

# Project documentation

物件記録



## Abstract | プロジェクト概要



### Hamamatsu Passive House

The First Passive House Project in Hamamatsu City by COTTON HOUSE Co., Ltd.

#### Data of building | 物件データ

|                                     |                               |   |                                     |
|-------------------------------------|-------------------------------|---|-------------------------------------|
| Year of construction<br>竣工年         | 2024                          | <b>Space heating</b><br>年間暖房需要                              | <b>12</b><br>kWh/(m <sup>2</sup> a) |
| U-value external wall<br>U-value 外壁 | 0,203<br>W/(m <sup>2</sup> K) |   |                                     |
| U-value basement<br>U-value 床または基礎  | 0,347<br>W/(m <sup>2</sup> K) | Primary Energy Renewable (PER)<br>総一次エネルギー消費量(PER)          | 47<br>kWh/(m <sup>2</sup> a)        |
| U-value roof<br>U-value 屋根          | 0,114<br>W/(m <sup>2</sup> K) | Generation of renewable Energy<br>再生可能エネルギーによる創エネ           | 0<br>kWh/(m <sup>2</sup> a)         |
| U-value window<br>U-value 窓         | 1,10<br>W/(m <sup>2</sup> K)  | Non-renewable Primary Energy (PE)<br>旧基準による総一次エネルギー消費量 (PE) | 93<br>kWh/(m <sup>2</sup> a)        |
| Heat recovery<br>換気熱交換効率            | 68 %                          | Pressurization test n <sub>50</sub><br>気密性能 n <sub>50</sub> | 0,37 h <sup>-1</sup>                |
| Special features<br>特記事項            |                               |   |                                     |

## Brief Description

### Hamamatsu Passive House

The first passive house project in Hamamatsu City, Shizuoka Prefecture. This project is located in a relatively mild climate region, with a strong emphasis on summer standards. The exterior wall specifications include two types: EIFS and tile cladding, and the roof shapes are roof balconies and shed roofs. It is a project that directly confronted a variety of details.

The project site is classified as one of the regions in Japan with the highest solar exposure. Due to the ample sunlight available in winter, meeting the heating demand is relatively easy. Conversely, addressing the cooling and dehumidification demand becomes more challenging. To mitigate this, a combination of external blinds and roller shades is used for solar shading, while heat dissipation from the slab into the ground is effectively utilized to manage the high cooling and dehumidification load.

## 物件概要

### 浜松パッシブハウス

#### 浜松市で初めてのパッシブハウスプロジェクト

このプロジェクトは、比較的温暖な気候の地域にあり、夏の基準を特に重視して設計されています。外壁仕様には、EIFS(外断熱システム)とタイル仕上げの2種類があり、屋根の形状もまたルーフバルコニーと片流れ屋根の2種類があります。

多様な納まりに対して真正面から向き合ったプロジェクトです。

本計画地は、日本国内において最も日照が確保できる区域に分類される。冬季の日照が十分に得られるため、暖房需要を満たすことは容易である。一方で、冷房・除湿需要への対応はより難しくなる。そのため、日射遮蔽には外付けブラインドとロールシェードを併用し、さらにスラブ面から地中への放熱を有効活用することで、高い冷房・除湿需要に対応している。

## Responsible project participants

### 物件関係者

|   |   |
|---|---|
| Architect<br>基本設計者                                | COTTON HOUSE Co., Ltd.<br><a href="https://www.cotton-house.jp">https://www.cotton-house.jp</a> |
| Implementation planning<br>実施設計者                  | L'art de vie LLC<br><a href="https://www.lartdevie.info">https://www.lartdevie.info</a>         |
| Building systems<br>設備設計者                         | Simsim Inc.<br><a href="https://simsim-hevac.com">https://simsim-hevac.com</a>                  |
| Structural engineering<br>構造設計者                   | L'art de vie LLC<br><a href="https://www.lartdevie.info">https://www.lartdevie.info</a>         |
| Building physics<br>建築物理                          | L'art de vie LLC<br><a href="https://www.lartdevie.info">https://www.lartdevie.info</a>         |
| Passive House project planning<br>パッシブハウス・コンサルタント | Masaomi Furusho   |
| Construction management<br>現場監理                   | COTTON HOUSE Co., Ltd.<br><a href="https://www.cotton-house.jp">https://www.cotton-house.jp</a> |

## Certifying body

### 認定機関

Passive House Japan  
[www.passivehouse-japan.org](http://www.passivehouse-japan.org)

## Certification ID

### PHデータベース ID

**7551**

Project-ID ([www.passivehouse-database.org](http://www.passivehouse-database.org))  
Projekt-ID ([www.passivhausprojekte.de](http://www.passivhausprojekte.de))

