Certificate

about the BlowerDoor Test

Object:

end-terrace house

Passive street 123
12345 Passive City

Test Date: 01.05.2017

Select

according to EN 13829, Method A

12.05.2017

Passivman

Passivhaus Institut Dr. W. Feist
Rheinstraße 44/46
64283 Darmstadt

BlowerDoor Test

EN 13829, Method A

Building Test Info and Air-Moving Equipment

Building Information

Building:	end-terrace house
Address:	Musterstrasse 123
	54321 Passivhausen
Year of Construction:	2017
Test Date:	01.05.2017

Customer Information

Name:	
Address:	Frankfurter Straße 149
	63263 Neu-Isenburg
Phone:	06102-8129121
Fax:	06102-8129130

Business Info

Name:	Passivhaus Institut	Technician:	Passivman
	Dr. W. Feist	Phone:	06151-82699-0
Address:	Rheinstraße 44/46	Fax:	06151-82699-11
	64283 Darmstadt		

Test Method

Method:	A Test of a building in use
Standard:	Following EN 13829
Note:	

Test object:

Test object:	see comments			
Internal Volume V:	492 m³	Error:	+/- 3 %	Calculation Reference Values:
Net Floor Area A_F:				see appendix
Envelope Area A_E:				
Type of Ventilation:	None			
Type of Heating System:	Gasheizung			
Type of Air Conditioning:	keine			

Additional Information you will find in "Comments".

Air-moving Equipment

Device:	Minneapolis BlowerDoor Modell 4, APT				
Serial Numbers:	Fan:		Pressure Gauge:	APT8 - 72	Calibration: 09.06.06
Other Devices:					

BlowerDoor Test

Test Standard EN 13829, Method A

Minneapolis BlowerDoor Modell 4 - Tectite Express 3.6.7.0

Object: end-terrace house 54321 Passivhausen	Technician: Passivman Date: 31.02.2015

Temperature and Wind Conditions

Inside Temperature:	7 °C	Wind Force:	3
Outside Temperature:	5 °C	Number of exterior pressure taps:	1
Barometric Pressure: (Standard):	101325 Pa	Building Wind Exposure:	B
		Uncertainty because of Wind (Table Geißler):	**9 %**

Depressurization

Zero Flow	Δp_{01+}	Δp_{01-}	Δp_{02+}	Δp_{02-}
(baseline)	3,7 Pa	-0,7 Pa	0,3 Pa	-0,5 Pa

Pressurization

Zero Flow	Δp_{01+}	Δp_{01-}	Δp_{02+}	Δp_{02-}
(baseline)	0,7 Pa	-0,4 Pa	5,0 Pa	-

Sets of Measurement

Ring	Building Pressure	Fan Pressure	Fan Flow V_r	Tolerance
O ABCDE	[Pa]	[Pa]	[m³/h]	[%]
Δp_{01}	3,5			
C	-80	272	347	0,14
C	-67	224	314	1,40
C	-55	168	271	-0,88
C	-53	160	265	-1,47
C	-46	141	247	0,48
C	-36	105	212	-0,04
C	-24	66	168	0,39
Δp_{02}	0,1			

Correlation Coefficient r:		*0,999*	Confidence interval	
C_{env}	[m³/(h Pa^n)]	20	max. 22	min. 18
C_L	[m³/(h Pa^n)]	20	max. 23	min. 18
n	[-]	0,64	max. 0,67	min. 0,61

Ring	Building Pressure	Fan Pressure	Fan Flow V_r	Tolerance
O ABCDE	[Pa]	[Pa]	[m³/h]	[%]
Δp_{01}	0,5			
C	79	282	354	4,51
C	65	180	281	-3,27
C	59	163	266	-1,04
C	56	148	254	-2,05
C	49	123	231	-0,08
C	39	90	197	1,50
C	29	54	151	0,62
Δp_{02}	5,0			

Correlation Coefficient r:		*0,996*	Confidence interval	
C_{env}	[m³/(h Pa^n)]	13	max. 17	min. 9
C_L	[m³/(h Pa^n)]	13	max. 17	min. 9
n	[-]	0,75	max. 0,84	min. 0,67

Results

V =	492 m³	A_F =		A_E =	

	V_{50}	Uncertainty	n_{50}	Uncertainty	w_{50}	Uncertainty	q_{50}	Uncertainty
	m³/h	%	1/h	%	m³/m²h	%	m³/m²h	%
Depressurisation	**250**	+/- 12 %	0,51	+/- 12 %				
Pressurisation	**244**	+/- 12 %	0,50	+/- 12 %				
Average	**247**	+/- 12 %	**0,50**	+/- 12 %				

Regulation complied with: **PHI**

Maximum allowable:	**0,6**	1/h			

The test results meet the regulation.

