PASSIVE HOUSE OBJECT DOCUMENTATION



Iga Passive House – ID 6319

Detached single family house in Iga, Mie, Japan



Client / Building Services : Architect : Energy consultant : Hideaki Mori Yutaka lizuka Kota Aoyama Moridaikenchisan i + i architects Ingerosec Corporation



This is a model house proposed by a construction company based in Iga, focusing on domestic building materials in order to realize an affordable and simple passive house. The owner is the president of the construction company. The building is two levels with wood-frame.

U-Value exterior wall = 0.167 W/m2K U-Value floor = 0.265 W/m2K U-Value roof = 0.125 W/m2K U-Value windows = 1.18 W/m2K

PHPP annual heating demand = 8.56 kWh/m2a

PHPP Primary energy demand = 98 kWh/m2a

Heat recovery efficiency = 86%

Pressure test n50 = 0.30/h

1. Description of the construction task

This is a model house proposed by a construction company based in Iga (known as Ninja village), focusing on domestic building materials in order to realize an affordable and simple passive house. The owner is the president of the construction company.

Iga is a basin with a climate that is hot in summer and cold in winter, and is one of the coldest areas in Mie prefecture. He, the owner and president of the construction company, thought that a passive house would be suitable for such a harsh climate and would be the standard for homes that locals want.

The building faces south and the roof is gabled. Most of the south surface is an opening, and the south side of the first floor is set back, so that the solar shading/acquisition in the summer and winter will work effectively. The light taken in from the south reaches the entire house by the central atrium. Therefore, electricity for lighting in the daytime is almost unnecessary. From the window on the west side of the second floor, residents can see the mountains of Iga and feel a sense of unity with nature.

There are two air conditioners, an underfloor air conditioner on the 1st floor and a wallmounted air conditioner on the 2nd floor, and these two units are used according to the season. Focus200 is used for the ventilation system, and an indoor circulation type range hood is used because the kitchen is IH.

Insulation of walls and roof is composed of Urethane foam with λ -value: 0.021(W/mK) and Phenolic foam with λ -value: 0.020(W/mK), and around the foundation is composed of concrete with XPS with λ -value: 0.028(W/mK).

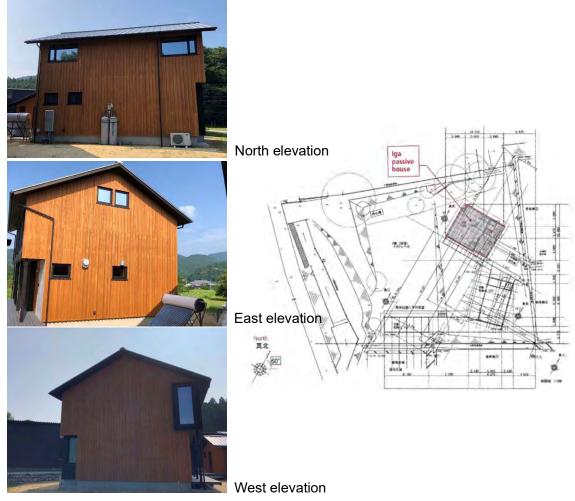
The windows are PVC windows (triple glazing) made by a Japanese manufacturer (YKK AP), and used solar acquisition type glazing and solar shielding type glazing properly on the south side and other sides.

And solar collector backed up by a gas boiler is used for hot water supply.