## Author of project documentation

### 本物件記録の作成者

Masaomi Furusho

Date  
日付

Signature  
署名

20.02.2025

# 1. Ansichtsfotos 外観写真



View from Northwest



View from Southwest

## 2. Innenfoto exemplarisch 内観写真



Dining & Kitchen

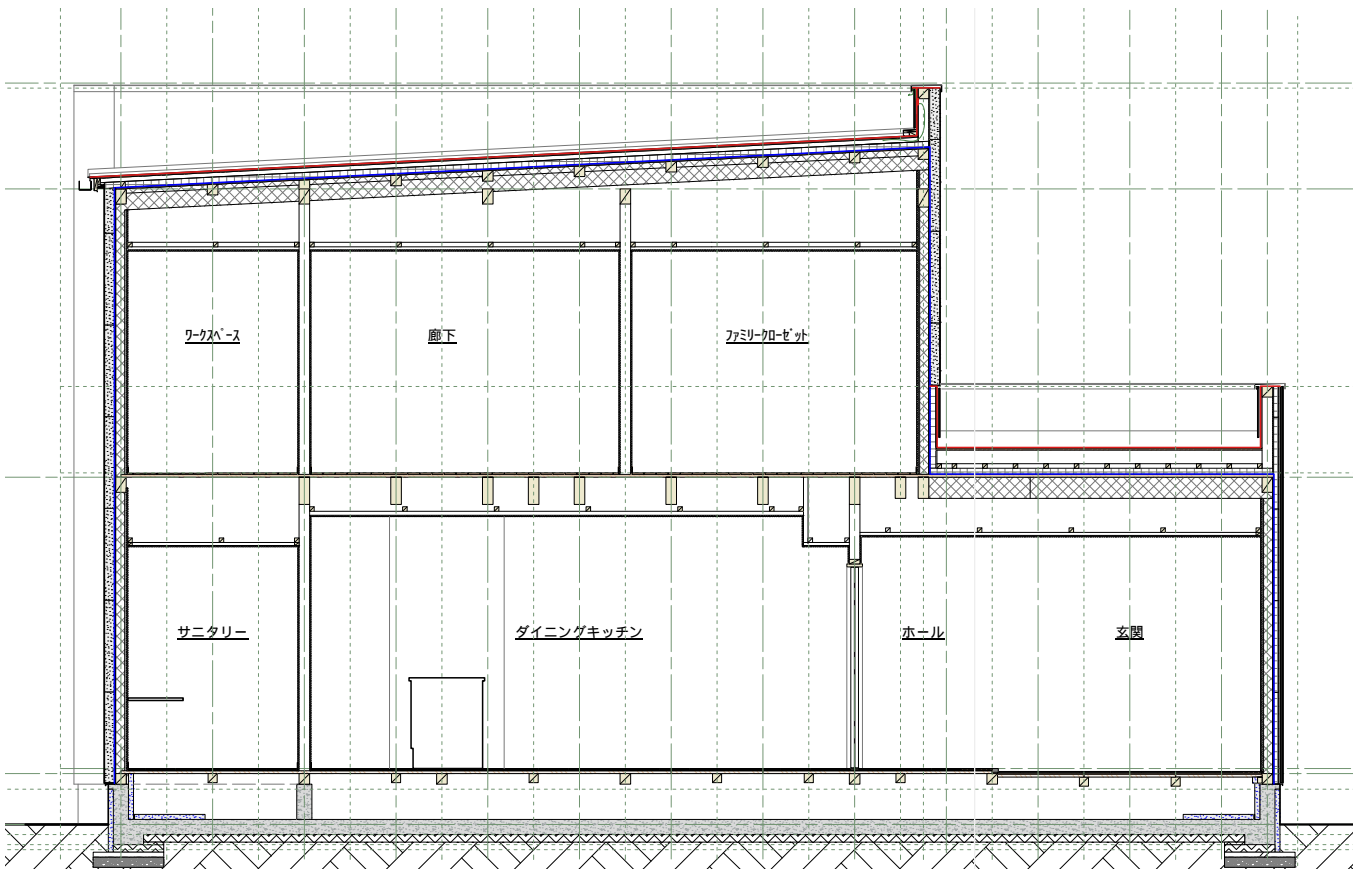
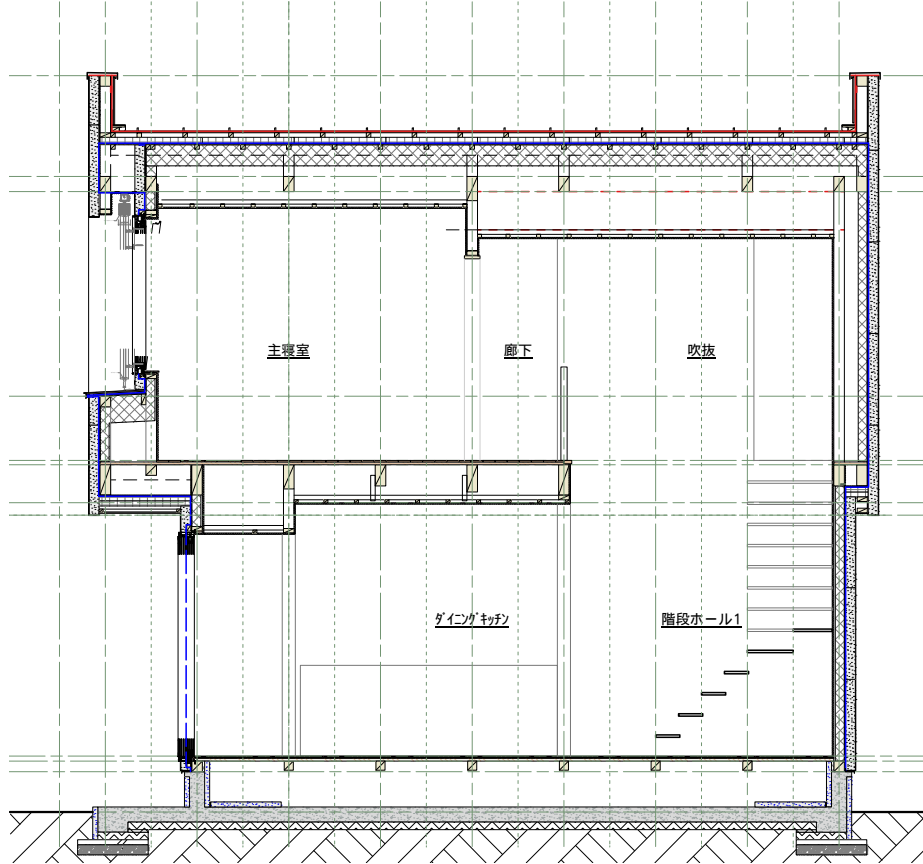


