Student house Marne La Vallée

by Adrien Henocq / 2015-06-30 11:14:27 / France / 16198 / FR

Primary energy need :

75.1 kWhep/m².an

(Calculation method :)

ENERGY CONSUMPTION

Economical building *Building*

< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Energy-intensive building

Building Type : School, college, university
Construction Year : 2013
Delivery year : 2014
Address 1 - street : Boulevard Descartes 77420 CHAMPS SUR MARNE, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 1 977 m²
Construction/refurbishment cost : 4 200 000 €
Number of Pupil : 77 Pupil
Cost/m2 : 2124.43 €/m²

Certifications :

General information

This is the reconversion of an old farmhouse in order to install there the House of Students of Paris Est Marne-La-Vallée. The main buildings have been preserved except the East Wing whose condition did not allow the conservation. The reconstructed parts respect the initial morphology of the frame. Conserving these buildings is primarily afford the luxury of large volumes and beautiful frames. The first step consists in taking up the building underpinning work and to cover a unitary roof over the entire length. This unitary unit covers old and new construction, provides light, gives thermal and acoustic comfort. The roof acts as a regulator: it is covered with an expanded aluminum mesh whose geometry allows effective sun protection in summer and let the light penetrate in winter.
It is a tchnical roof under which circulate ventilation network and cable ducts. This principle allows the walls to keep their massiveness without having to rip them again. This takes advantage of their tremendous inertia. Lined with concrete of hemp complex and with lime-hemp coating, walls also act as regulators and allow hygric exchange between inside and outside: the walls breathe.
This lining coverage fits well with the walls and contrasts with the correctness of the roof. Extensible, lime allows the deformations of the frame associated to all these transformations.
In new parts, pumice stone blocks and the use of raw and natural materials complete the structure.

At the time of the «throwaway society», the project is designed as a tool for students capable of evolving with the practices and changes in allocations. The result is a building for a very long time.

Sustainable development approach of the project owner

LABEL HQE Commercial building

Architectural description

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Stakeholders

Stakeholders

Function : Contractor

Région Ile de France

http://www.iledefrance.fr/

Function : Contractor representative

Icade Promotion

http://www.icade.fr/activites/promoteur-projets-immobiliers

Energy

Energy consumption

Primary energy need : 75,10 kWhep/m^2.an

Primary energy need for standard building : 130,00 kWhep/m^2.an

Calculation method :

Initial consumption : 180,00 kWhep/m^2.an

Envelope performance

Envelope U-Value : 0,43 $W.m^{-2}.K^{-1}$

Renewables & systems

Systems

Heating system :

- Condensing gas boiler

Hot water system :

- Individual electric boiler

Cooling system :

- No cooling system

Ventilation system :

- Nocturnal Over ventilation

- Humidity sensitive Air Handling Unit (Hygro B
- Double flow heat exchanger

Renewable systems :

- No renewable energy systems

Solutions enhancing nature free gains :

La ventilation double flux est reservée aux grands volumes existants de manière à recuperer la chaleur du bâtiment sous toiture. Le vitrage est à faible émissivité et protection par résille en aluminium déployé et protections solaire.

Smart Building

BMS :

Building thermal management allows the detection of malfunctions in heating networks, ventilation, plumbing and current high/low and record consumption by item.

Environment

Urban environment

The building is built in the heart of the Campus of the City of Paris Descartes Marne la Vallée. The building promotes the history of the farm and of the Upper House whose influence has marked the territory.

Products

Product

Hemp concrete

BCB Tradical

http://www.bcb-tradical.com/fr-contacts.html

http://www.bcb-tradical.com

Product category : Second œuvre / Cloisons, isolation

Hemp concrete is an insulating building material in the mass. Called sometimes eco-hybride1 (because compound of a plant product and an mineral binder) he is composed of shives (central and wooded parts of the rod of hemp, very light and insulating because of a rich capillary size of 10 µm and 50 µm) and aerial and hydraulic lime. It is an alternative to conventional materials. It finds its place in wide range of construction solutions satisfying the need for energy conservation, the need for sustainable development and the demand for building healthy habitat. This material is used for the construction of buildings labeled «BBC Effinergie», according to RT 2012 thermal regulations in application for all types of construction from January 1, 2013.

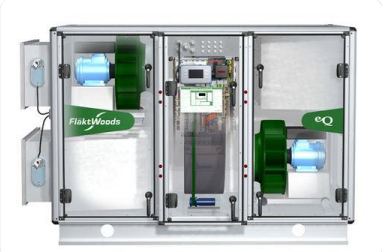
In study phase the building owner accepted this requirement taking into account the reservations of the control office, reservations that were raised due to the production by the PV manufacturer and technical advice in the end phase study.

Central air handling - EQ Prime

Flätz woods

info.fr@flaktwoods.com

http://www.flaktwoods.com/



Product category : Génie climatique, électricité / Ventilation, rafraîchissement

Simple or integrated air handling unit, energy recovery and advanced control for all types of building equipment. Proposed in 17 sizes on flow ranges from 400 to 32,000 m3 / h. Preconfigured components combining single and double boxes flow records, rotary recovery units or plates, fans, batteries, filters and silencers, integrated in an envelope of various sizes equipped with watertight doors with ergonomic handles. With a permanent magnet motor.
Digital control system communicating on Web server via open protocol (OPC, BACnet, LonWorks or Modbus). Laying plug and play equipment in technical room or outside.