2. Exterior photos



South elevation



3. Interior photos



1F Living & Dining

1F Living & Dining

Double Height

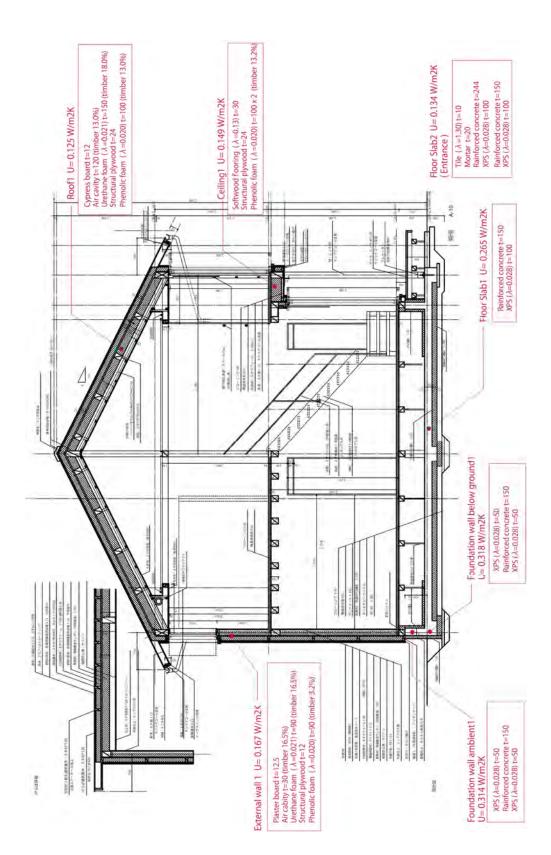


2F Free Space

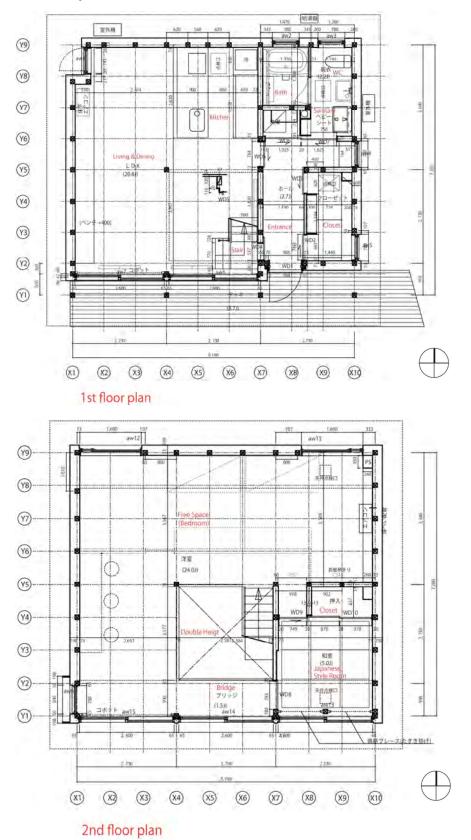


2F Bridge

4. Cross section

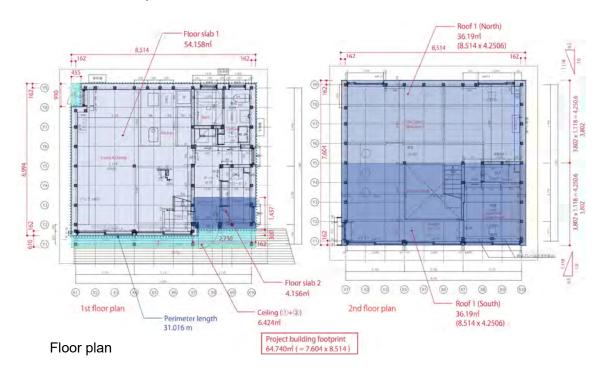