Staircase landing

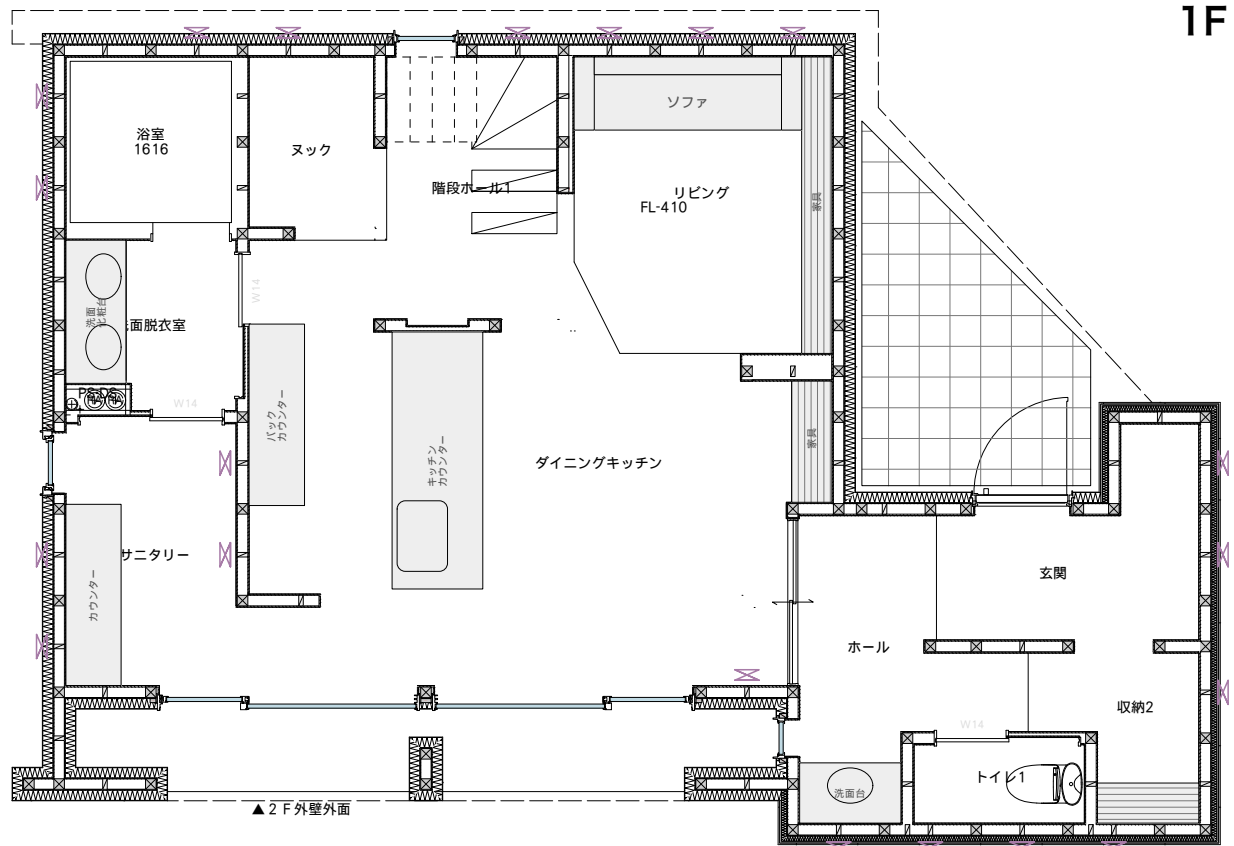
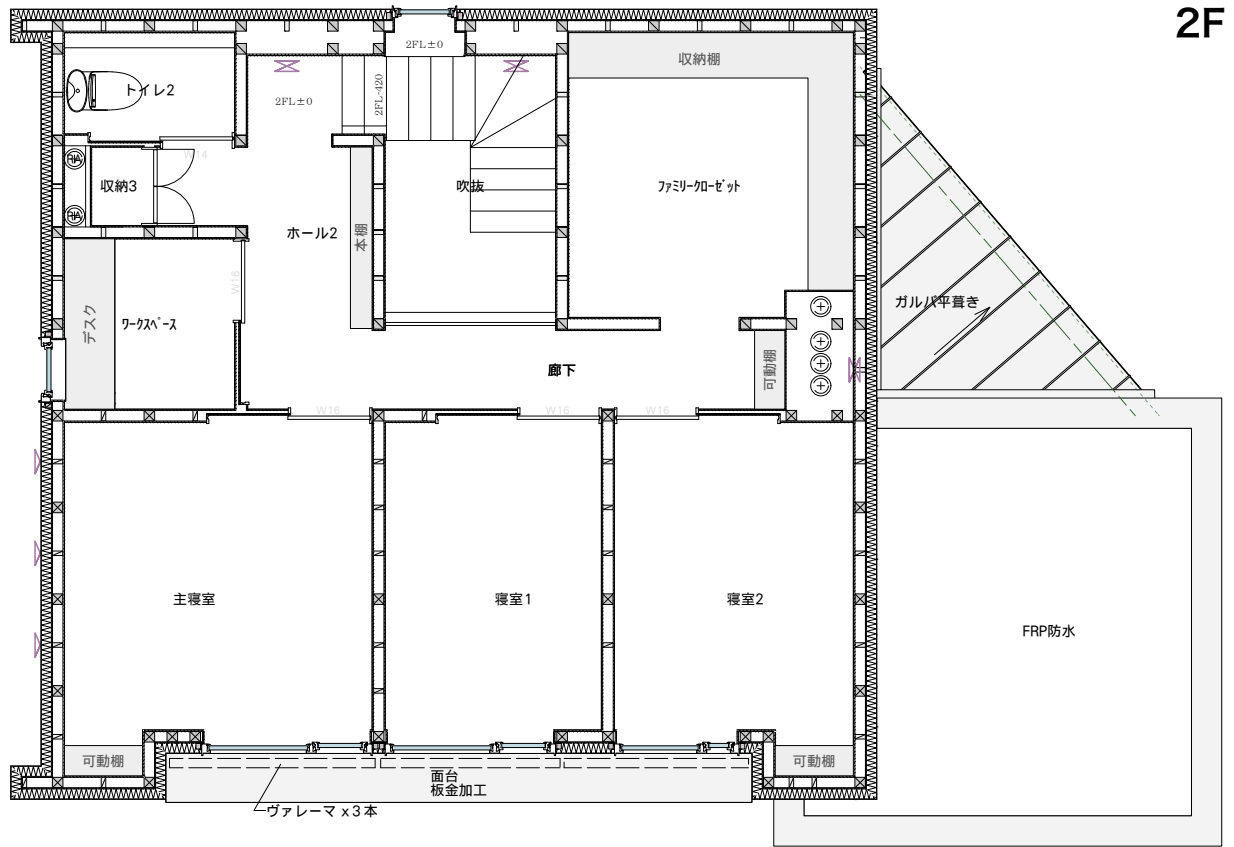


