

ENGINEERING
TOMORROW

Danfoss

Case story | DHP-C Opti ground source heat pump

Luxury, **low carbon**, sustainable apartments

Owners of new apartments using geothermal energy from Danfoss save over 70t in CO₂ emissions per year!

up to

70 t

of CO₂ per year
can be saved with
geothermal heating
from Danfoss

Reside in a quiet place, yet still close to the big cities

Park Suites are located in a pedestrian green area in the center of Londerzeel, a quiet village in Flemish Brabant. Just a 5-minute drive from the Brussels ring road and fifteen minutes away from the Antwerp ring, centrally located between our two largest trading cities. A perfect location for all who want or need be close to the big city but prefer a quiet and smaller environment for daily living.

Park Suites are new apartments with a modern design, consisting of 7 spacious duplex apartments and 41 luxury apartments in a prime location, situated just 150 meters from the local church, in an oasis of green tranquility with bustling Molenbeek in the background. These properties stretch out over a 10 000 sqm area, amidst a beautiful scenic garden.

Park Suites - aesthetically beautiful real estate

'With Park Suites we wanted to offer something for everyone; for those who like to relax behind doors or those who like to potter about in their well-kept garden. Maybe you simply love lots of space and sunlight whilst enjoying your own corner of nature or you are a family that needs lots of space to unravel the chaos of everyday life and eventually relax on a comfy sofa in your spacious living room.' - says Philip Coppens, developer of Park Suites.

Park Suites is a 48 apartment build in 4 blocks surrounded by greenery. Each ground floor apartment and each house has a private patio available in the grounds of the park. All other apartments boast a very spacious terrace. The 14 penthouse sun lit roof terraces have an area of 40 sqm up to an impressive 104 sqm, with a built in pool as optional. Typical for Park Suites architectural design are the large windows in each apartment and the modern design of the buildings. *'The large windows are remarkable, they let light permeate inside the rooms. This is always a character of my way of working in architecture, we let the sun flood inside, but retain privacy that's why the level is different for bicycles and pedestrians, a difference of 1,2 m. Together with the natural habitat you get a hidden terrace.'* says architect Paul Schellekens.

One of criteria when designing Park Suites was to hide the parking area and



Park Suite – 1st phase



Living room in apartments

access roads. The area which surrounds the buildings is for people and pedestrians. Tenants can enjoy aperitifs with friends or sun bathe in their own park. The park is very quiet, thanks to the underground garage. Each home has private access to the underground garage and to its front door, tenants can drive up to their private parking lot and enter the lift that stops automatically at the right floor, giving everybody maximum privacy and security.

'The aim is for Pure Estates not to be commercial mass production, I have no ambition to place large real estate projects on legs, I want to create practically beautiful and eloquent places, not a one size fits all typical home, every house or apartment must be unique.' Philip comments.

Energy efficiency, comfort and environmental foot print awareness

These new apartments were built with

the aim of providing the owners with maximum comfort. All 48 apartments are equipped with a separate geothermal heat pump, that can heat their homes, produce domestic hot water and in summer everybody may enjoy the comfort of natural passive cooling. As the apartments have large windows and are very well insulated, they tend to accumulate heat surplus during summer. Without the passive cooling some apartments will heat up to 28 °C, which is not comfortable at all. Thanks to the geothermal heat pump you can keep the houses cooled to 23 °C. As the heating is passive only 2 circulation pumps are running and you can cool your home for less than 30€ on a yearly basis. The major advantage of passive cooling is that is significantly cheaper (10 times) than the use of traditional air-conditioning. Floor cooling is also the most comfortable way to cool your home as there is no air movement, noise or drainage for condensation.



Kitchen, bath room and bedroom



Dining room

'Previously we lived in a single family house where we had to purchase 4 000 liters of oil (at an additional cost of 2 200 to 3 000€) and today living in the apartment, my electricity bills are exactly the same as the electricity bills in the house, but they cover electricity, heating and hot water' – says Luc Guns owner of a new 130 sq meter apartment and adds '...also there is a much higher level of comfort with the floor heating and a completely new pleasant surprise for me is the passive floor cooling. I can recommend this to everybody.'

One of the biggest challenges was to connect the brine circuits to all 48 apartments. All 48 boreholes were drilled before the construction, underneath the huge cellar. The construction project was split into

2 phases. The drilling for phase 2 had to be made during phase 1, as there was not enough space. It also required a precise location for the boreholes and calendar planning as all the drilling had to be completed just before the developer started with the fundamentals. All the brine connections at borehole level had to be made in advance, and afterwards, when construction was finished, the brine circuits were connected to the manifolds on separate floors.