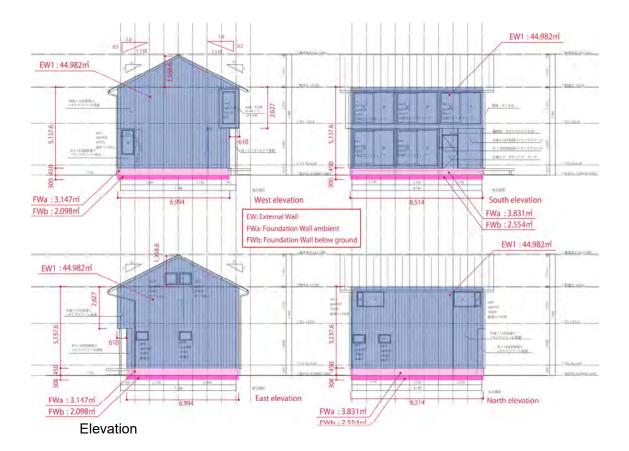
5. Floor plans



7

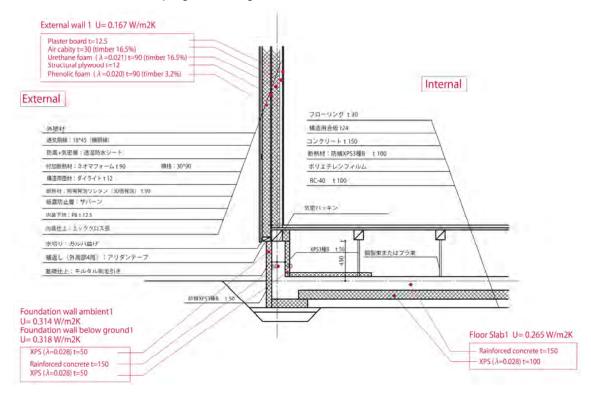
6. Thermal envelope area



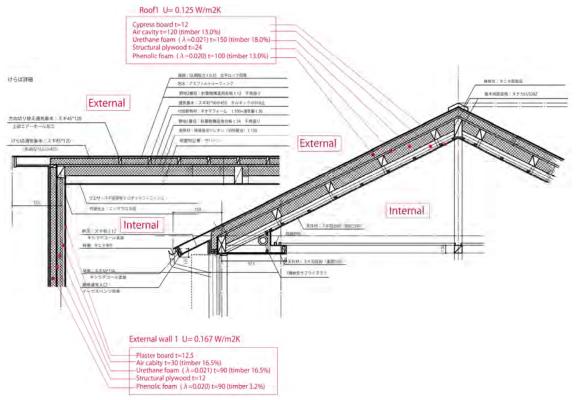


7. Construction details

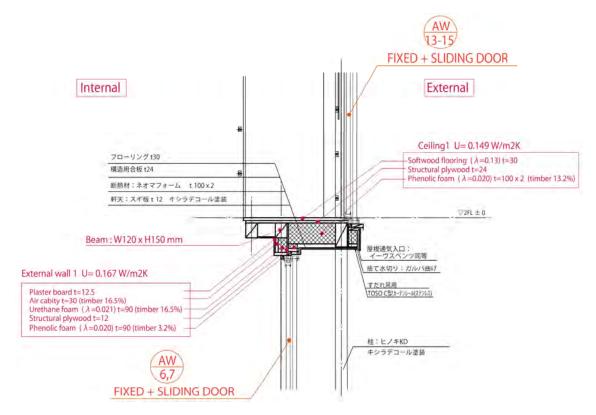
7.1 External wall build-up against the ground