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

Business Info: Passivman

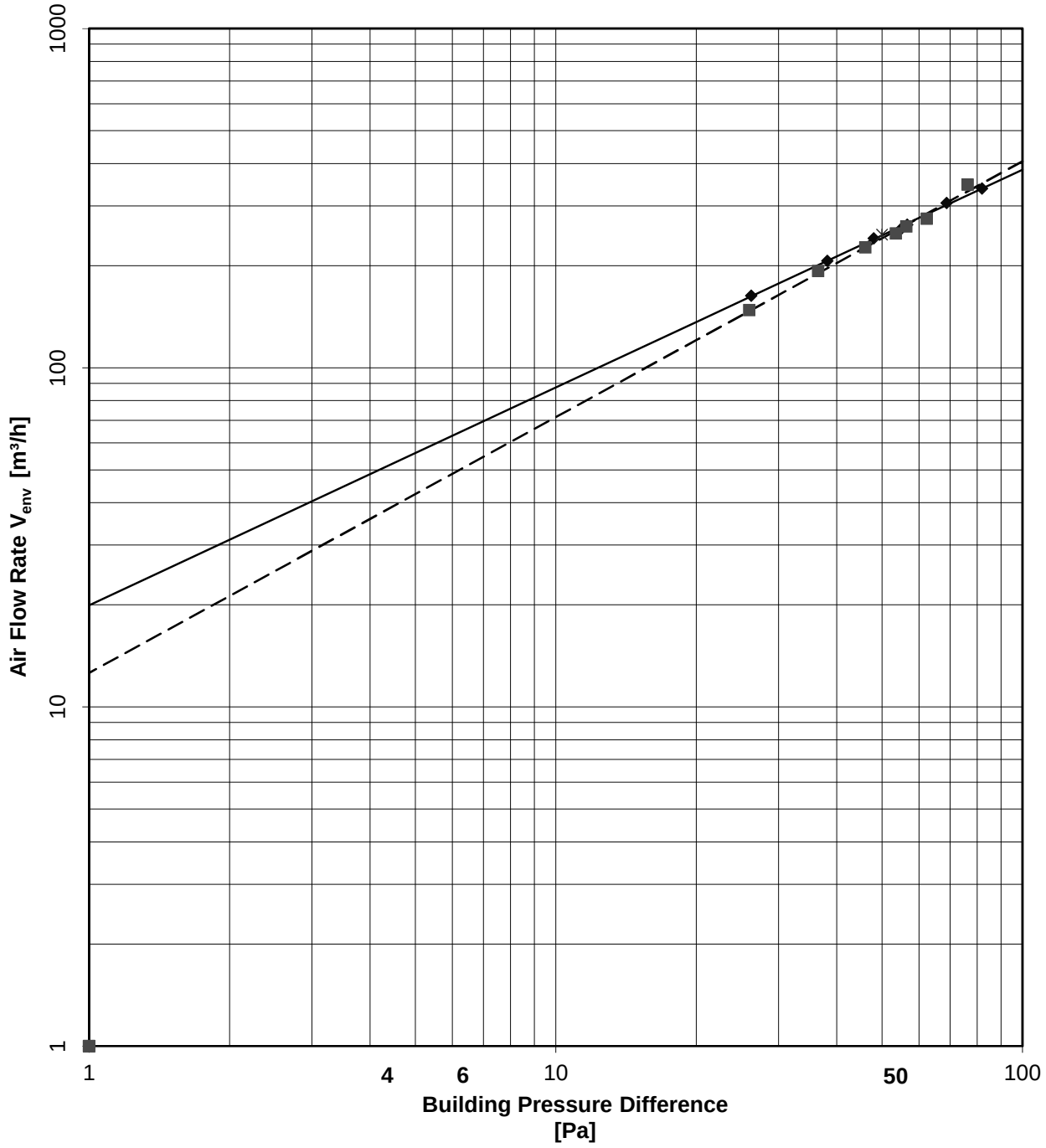
Passivhaus Institut Dr. W. Feist

64283 Darmstadt

Date, Sign

Stamp

BlowerDoor Air Leakage Graph
Object: end-terrace house



◆ (Air Flow) Depressurisation [m³/h]

■ (Air Flow) Pressurisation [m³/h]

——— Regression line Depressurisation [m³/h]

— — – Regression line Pressurisation [m³/h]

✳ Air Flow Rate at 50 Pa [m³/h]

BlowerDoor Test

EN 13829, Method A

Comments

Object: end-terrace house 54321 Passivhausen	Technician: Passivman Datum: 01.05.17

Installation of the Blower Door in the entrance door.

The building is closed, all windows and doors are installed. Window sills are installed, that is why the airthightness layer there is not accessible anymore.

The door sill of the garden door was not installed yet, so the door has been temporarily sealed.

The floor screed was already present.

The ventilation unit is present and the openings are temporarily closed.