'Heat for 3 apartments is extracted from one borehole loop. Most of the time the heat pumps are not running simultaneous, resulting in a much higher brine temperature. Even in January the incoming brine temperature never drops below 6°C.'



...we can use geothermal energy for heating and cooling while securing a high level of comfort for the tenants, we can reduce CO₂, we can lower E-peil*, we have no need for a gas installation on the premises nor any chimney installations. In retrospect, I can say yes! it was totally worth it.

Says a smiling Philip Coppens



This results in a higher brine temperature and the benefit is an increased annual efficiency for each heat pump, meaning lower energy consumption and energy bills' says Luc Van de Velde from Ecoterm, responsible for heating system installations.

'Exacting heat pumps for this project we could 'kill two birds with one stone, or even more than two' says a smiling Philip Coppens and adds: '... we can use geothermal energy for heating and cooling while securing a high level of comfort for the tenants, we can reduce CO₂, we can lower E-peil, we have no need for a gas installation on the premises nor any chimney installations. In retrospect, I can say yes! it was totally worth it.'*



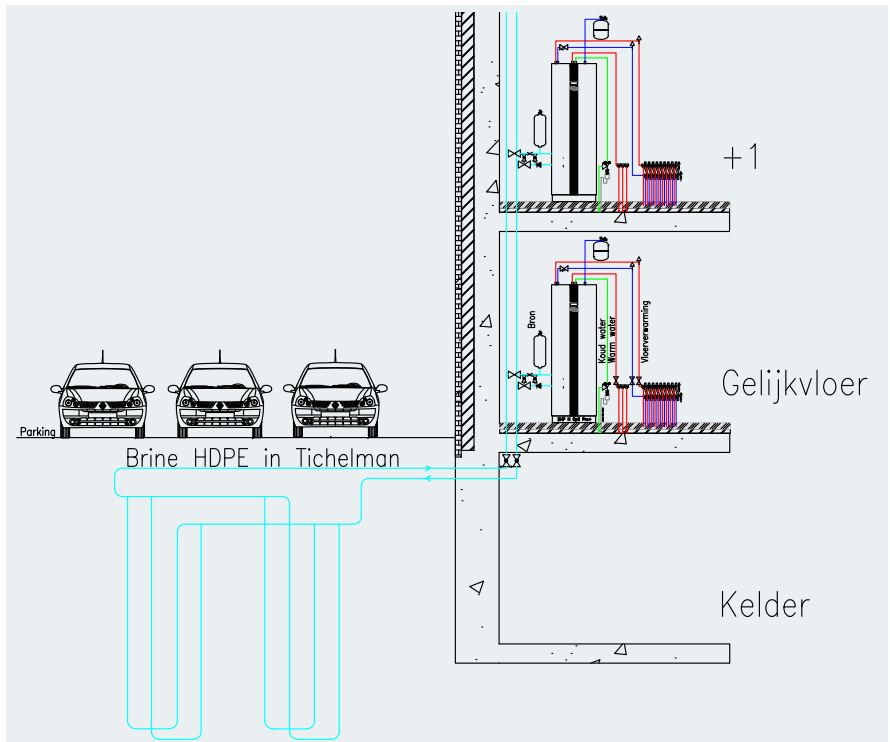
DHP-C Opti gorund source heat pump



Drilling for ground source heat pumps

Fact box

- Location:** Londerzeel, Belgium
- Developer:** Pure Estate
- Architects:** Paul Schellekens and M-10 architecten
- New build:** 2014 – 2017
- Heated area:** 48 apartments, 110 to 180 m² heated, totally 6 800 m² heated
- Renewable energy sources:** 48 Danfoss DHP-C Opti 8 ground source heat pumps
- Drilling:** 48 boreholes each 145 m deep, totally 6 960 m of drilling
- PV-panels:** 500 m²
- Heating system components:**
 - floor heating - 60 000 m Danfoss multi layer pipe
 - 180 Danfoss TWA thermal actuator
 - 52 Danfoss FHF manifolds
- CO₂ emissions saved per year compared with gas: 70 t**



System Solution: Danfoss DHP-C Opti, TWA thermal actuator, FHF manifolds

* E-peil (energieprestatiepeil) is a Belgium rating system that ranks building energy classes with financial incentives from the government.

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