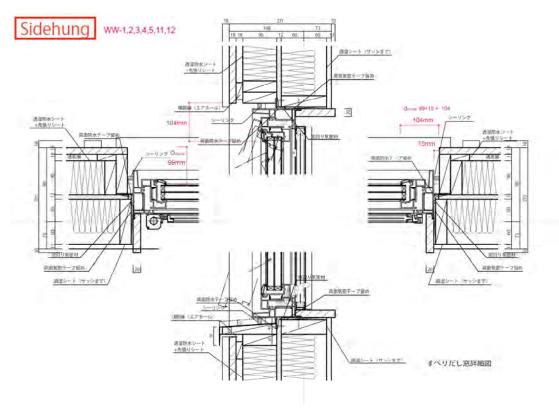
7.2 Roof build-up / Ceiling build-up

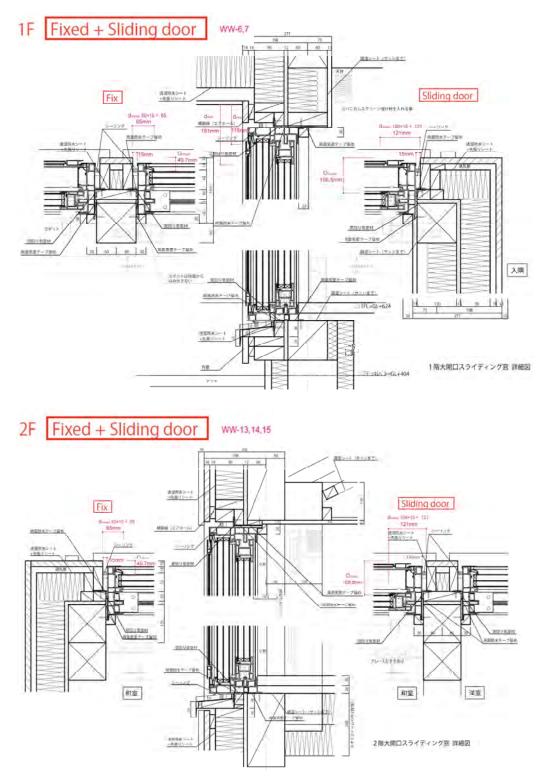


7.3 Ceiling build-up



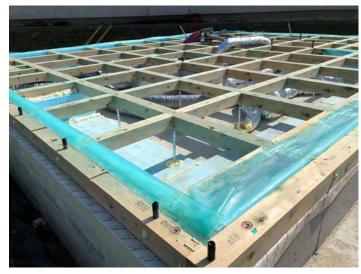
7.4 Window installation





The windows are PVC window developed by YKK AP in Japan. The "APW430" series with triple glass is used in this building. Uf is 1.25-2.20 W/m2K. Ug and g-value are as follows. -Solar acquisition 3+Ar16+3+Ar16+low-E3 : Ug = 0.97 W/m2K, g-value = 0.57 -Solar shielding Low-E3+Ar16+3+Ar16+low-E3 : Ug = 0.60 W/m2K, g-value = 0.31

7.5 Construction Site Photos



Thermal insulation work for basement XPS: t=50mm x 2 (Inside and Outside)

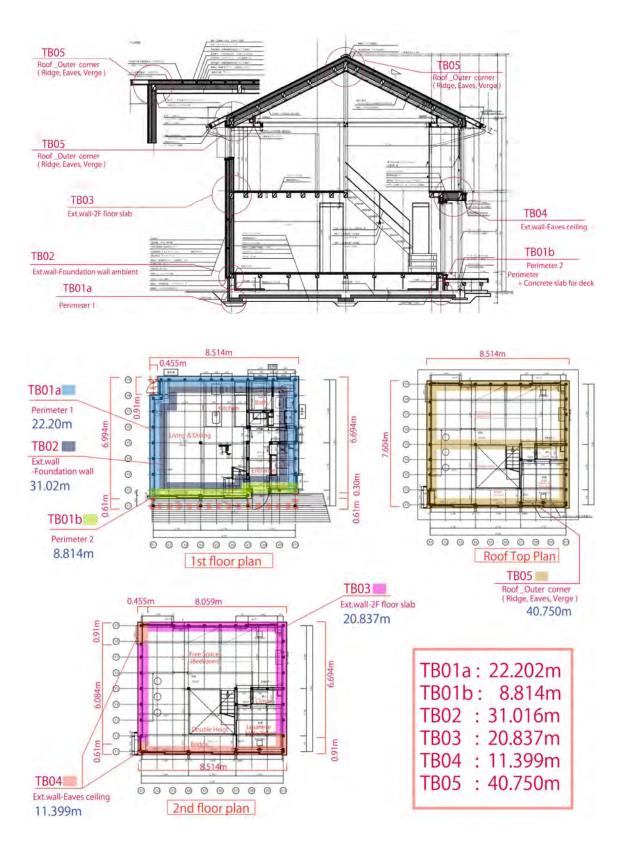


Thermal insulation work for wall Urethanform: t=90mm



Thermal insulation work for wall Urethanform: t=150mm

7.6 Thermal Bridges



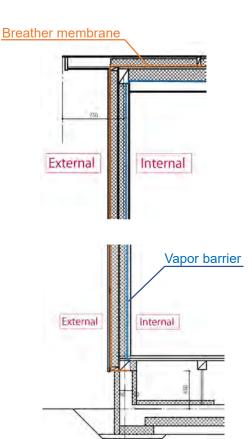
7.7 Airtightness

Under Pressure 住宅の気密性能試験結果(2)

			- 201	「者・測定ノ	(は)御史:	54 W				
東東所	-	HUCO		11.2/17	1077	41.0		10.10	20460	mmt-2
				化棉布/	107.0	= 0.9		RK.		
	反府状间而后;							165	05-6368-	2010
	A 2201(活動) 基金とびに方法						der pres	sure		_
御定鉄匠 >	一十一礼總標									
试验日時	2018年6月	26 11 11 11	11.6							
EVEL H - F	天候					电波			m/s	(参)
	密内温度	-	27.	0 °C	-	肌向				(金)
測定時の環境	外気温	_	29.			制定位置				(金)
	2P AGE	-	67.	5 0	_	ane to at			hPa	(参)
	<u> </u>	<u> </u>	_							-
测定点	1	2	3	4	5	6	7	8	9	10
王力差:ΔP(Pa)	34.1	54.7	67.7	89.0	150.0					
善気量:Q(m²/h)	46	69	87	108	145					
家間特性値:n	(1 <= n <= 2)		1.25							
通気率(ΔP=1P)	時の通気量)	:a	2.8	m³/h•Pa ^{l/n}						
Δ P=9.8Pa(こお)	ナる通気量:Q	9.8	17.6	m³/h						
系数:b			0.678							
8相当隙間面材	t: α A(cml)		12	cmi						
8当称肌面積:	ic(ent/m)	1.1	0.1	xmi/mi						
10.00004900	REPROACE	0	0.2	回16 12	P-Seralq	の地支庫	65 m² /h	Ĩ		
The result of F	IE 17 M [Pa]	1 test	0.246m	at 50Pa 990 2483 75			Air chang		ne al	