Entrance

### 3. Cross-section view 断面図



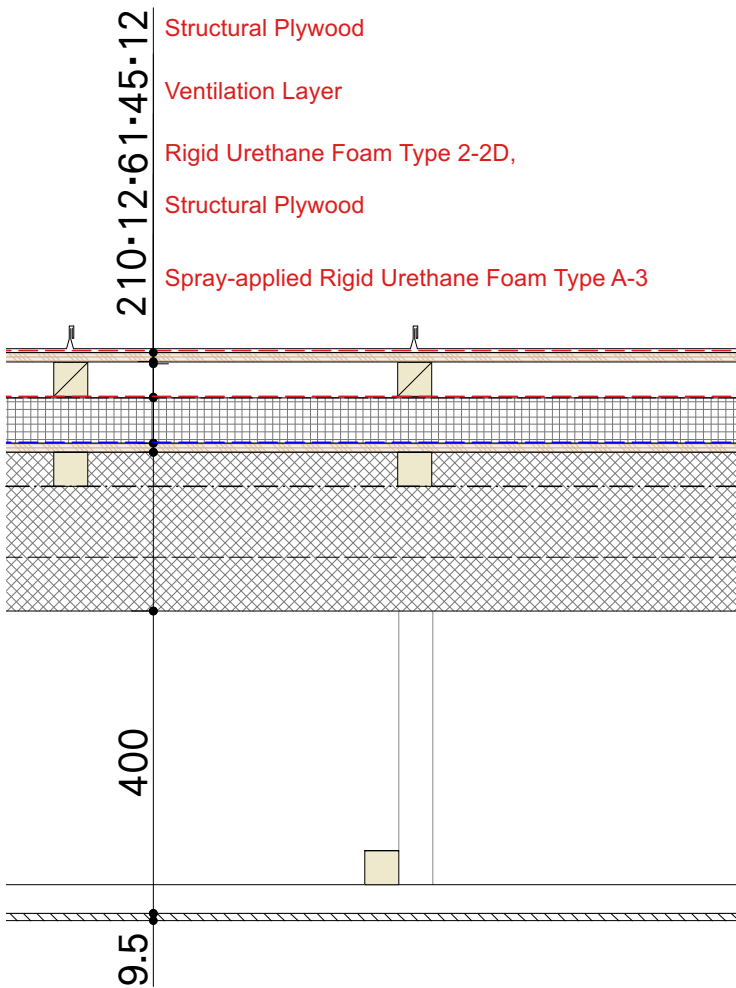
# 4. Floor-plan 平面図







## 7. Roof Composition 屋根の構成



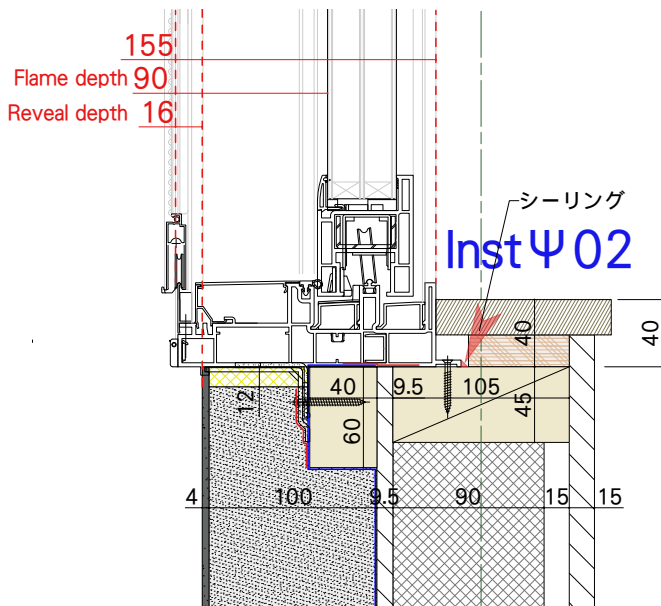
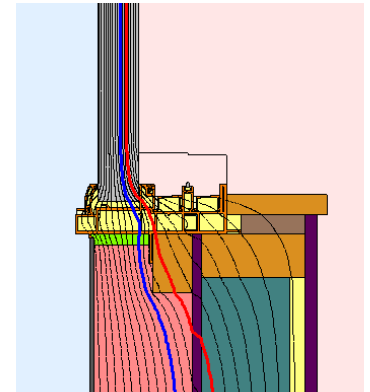
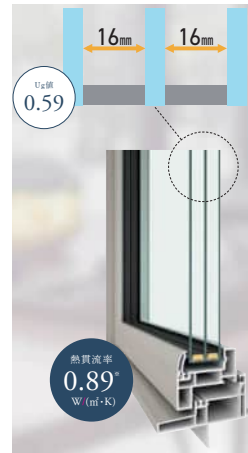
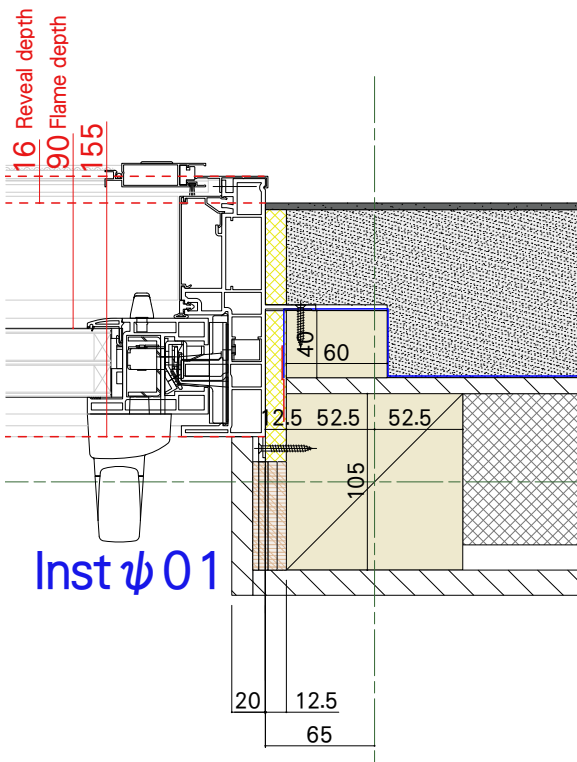
To ensure the roof functions as a horizontal diaphragm, a construction method is adopted in which structural plywood is directly attached to the rafters. The insulation system consists of 210mm of site-sprayed polystyrene foam applied beneath the plywood and an additional 61mm layer of XPS installed above it. A ventilation layer is then incorporated, followed by a plywood substrate and a sheet metal roof.



気密シート&屋根断熱  
Q1ボード t61  $\lambda$ 0.021

| 部位番号                                       |                    | 12UUU01          |                    |                     | 08ud               |                      | 表面熱抵抗[m <sup>2</sup> K/W] |  | 内断熱? |  |
|--|--------------------|------------------|--------------------|---------------------|--------------------|----------------------|---------------------------|--|------|--|
| 外皮の方位                                      |                    | 1-屋根             |                    | 室内側 R <sub>si</sub> |                    | 0.13                 |                           |  |      |  |
| 外部条件                                       |                    | 3-通気層            |                    | 屋外側 R <sub>se</sub> |                    | 0.13                 |                           |  |      |  |
| 断面構成 1                                     | $\lambda$ [W/(mK)] | 断面構成 2 (オプション)   | $\lambda$ [W/(mK)] | 断面構成 3 (オプション)      | $\lambda$ [W/(mK)] | 厚み [mm]              |                           |  |      |  |
| Rigid Urethane Foam Type 2-2D              | 0.021              |                  |                    |                     |                    | 61                   |                           |  |      |  |
| Structural Plywood                         | 0.170              |                  |                    |                     |                    | 12                   |                           |  |      |  |
| Spray-applied Rigid Urethane Foam Type A-3 | 0.038              | Softwood conifer | 0.130              |                     |                    | 45                   |                           |  |      |  |
| Spray-applied Rigid Urethane Foam Type A-3 | 0.038              |                  |                    |                     |                    | 165                  |                           |  |      |  |
| Air  | 2.450              |                  |                    |                     |                    | 400                  |                           |  |      |  |
| Gypsum Board                               | 0.221              |                  |                    |                     |                    | 9.5                  |                           |  |      |  |
| 断面1の割合                                     |                    | 断面2の割合           |                    | 断面3の割合              |                    | 合計                   |                           |  |      |  |
| 90%  |                    | 9.9%             |                    |                     |                    | 69.3 cm              |                           |  |      |  |
| U値の補正                                      |                    | U値:              |                    | 0.114               |                    | W/(m <sup>2</sup> K) |                           |  |      |  |