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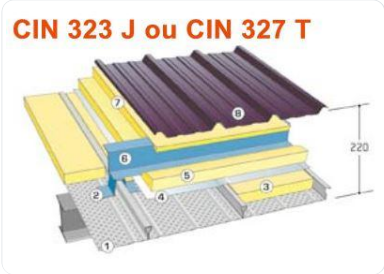
Roofing ARVAL CIN 323J - System Globalroof

ARVAL

france@arcelormittal.com



http://ds.arcelormittal.com/construction/france/language/FR

Product category : Gros œuvre / Charpente, couverture, étanchéité

The GLOBALROOF Acoustic and thermal systems are multi-skin steel roofing solutions. These complexes possess high performance not only thermal insulation but also, if desired, acoustic treatment, both in isolation in absorption. The GLOBALROOF Acoustic and thermal systems can provide a personalized response to the requirements of thermal and acoustic regulations in force. They usually consist of an incorporated inner skin seal support or HACIERBA trays, thermal insulation may include several insulators beds, possible intermediate spacers and a roof profile or membrane sealing.

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Cogetherm

Cogetherm

cogebloc@wanadoo.fr

http://www.cogetherm.com

Product category : Gros œuvre / Structure, maçonnerie, façade

THE PROCESS COGETHERM, SELF-INSULATION PUMICE STONE BLOCK. It isolates you for life with exemplary consistency. The implementation is done while pumice stone: COGETHERM® blocks, insulating mortar, concrete and all the accessories that are used for installation. The only one to offer a construction with a unique material. Therefore, your building has a very high thermal coefficient. It is the only product that filled up the thermal regulations. Do not fear the shocks, it is safe, completely fireproof: classified M0. Composed of 92% of naturally insulating pumice stone and 8% pure clinker. It does not pollute the manufacture, does not undergo cooking. No addition of polystyrene or other polluting materials. 100% recyclable, it consumes the manufacture 4 to 7 times less energy than other monomurs manufacturers.

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Costs

Construction and exploitation costs

Total cost of the building : 4 200 000 €

Health and comfort

Indoor Air quality

Insulation and finishing work products improve the quality of indoor air: The hemp concrete and hemp-lime plaster, and partitioned space and suspended ceilings CLINEO type Knauff participates to a decrease of VOC in the building throughout the life cycle.

Comfort

Health & comfort : The light quality has been checked by FLJ calculations by local and according to occupation modes (offices, multifunctional hall, dance hall ...). The summer comfort is ensured by the expanded aluminum mesh which protects the roof of sunlight in the summer period. The buildings are all through and the natural ventilation is optimized.

Calculated thermal comfort : Voir RT jointe

Acoustic comfort : The acoustic comfort target reaches the level « efficient» with an improvement of 3dB: offices have suspended acoustic ceilings on over 75% of surface and 50% for traffic (organic panels from Knauff: sound absorption index balanced, according to NF EN ISO 11654: µW > 1.00) The entire roof is treated with a complex of CIN in ARVAL 323J, with micro-perforated plate plus mineral wool soffit . The use of lime-hemp coating also improves the acoustic comfort inside.

Carbon

Life Cycle Analysis

Eco-design material : BCB Trafical hemp concrete and lime-hemp coating, pumice stone type Cogébloc, wood certified Douglas et Mélèze, Tarkett Linoleum

Contest

Reasons for participating in the competition(s)

Mainly renovated building meets the requirements of THPE 2005 label. He is certified by Certivéa HQE tertiary building and responds primarily to the requirements of a bioclimatic architecture to get the most passive inputs. In winter the roof glazing 4/16/4 heats up under the effect of the light and is protected from the highest sun's rays in summer by the mesh material that ensures its solar shading function.
The air space (+ de14cm) between the roof and fishnet ensures natural cooling of the roof by convection. However, this solar shading function was taken into account in the regulatory calculations only in the form of solar factor for glazings while the reality is more complex. This roof hides all installations (primary ventilation, fresh air intake and extraction, ...).
The existing buildings are insulated with hemp concrete covered with lime hemp coats (Tradical BCB) which encourages hygric exchanges between inside and outside throughout the year for better thermal comfort. The thickness of existing walls is utilized to provide the inertia to all the building. The hemp concrete works like a carbon sink and significantly improves the quality of indoor air.
In rebuilt parts the insulation is made with pumice blocks (Cogetherm block) that require very little fossil energy for processing.
On all large volumes, these construction systems optimize the performance of two condensing boilers that are combined to a double flow ventilation with heat recovery. No cooling system is provided, with the exception of night operation cooling of air handling units. The inertia of the buildings allows an extraordinary phase of «déphasage».
In addition, natural ventilation is highlighted by time-delayed opening systems arranged on the roof on North sides. It allows the evacuation of the heat accumulated in the roof space by an additional air-wash during heat waves.
The frames have been preserved, redressed and renovated in situ with wooden pieces from the demolished lots.
The windows are made from powder-coated steel with thermal breaks to combine high reliability and performance.
Finishings products are often left raw and they come from suppliers with a high commitment in recycling processes (acoustic insulation Organic, partitions and suspended ceilings Cleaneo from Knauf, linoleum floors).
The layout is made with entire panels to limit falls.
The steel roofing complex and the aluminium rooftop raw were chosen for they good lifetime and an infinite variety of possibilities of recyclability.

Building candidate in the category

Matériaux bio-sourcés et recyclés

Green Building Solutions Awards 2015
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