Over Pressure 住宅の気密性能試験結果(2)

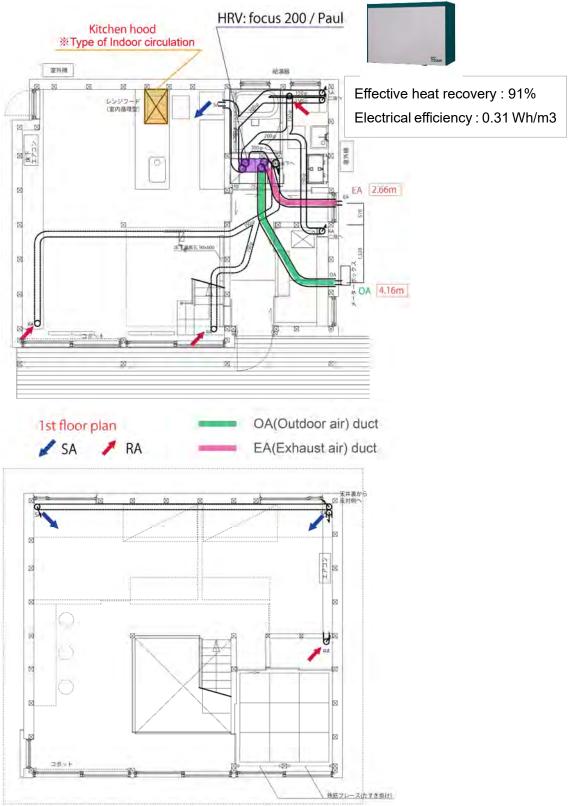
				測算	ミ者・測定	方法·测定	装置				
事業所		921	ペック株式会	社	事業(事業)		测定者	高田	日 英克	登録番号	08067-20
所在地	大阪	府吠田市広	芝町9-12-6				-	電	话番号	06-6368-	2040
网络沙漠	115	12381 (22)	地による住	を言い気剤	生態試験力	16)1:46	DETA O	er pres	9U/0		
						と装置を使用	して行った				
测定装置	-	ナー札幌	朱式会社)	KN8-25000	型						
試験日日	9	2018年6月	月26日 13月	钟5分							
		天候	時	in.			風速			m/s	(参考
Michaels on d		室内温	皮	27.	1 °C		風向				(参考
測定時の環境		外気温	外気温度		28.7 °C		風速測定位置				(参考
	1						気圧			hPa	(参考)
Micha Ir	_	1	2	3	4	5	6	7	8	9	10
測定点 圧力差: ΔF	-	32.6	2 56.6	3 74.5	107.3	ə 150. 0	0	1	8	9	10
注刀差:41 通気量:Q(s		32.6	100	110	107.3	226			-	-	-
地気度ない	(710)	91	100	110	134	220					I
除間特性値	l : n (1	l <= n <= 2)	1.46							
通気率(∆P	-1Pa#	キの通気量):a	6.6	$m^2/h\cdot P d^2$	in .					
$\Delta P=9.8Pal$	こおけ	る通気量:・	Q9.8	31.3	m²/h						
係数:b				0.680							
総相当険問	面積	$: \alpha A(c m^2)$		21	c m ²						
相当論願證	箱:0	(a mi/mi)		0.1	cm/m						
金考:50Pa9	の前	复回的CAC	10.	20.4	TL/b	APPENDE	NO. IN CON	脑副	10		
The result o	t Pre			0.360/h al 95 + 263,9	_			r change P=50Pa	e volume	at	
			00		./			-			
			70- 60-		/				_		
			50		Y						
		Z	-00-	_					-		
		E.九蒽[Pu]	30	\wedge				-	-		
		田									
Average	Air ch	ange rate									
(0.2463 = 0.303		00) + 2									
0.30	/h al	50Pa	-	_	10	200	300	400	500		