## 8. Window and its fit diagram 窓とその収まり図



The YKK Corporation APW430 window, which is readily available in Japan, has been selected for this project. While it offers top-tier performance among widely used domestic products, it is undeniable that its performance falls short compared to high-performance windows from overseas. However, it provides superior cost-performance relative to foreign products, making it the optimal choice considering the balance between price and performance.

|  |                                    |
|--|------------------------------------|
| 窓 (フレーム) の製品タイプ / 製品名 / 窓の種類<br>product type of the window (-frame, product name)/ window type | PVC window frame APW430 Sliding    |
| フレームのU値 (Uf)<br>U-Value of frame Uf  | 1,57 w/m <sup>2</sup> K            |
| ガラス構造の種類<br>Construction type glazing  | 3-times thermal insulation glazing |
| ガラスのU値 (Ug)<br>U-Value of glass/ Ug  | 0,91 w/m <sup>2</sup> K            |
| ガラスのg値 (太陽熱取得率)<br>g-Value of glazing  | 0,57                               |

# 9. Airtightness Measurement Result 気密測定結果

## Blower Door Test Report according to JIS A2201

|   |                          |                                      |                          |
|---|--------------------------|--------------------------------------|--------------------------|
| <b>Date:</b> 2024.01.17                       |                          |                                      |                          |
| <b>Object Name:</b>                           | 浜松バッドハウス                 | <b>Technician:</b>                   | 前川 貴博                    |
| <b>Inside Temperature (°C):</b>               | 18.5°C                   | <b>Wind direction:</b>               | 北北西                      |
| <b>Outside Temperature (°C):</b>              | 14.4°C                   | <b>Wind speed (m/s):</b>             | 0m/s                     |
| <b>Barometric Pressure (hPa):</b>             | 1028.5hPa                | <b>Weather:</b>                      | 晴れ                       |
| <b>Depressurization</b>                       |                          | <b>Pressurization</b>                |                          |
| <b>Zero Flow Pressure Difference</b>          |                          | <b>Zero Flow Pressure Difference</b> |                          |
| <b>At the Beginning ( Pa )</b>                | <b>At the End ( Pa )</b> | <b>At the Beginning ( Pa )</b>       | <b>At the End ( Pa )</b> |
|   |                          |                                      |                          |
| <b>Zero Flow automatically set? (yes/no):</b> | yes                      | <b>Device Name (if yes):</b>         | KNS-5000G(コーナー札幌)        |

| Sets of Measurement |         |                   |                  |                   |                  |                   |
|---------------------|---------|-------------------|------------------|-------------------|------------------|-------------------|
| Depressurization    |         |                   |                  |                   |                  |                   |
| Measurement         | 1       |                   | 2 (if necessary) |                   | 3 (if necessary) |                   |
|                     | ΔP [Pa] | Fan Flow Q [m³/h] | ΔP [Pa]          | Fan Flow Q [m³/h] | ΔP [Pa]          | Fan Flow Q [m³/h] |
| Measurement point   |         |                   |                  |                   |                  |                   |
| 1                   | 20.2    | 41                | 51               | 91                |                  |                   |
| 2                   | 27      | 59                | 58.8             | 102               |                  |                   |
| 3                   | 3.1     | 76                | 69.3             | 118               |                  |                   |
| 4                   | 42.3    | 84                | 79.4             | 127               |                  |                   |
| 5                   | 49.5    | 97                | 92.8             | 158               |                  |                   |

| Characteristic value                    | 1  |            | 2     |            | 3     |            |
|---|----|------------|-------|------------|-------|------------|
|   | ΔP | Fan Flow Q | ΔP    | Fan Flow Q | ΔP    | Fan Flow Q |
| n (1 ≤ n ≤ 2)                           |    |            | 1.07  |            | 1.13  |            |
| Air permeability a [m³/h·Pa¹/n]         |    |            | 2.5   |            | 2.8   |            |
| ΔP=9.8Pa Ventilation volume Q9.8 (m³/h) |    |            | 21.7  |            | 20.9  |            |
| coefficient b                           |    |            | 0.688 |            | 0.691 |            |
| ΔP=50Pa Ventilation volume Q50 (m³/h)   |    |            | 100   |            | 88    |            |
| Q50 (m³/h) Average                      |    |            |       |            | 94    |            |

| Pressurization    |         |                   |                  |                   |                  |                   |
|-------------------|---------|-------------------|------------------|-------------------|------------------|-------------------|
| Measurement       | 1       |                   | 2 (if necessary) |                   | 3 (if necessary) |                   |
|                   | ΔP [Pa] | Fan Flow Q [m³/h] | ΔP [Pa]          | Fan Flow Q [m³/h] | ΔP [Pa]          | Fan Flow Q [m³/h] |
| Measurement point |         |                   |                  |                   |                  |                   |
| 1                 | 19.5    | 41                |                  |                   |                  |                   |
| 2                 | 26.8    | 54                |                  |                   |                  |                   |
| 3                 | 34.9    | 67                |                  |                   |                  |                   |
| 4                 | 41.6    | 78                |                  |                   |                  |                   |
| 5                 | 49.3    | 94                |                  |                   |                  |                   |

| Characteristic value                    | 1  |            | 2     |            | 3  |            |
|---|----|------------|-------|------------|----|------------|
|   | ΔP | Fan Flow Q | ΔP    | Fan Flow Q | ΔP | Fan Flow Q |
| n (1 ≤ n ≤ 2)                           |    |            | 1.14  |            |    |            |
| Air permeability a [m³/h·Pa¹/n]         |    |            | 3     |            |    |            |
| ΔP=9.8Pa Ventilation volume Q9.8 (m³/h) |    |            | 22.3  |            |    |            |
| coefficient b                           |    |            | 0.687 |            |    |            |
| ΔP=50Pa Ventilation volume Q50 (m³/h)   |    |            | 93    |            |    |            |
| Q50 (m³/h) Average                      |    |            |       |            | 93 |            |