Main leaking points:

Room Living room - electrical socket strong air draught
Room Kitchen - window connection down
Room HVACR - cable penetration
Room studio - window connection left
Pipe penetration outside air - connection to the plaster down

BlowerDoor Test

EN 13829, Method A

Zero-Flow (Baseline) and Accuracy

Object:	end-terrace house
	54321 Passivhausen
Technician:	Passivman
Date:	01.05.2017

Depressurization

Reading	Zero Flow Pressure Difference At the Beginning	At the End
1	4,0	-1,4
2	3,9	-0,5
3	5,5	-0,2
4	5,8	0,0
5	7,0	0,1
6	7,5	0,3
7	6,8	0,1
8	6,0	0,0
9	2,6	0,0
10	0,9	0,2
11	2,4	0,0
12	3,1	0,3
13	7,2	0,5
14	9,2	0,7
15	5,6	0,7
16	3,6	0,6
17	2,4	0,3
18	0,3	0,1
19	-0,7	0,1
20	1,1	0,3
21	2,2	0,5
22	3,4	0,6
23	1,8	0,5
24	2,9	0,4
25	5,0	0,4
26	2,7	0,1
27	0,9	-0,2
28	1,3	-0,6
29	0,9	-0,7
30	1,1	-0,7

Pressurization

Reading	Zero Flow Pressure Difference At the Beginning	At the End
1	2,2	8,8
2	1,6	9,3
3	0,7	11,0
4	1,2	8,7
5	0,9	7,1
6	-0,3	7,3
7	-0,8	5,5
8	-0,7	4,7
9	-0,3	6,3
10	-0,1	4,5
11	0,2	4,0
12	0,1	4,1
13	0,4	4,2
14	0,7	3,6
15	0,6	3,5
16	0,6	3,6
17	0,5	2,6
18	0,5	2,9
19	0,5	3,2
20	0,6	3,4
21	0,5	2,8
22	0,5	3,0
23	0,6	2,8
24	0,9	3,5
25	0,8	3,0
26	-0,2	4,4
27	0,0	7,0
28	0,4	4,6
29	0,7	6,0
30	0,7	5,0

Average of the positive and negative Values of Zero Flow Pressure Difference

	Δp_{01+}	Δp_{01-}	Δp_{02+}	Δp_{02-}
Average	3,7	-0,7	0,3	-0,5

	Δp_{01+}	Δp_{01-}	Δp_{02+}	Δp_{02-}
Average	0,7	-0,4	**5,0**	-

Average of all Values of Zero Flow Pressure Difference

Zero Flow	Δp_{01} [Pa]	Δp_{02} [Pa]
(baseline)	3,5	0,1

Zero Flow	Δp_{01} [Pa]	Δp_{02} [Pa]
(baseline)	0,5	5,0

Note:

Accuracy (Proposal Germany: FLiB-Supplement 11/2001)

Name	Description	Depressurisation		Pressurisation	
a	Accuracy of the device to measure airflow rate	+/- 4 %		+/- 4 %	
b	Accuracy building pressure	+/- 3 %	50 Pa	+/- 4 %	50 Pa
c	Uncertainty because of wind	+/- 9 %		+/- 9 %	
d	Uncertainty barometric pressure (standard or measured)	+/- 5 %		+/- 5 %	
e	Uncertainty leaving out a depressurazition or pressurazition	+/- 0 %		+/- 0 %	
g	Uncertainty reference values	+/- 3 %		+/- 3 %	
only info	Random error of the airflow rate	+/- 1 %		+/- 3 %	

nett volume / end-terrace house Passive City						
	house		**room**	**area plans [m²]**	**room height [m]**	**nett volume [m³]**
	8	00 GF	Living room	32,34	2.66	**86,02**
		00 GF	kitchen	11,85	2.66	**31,52**
		00 GF	corridor 1	7,34	2.66	**19,52**
		00 GF	WC	2,01	2.66	**5,35**
		01 upper flr	child 1	15,31	2.53	**38,73**
		01 upper flr	child 2	10,61	2.53	**26,84**
		01 upper flr	parents	13,92	2.53	**35,22**
		01 upper flr	bathroom	7,79	2.53	**19,71**
		01 upper flr	corridor 2	4,57	2.31	**10,56**
		02 upper flr	studio	16,37	2,55	**41,78**
		02 upper flr	work	11,5	2,55	**29,35**
		02 upper flr	bathroom 2	6,36	2,55	**16,23**
		02 upper flr	corridor 3	1,1	2,55	**2,81**
		-1 BF	basement 1	25,1	2.45	**61,50**
		-1 BF	basement 2	14,16	2.45	**34,69**
		-1 BF	HVACR	7,41	2.45	**18,15**
		-1 BF	corridor baseme	5,74	2.45	**14,06**
						492,06