Net Air Volume for Airtightness test: Vt = 263.9 m3 The result of Pressurization test: Under Pressure <u>0.246 / h</u> at 50Pa Over Pressure <u>0.360 / h</u> at 50Pa

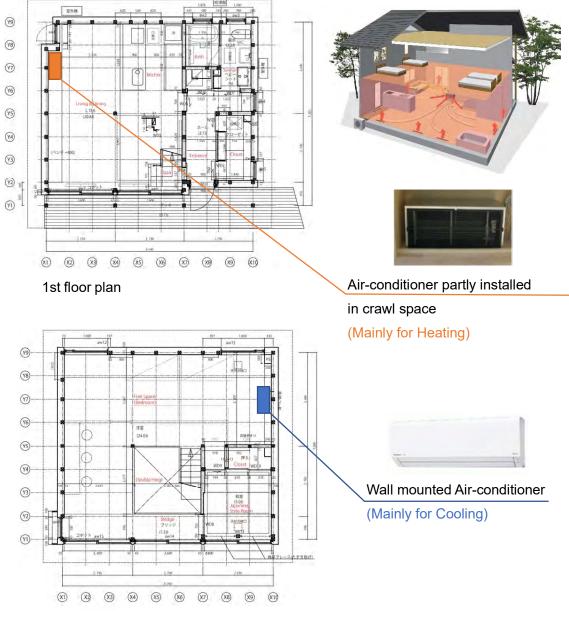
Average Air change rate: (0.246 + 0.360) / 2 = 0.3032 0.30 / h at 50Pa