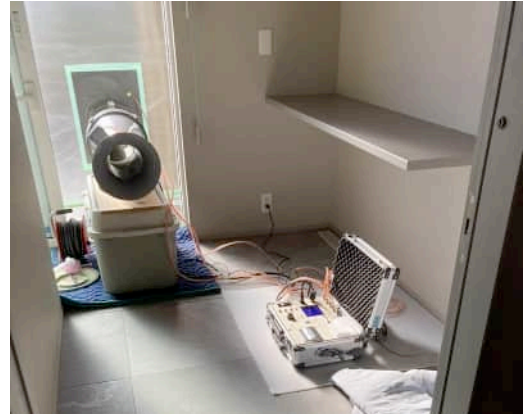
|                  |                                     |             |                                       |             |
|------------------|-------------------------------------|-------------|---------------------------------------|-------------|
| <b>Results</b>   | <b>Net Air Volume V<sub>n</sub></b> |             | <b>252.107 m³ (according to PHPP)</b> |             |
|                  | Q50                                 | Uncertainty | n50                                   | Uncertainty |
|                  | m³/h                                | %           | 1/h                                   | %           |
| Depressurisation | 94                                  |             | 0.37                                  |             |
| Pressurisation   | 93                                  |             | 0.37                                  |             |
| Average          | 93.5                                |             | 0.37                                  |             |

|                                  |                                      |  |            |  |
|----------------------------------|--------------------------------------|--|------------|--|
| <b>Regulation complied with:</b> | <b>Passive House Standard by PHI</b> |  |            |  |
| <b>Maximum allowable:</b>        |                                      |  | <b>0.6</b> |  |

The test results meet the requirements for the Passive House certification.

Note: The result does not exclude faults in the construction.

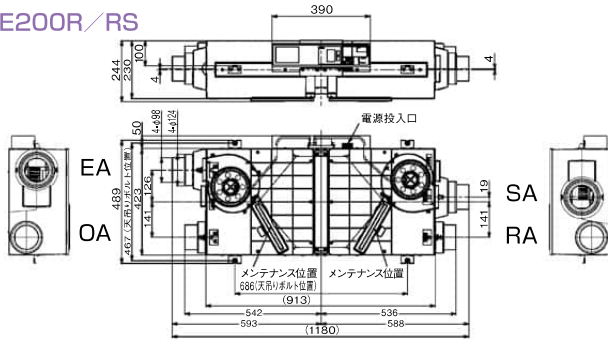
Company Name: 株式会社ユニゾン エアロジック事業部  
 Date, Sign: 2024. 1/22 前川 貴博



Airtightness is ensured primarily through two methods. The first involves applying airtight tape or similar sealing materials to the joints of gypsum board and structural plywood, which are directly attached to the framing. The second method consists of applying spray-applied rigid polyurethane foam across the entire interior surface. By combining these two approaches, a high level of airtightness is achieved.

