw (Oostnieuwkerke) – main contractor
- Valcke Prefab Beton (Vlamertinge) – prefab contractor
- Spie Vano (Moeskroen) – electricity
- Quartier (Kuurne) – HVAC / plumbing
- IFPC (Oudenaarde) – sprinkler installation
- Vanhecke (Wingene) - geothermal energy
- BM Engineering (Kortrijk) – structural stability + special services design

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