7.8 Ventilation



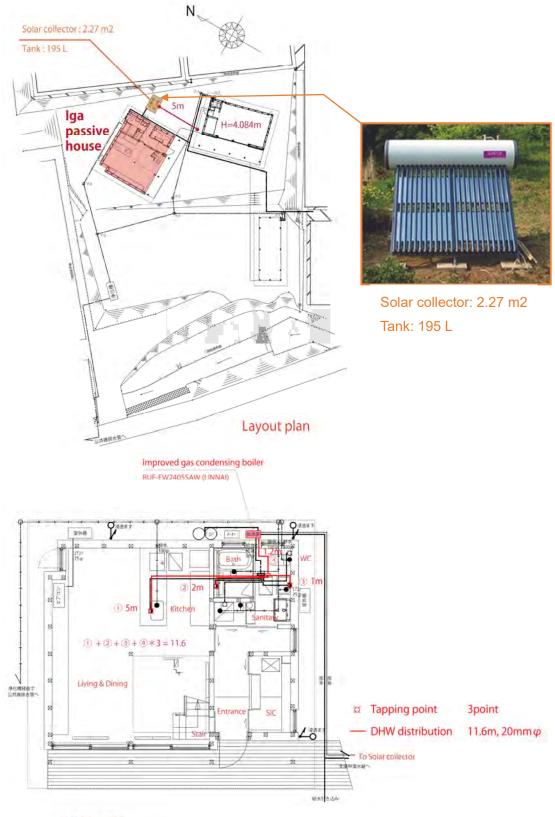
2nd floor plan

7.9 Heating and Cooling



2nd floor plan

7.10 DHW (Domestic Hot Water)



1st floor plan

8. PHPP results

	louse	Verification				
			B	uilding: Iga Passiv	e House	
				Street 1238 Masl		
		111	Postco	de/City: 518-1414	Mie	
-				Country: Mie	JP-Ja	pan
					timber house (single fa	mily)
	u			ata set: ud00-JP		
100 m		and the second se		te zone: 4: Warm-t	and the second se	location: 300.3 m
1000					ri, Moridaikenchisan	100101
1000			Home owner /	Street 1238 Masi		
and the second second			Boston	de/City: 518-1414	Mie	
Contraction of the				Country: Mie	JP-Ja	0.20
			the second s		10.00	- Contraction of the Contraction
Architecture:	the state of the lattice of the lattice		Mechanical en	gineer: Moridaike		
		lishi-Shinjuku, Shinjyuku-ku,		Street: 1238 Masl		
Postcode/City:	and the second se	Tokyo		de/City: 518-1414	Mie	
Province/Country:	Tokyo	JP-Japan	Province/C	Country: Mie	JP-Ja	pan
Energy consultancy:	INGEROSEC	Corporation	Certifi	cation: PASSIVE	HOUSE JAPAN	
Street	6-5-1 43F Nit	shi-Shinjuku, Shinjuku-ku		Street: 3-21-10, 0	hmachi, Kamakura	
Postcode/City:	163-1343	Tokyo	Postco	de/City: 248-0007	Kanagawa	
Province/Country:	Tokyo	JP-Japan	Province/C	Country: Kanagawa	JP-Ja	pan
Year of construction:	2017		Interior temperature win	ter [°C]: 20.0	Interior temp. summ	er (°C): 25.0
No. of dwelling units:			Internal heat gains (IHG) heating case		IHG cooling case	
				Traviti I. Sera	into ocomig cube	
No. of occupants: Specific building character		rence to the treated floor area	Specific capacity [Wh/K per n	n² TFA]: 84	Mechanical	cooling: x
Specific building character	ristics with refe	Treated floor area m ²	97.4	Criteria	Alternative	Fullfilled?2
Specific building character	ristics with refe	Art	97.4	Criteria	Alternative criteria	
Specific building character Space heating	ristics with refe	Treated floor area m ² Heating demand kWh/(m ² a)	97.4 8.56 ≤	Criteria	Alternative criteria	Fullfilled? ² yes
specific building character	ristics with refe	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ²	97.4 8.56 10.34 ≤	Criteria 15 -	Alternative criteria - 10	Fullfilled? ²
Specific building character Space heating Space cooling	ristics with refe Cooling &	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum. demand kWh/(m ² a)	97.4 8.56 ≤ 10.34 ≤ 21.20 ≤	Criteria 15 -	Alternative criteria 7 10 21	Fullfilled? ² yes
Specific building character Space heating Space cooling Fre	ristics with refe Cooling &	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum. demand kWh/(m ² a) Cooling load W/m ²	97.4 8.56 10.34 21.20 5 14.50	Criteria 15 -	Alternative criteria 7 10 21	Fullfilled? ² yes
Specific building character Space heating Space cooling Fre Frequency of exce	Cooling &	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum. demand kWh/(m ² a) Cooling load W/m ² rrheating (> 25 °C) %	97.4 8.56 10.34 21.20 5 14.50 5 5	Criteria 15 	Alternative criteria 7 10 21	Fullfilled? ² yes yes
specific building character Space heating Space cooling Fre Frequency of exce Nirtightness	Cooling a Cooling a equency of ove essively high hu Pressuriza	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum. demand kWh/(m ² a) Cooling load W/m ² rheating (> 25 °C) % umidity (> 12 g/kg) %	97.4 8.56 ≤ 10.34 ≤ 21.20 ≤ 14.50 ≤ - ≤ 0 ≤	Criteria 15 - 21 - 10	Alternative criteria 7 10 21	Fullfilled? ² yes yes yes
specific building character Space heating Space cooling Frequency of exce Airtightness Non-renewable Primary	Cooling a Cooling a equency of ove essively high hu Pressuriza	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum. demand kWh/(m ² a) Cooling load W/m ² rheating (> 25 °C) % unidity (> 12 g/kg) % ation test result n ₅₀ 1/h	97.4 8.56 ≤ 10.34 ≤ 21.20 ≤ 14.50 ≤ - ≤ 0 ≤ 0.30 ≤	Criteria 15 - 21 - 10 0.6	Alternative criteria 7 10 21	Fullfilled? ² yes yes yes yes