# 10. Ventilator 換気装置

ROYAL ELECTRIC CO., LTD.,  
SE200R/RS

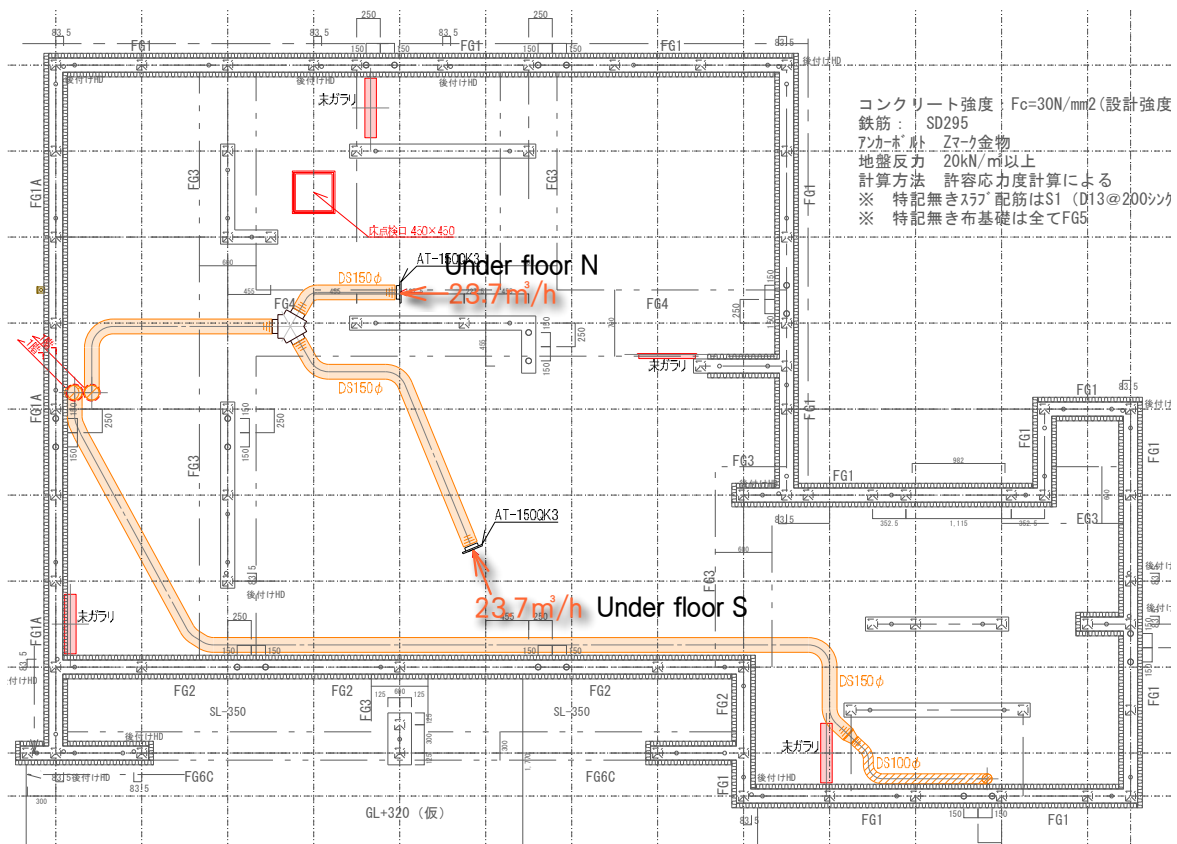


Effective heat recovery 68 %  
Electrical efficiency 0.23 Wh/m<sup>3</sup>

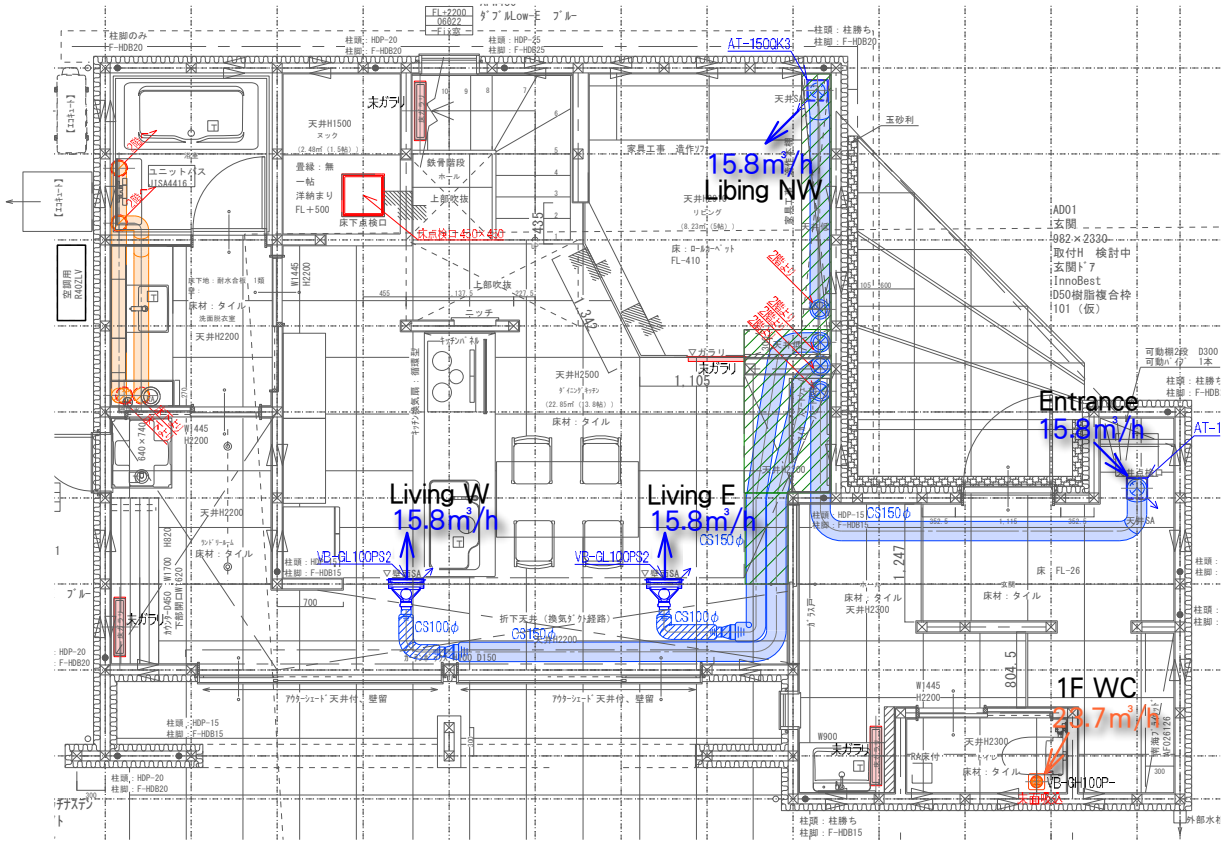
The ventilation system utilizes the SE200R from ROYAL ELECTRIC CO., LTD., a domestic Japanese manufacturer. This is a simple ventilation system incorporating a total heat exchange element.



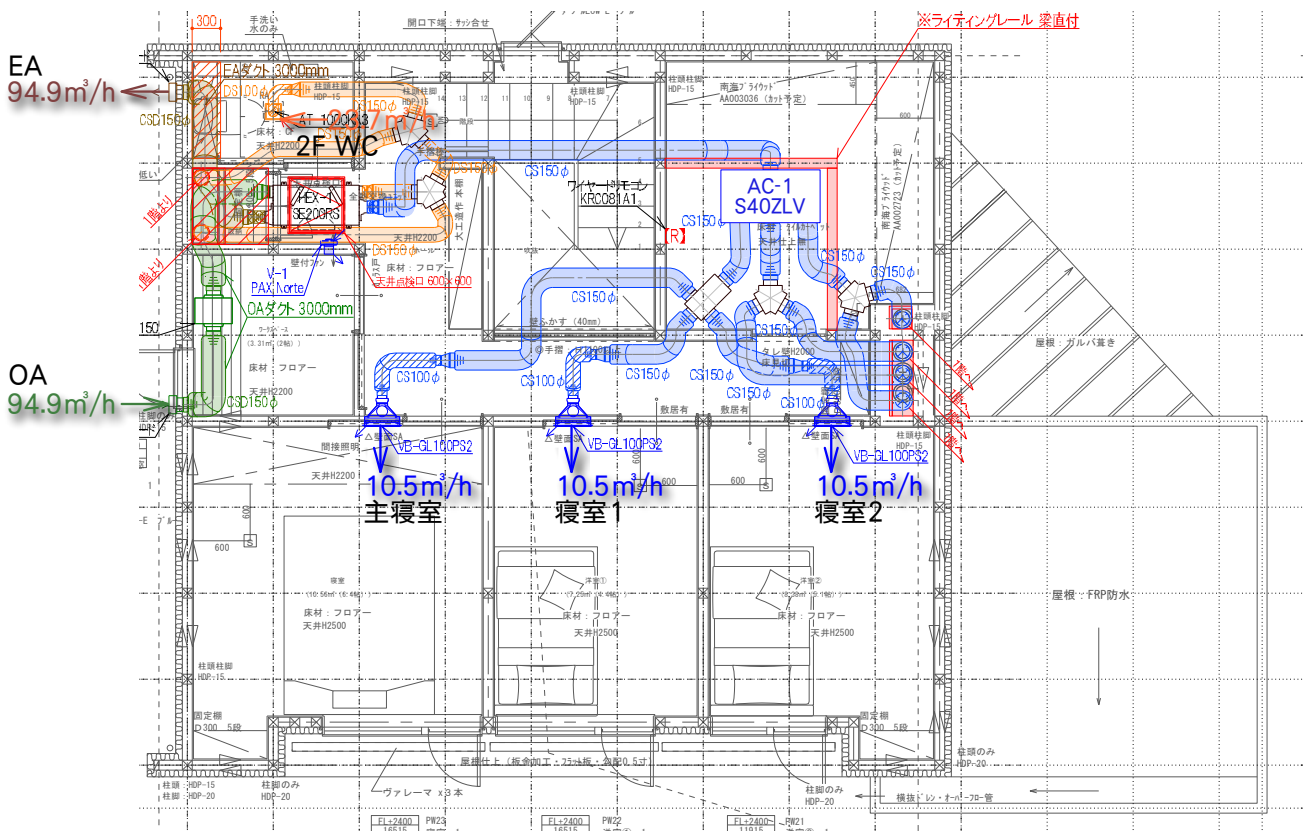
# 11. Duct plan ダクト計画



Underfloor Duct Diagram



First-Floor Ceiling Duct Diagram



Second-Floor Ceiling Duct Diagram



This plan features a system directly connected to both the heat exchanger and the indoor unit of the air conditioner. Supply air is introduced into each room after passing through the heat exchanger and the indoor unit. Exhaust air is extracted from the underfloor space on the first floor and the toilets. The duct diameter for both the supply air (SA) and return air (RA) is set at 125mm, ensuring sufficient capacity to prevent any impact on airflow balance.

## 12. Heat supply 熱供給



The heating and cooling system utilizes a heat pump as its energy source. The indoor unit of this heat pump is directly connected to a heat exchanger. The cooling capacity is 4 kW, providing approximately twice the required capacity for cooling and dehumidification demand.



The hot water supply system utilizes Daikin's "Eco Cute" heat pump water heater, a product from a domestic Japanese manufacturer. This system heats water using electricity during off-peak nighttime hours and stores it in a storage tank. The tank has a capacity of 370 liters, which is sufficient to meet the hot water demands of both the bathroom and kitchen.

## 13. Construction cost 建設コスト

## 14. References 参考文献

# 15. PHPP Results 結果シート

## パッシブハウス Verification



|                                      |  |  |
|--------------------------------------|--|--|
| 物件名:                                 | Hamamatsu Passive House                |  |
| 番地・町名:                               | 2-1142 Nishigasakicho Chuoku Hamamatsu |  |
| 郵便番号/都市名:                            | 431-3115                               | Shizuoka                                 |
| 都道府県/国:                              | JP-Japan                               |  |
| 用途:                                  | detached single family home            |  |
| 気象データ:                               | ud---02-JP0021a-Shizuoka               |  |
| 気候区分:                                | 4: Warm tempertate (温帯気)               | 建設地の標高: 12 m                             |
| 建築主 / クライアント:                        | COTTON HOUSE CO.,LTD.                  |  |
| 番地・町名:                               | 21566 Shinoharacho Chuoku Hamamatsu    |  |
| 郵便番号/都市名:                            | 431-0201                               | Shizuoka                                 |
| 都道府県/国:                              | JP-Japan                               |  |
| 設備設計者:                               | L'art de vie studio                    |  |
| 番地・町名:                               | 5-16-1 Otemachi Kariya                 |  |
| 郵便番号/都市名:                            | 448-0857                               | Aichi                                    |
| 都道府県/国:                              | JP-Japan                               |  |
| 認定機関:                                | Passive House Japan                    |  |
| 番地・町名:                               | 2-2-2 Ohmachi Kamakura                 |  |
| 郵便番号/都市名:                            | 248-0007                               | Kanagawa                                 |
| 都道府県/国:                              | JP-Japan                               |  |
| 冬の室内温度設定 [°C]:                       | 20.0                                   | 夏の室内温度設定 [°C]: 25.0                      |
| 暖房期の内部発熱量 (IHG) [W/m <sup>2</sup> ]: | 2.6                                    | 冷房期の内部発熱量 (IHG) [W/m <sup>2</sup> ]: 2.6 |
| 蓄熱性能 [Wh/K per m <sup>2</sup> TFA]:  | 84                                     | 冷房設備の有無: x                               |

|               |                        |       |
|---------------|------------------------|-------|
| 設計者:          | L'art de vie studio    |       |
| 番地・町名:        | 5-16-1 Otemachi Kariya |       |
| 郵便番号/都市名:     | 448-0857               | Aichi |
| 都道府県/国:       | JP-Japan               |       |
| エネルギーコンサルタント: | L'art de vie studio    |       |
| 番地・町名:        | 5-16-1 Otemachi Kariya |       |
| 郵便番号/都市名:     | 448-0857               | Aichi |
| 都道府県/国:       | JP-Japan               |       |
| 竣工年:          | 2024                   |       |
| ユニット数:        | 1                      |       |
| 利用者数:         | 2.4                    |       |

### 有効床面積を元に計算した建物の性能

|                  | 有効床面積 m <sup>2</sup>                             |      | 基準 | 代替基準 | すべて記入しましたか? |
|------------------|--|------|----|------|-------------|
| 暖房               | 有効床面積 m <sup>2</sup>                             | 98.2 |    |      | Yes         |
|                  | 暖房需要 kWh/(m <sup>2</sup> a)                      | 12   | ≤  | 15   |             |
|                  | 暖房負荷 W/m <sup>2</sup>                            | 9    | ≤  | -    |             |
| 年間冷房負荷           | 年間冷房 & 除湿需要 kWh/(m <sup>2</sup> a)               | 22   | ≤  | 22   | Yes         |
|                  | 冷房負荷 W/m <sup>2</sup>                            | 12   | ≤  | -    |             |
|                  | オーバーヒートの頻度 (> 25 °C) %                           | -    | ≤  | -    |             |
|                  | 湿度過多の頻度 (> 12 g/kg) %                            | 0    | ≤  | 10   |             |
| 気密性能             | 50PA時の漏気回数 1/h                                   | 0.4  | ≤  | 0.6  | Yes         |
| 旧一次エネルギー基準 (PE)  | 消費量 (PE) kWh/(m <sup>2</sup> a)                  | 93   | ≤  | -    | -           |
| 新一次エネルギー基準 (PER) | 一次エネルギー消費量 (PER) kWh/(m <sup>2</sup> a)          | 47   | ≤  | 60   | Yes         |
|                  | 垂直投影面積に対する再生可能エネルギー総エネルギー kWh/(m <sup>2</sup> a) | 0    | ≥  | -    |             |

◁ 空欄: データ不足; '-': 該当なし

ここに記載されている計算結果はPHPPの正しい入力に基づき、建物の実際の状況に即していることを証明します。

Passive House Classic? **Yes**

|                            |            |          |      |
|----------------------------|------------|----------|------|
| 責任者:                       | 名前:        | 名字:      | 署名:  |
| 2-Certifier                | Miwa       | Mori     |      |
| 47045_PHJP_PH_20241223_MMO | 認定ID番号     | 発行元:     | 都市名: |
|                            | 21.08.2024 | Kamakura |      |