Specific building character Space heating Space cooling Fre Frequency of exce Airtightness Non-renewable Primary Primary Energy	Cooling a Cooling a equency of ove essively high hu Pressurize Energy (PE) Gener- energy (in rel	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum. demand kWh/(m ² a) Cooling load W/m ² irheating (> 25 °C) % urnidity (> 12 g/kg) % attion test result n ₅₀ 1/h PE demand kWh/(m ² a)	97.4 8.56 ≤ 10.34 ≤ 21.20 ≤ 14.50 ≤ 0 ≤ 0.30 ≤ 98 ≤	Criteria 15 - 21 - 10 0.6	Alternative criteria 7 10 21	Fullfilled? ² yes yes yes yes
Specific building character Space heating Space cooling Fre Frequency of exce Airtightness Non-renewable Primary Primary Energy	Cooling a Cooling a equency of ove essively high hu Pressurize Energy (PE) Gener- energy (in rel	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum, demand kWh/(m ² a) Cooling load W/m ² inheating (> 25 °C) % umidity (> 12 g/kg) % atton test result n ₅₀ 1/h PE demand kWh/(m ² a) PER demand kWh/(m ² a) atton of renewable atton of renewable atton of renewable	97.4 8.56 10.34 21.20 14.50 - 0 0 0 98 65	Criteria 15 - 21 - 10 0.6	Alternative criteria 10 21 11	Fullfilled? ² yes yes yes yes yes
Specific building character Space heating Space cooling Fre Frequency of exce Airtightness Non-renewable Primary Primary Energy Renewable (PER)	Cooling 2 Cooling 2 equency of ove essively high hi Pressuriza Energy (PE) Gener energy (in rel build	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum, demand kWh/(m ² a) Cooling load W/m ² inheating (> 25 °C) % umidity (> 12 g/kg) % ation test result n ₅₀ 1/h PE demand kWh/(m ² a) PER demand kWh/(m ² a) ation of renevable ation to re-cleted kWh/(m ² a) ding footprint area)	97.4 8.56 10.34 21.20 14.50 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - - 0 - 0.30 - </td <td>Criteria 15 21 - 10 0.6 120 - -</td> <td>Alternative criteria 7 10 21 11 11 ² Empty field [Passive House Cla</td> <td>Fullfilled?² yes yes yes yes yes - hata missing: ¹ No requirement ressic? yes</td>	Criteria 15 21 - 10 0.6 120 - -	Alternative criteria 7 10 21 11 11 ² Empty field [Passive House Cla	Fullfilled? ² yes yes yes yes yes - hata missing: ¹ No requirement ressic? yes
Specific building character Space heating Space cooling Frequency of exce Airtightness Non-renewable Primary Primary Energy Renewable (PER)	Cooling 2 Cooling 2 equency of ove essively high hi Pressuriza Energy (PE) Gener energy (in rel build	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum, demand kWh/(m ² a) Cooling load W/m ³ rheating (> 25 °C) % umidity (> 12 g/kg) % ation test result n ₅₀ 1/h PE demand kWh/(m ² a) PER demand kWh/(m ² a) ation of renewable lation to pro-jected kWh/(m ² a) jing footprint area)	97.4 8.56 10.34 21.20 14.50 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - - 0 - 0.30 - </td <td>Criteria 15 - 21 - 10 0.6 120 -</td> <td>Alternative criteria 7 10 21 11 11 ² Empty field [Passive House Cla</td> <td>Fullfilled?² yes yes yes yes yes - hata missing: ¹ No requirement ressic? yes</td>	Criteria 15 - 21 - 10 0.6 120 -	Alternative criteria 7 10 21 11 11 ² Empty field [Passive House Cla	Fullfilled? ² yes yes yes yes yes - hata missing: ¹ No requirement ressic? yes
Specific building character Space heating Space cooling Fre Frequency of exce Airtightness Non-renewable Primary Primary Energy Renewable (PER)	Cooling 2 Cooling 2 equency of ove essively high hi Pressuriza Energy (PE) Gener energy (in rel build	Treated floor area m ² Heating demand kWh/(m ² a) Heating load W/m ² & dehum. demand kWh/(m ² a) Cooling load W/m ² rheating (> 25 °C) % umidity (> 12 g/kg) % ation test result n ₅₀ 1/h PE demand kWh/(m ² a) PER demand kWh/(m ² a) ation of renevable lation to pro-jected kWh/(m ² a) jing footprint area)	97.4 8.56 10.34 21.20 14.50 - 0 0.30 98 65 3 ≥	Criteria 15 21 - 10 0.6 120 - -	Alternative criteria 10 21 11 11 ² Empty field (Passive House Cla	Fulifiled? ² yes yes yes yes yes

9. Year of Construction and Costs

Year: 2017 – 2018

Costs: Information not available

10. Further Information

Client and Construction company: Moridaikenchisan Corporation https://www.mori-dai.com/event/passivehouse/



Architect: i + i architects https://iplusi.info/



Movie with the interview: https://youtu.be/urKjeyTwCvI

