

## WARMER FOREVER – AFFORDABLE FAMILY HOME



An award-winning family home is creating a buzz, simply because of **NZ Foam** insulation, a product improving the comfort levels and affordability standards for new builds.

**NZ Foam** is the main reason this consistently warm Christchurch abode, built by Fusion Homes, achieved the Lifestyle Award in the Sustainability category in the Canterbury Master Build Awards 2017. This spray-on insulation has enabled the home to exceed the minimum government R-value requirements.

What is an R value? This is the official measurement of how well insulated walls can resist heat flow. The government minimum recommendation for R Values is 3.6 for ceilings and 2.4 for 90mm walls. The **NZ Foam** system, in this instance, measured R Values as 5.1 in the ceiling and 3.6 in the walls. There is no need to increase the thickness of the walls to achieve high results. A minimal 70mm layer of foam creates an R Value of 3.13.



Solar panels on the roof were connected to a pay-back system. The benefits are enviable low power bills: \$145 in the depths of winter and as low as \$25 in summer. The house is in 24/7 use, with an office and a toddler to keep cosy. The family puts away the energy savings each month for their child's future, and solar installation costs will have paid for itself in under six years.

Additionally, even airflow is the key to perfection, which was achieved by using a heat recovery ventilation system supplied by Snow Temp. Heating is provided by a Tropicair dual burner.

Due to the airtight **NZ Foam** system in the walls, ceiling and under floor, most days heat loss has been an average of 3.6 degrees overnight. It keeps the warmth in, but during summer months it keeps uncomfortable extremes of heat out.

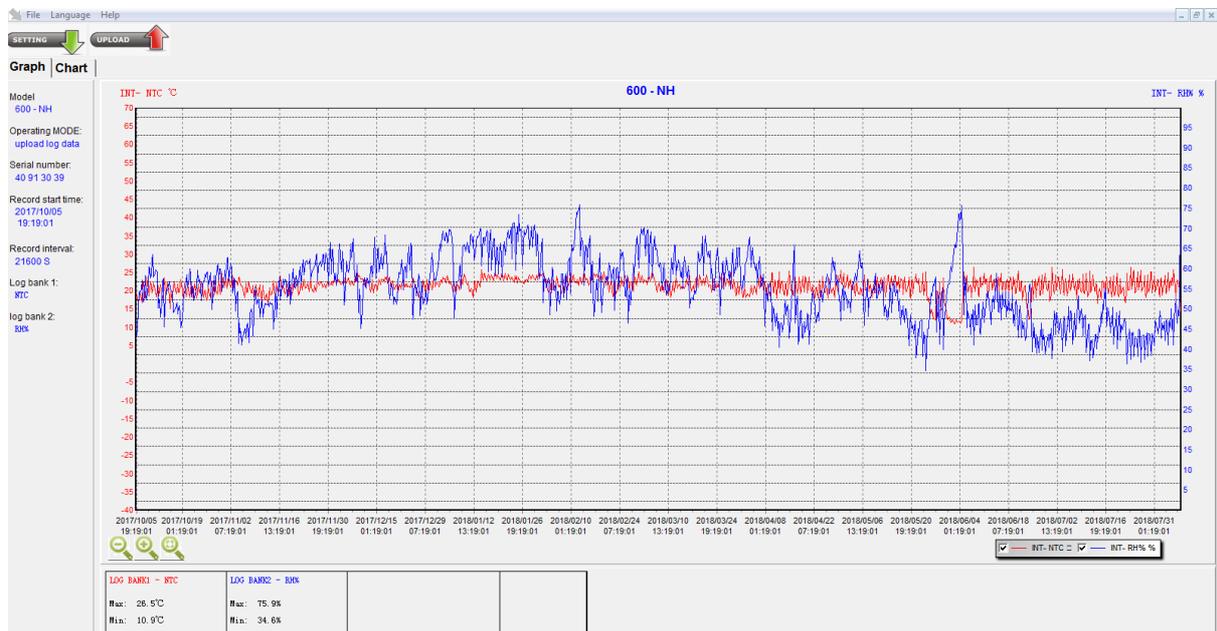
**NZFoam** essentially creates the glue to achieve an affordable drier, warmer home.



**Temperature taken morning and night - 10/05/2017 to 31/08/2018**

Blue in Humidity. Red is temperature.

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Blower door testing was complete in conjunction with the rest of the testing

## Temperature Data taken from Jun 2016 – Nov 2017

Temperatures were taken of the outside and of the inside of the building in the morning and at night. Average loss was 3.6 degrees and average temperature was 22 degrees.

Temperature Data												
Evening Temp Data				Morning Temp Data				Heat Loss				
Year/Month	Ave. Night Temp Inside	Ave. Night Temp Outside	Ave. Night Temp Diff.	Year/Month	Ave. Morning Temp Inside	Ave. Morning Temp Outside	Ave. Morning Temp Diff.	Year/Month	Ave Overnight Heat Loss			
2016	22.3	10.4	11.6	2016	18.3	8.8	9.4	2016	3.8			
Jun	21.7	9.2	12.4	Jun	16.8	7.8	9.0	Jun	5.0			
Jul	21.6	7.0	14.5	Jul	16.3	5.4	10.9	Jul	5.1			
Aug	23.1	6.6	16.5	Aug	18.5	4.6	13.4	Aug	5.2			
Sep	22.8	9.9	11.2	Sep	18.8	8.8	9.1	Sep	2.9			
Oct	21.5	11.4	10.1	Oct	18.3	9.7	8.6	Oct	3.2			
Nov	22.4	12.8	9.6	Nov	19.3	11.3	8.0	Nov	3.1			
Dec	22.7	15.6	7.2	Dec	20.2	13.7	6.5	Dec	2.5			
2017	22.1	11.5	10.2	2017	18.6	9.6	8.8	2017	3.4			
Jan	22.9	15.8	7.1	Jan	20.6	14.3	6.4	Jan	2.1			
Feb	23.0	16.6	6.4	Feb	21.0	14.6	6.4	Feb	2.2			
Mar	22.6	14.4	8.2	Mar	19.8	12.7	7.1	Mar	2.8			
Apr	22.3	12.1	10.2	Apr	18.9	10.2	8.7	Apr	3.5			
May	22.6	9.1	13.5	May	17.7	7.2	10.5	May	4.9			
Jun	22.1	7.4	14.7	Jun	18.1	6.1	12.0	Jun	4.0			
Jul	21.8	8.5	13.3	Jul	17.6	4.8	12.8	Jul	4.2			
Aug	21.0	8.1	12.9	Aug	17.2	6.4	10.8	Aug	3.9			
Sep	20.9	10.2	9.6	Sep	17.7	8.7	8.1	Sep	2.9			
Oct	21.2	11.7	8.3	Oct	17.4	9.8	6.6	Oct	3.2			
Nov	21.9	13.4	7.5	Nov	18.8	11.4	6.5	Nov	3.6			
<b>Grand Total</b>	<b>22.1</b>	<b>11.1</b>	<b>10.8</b>	<b>Grand Total</b>	<b>18.5</b>	<b>9.3</b>	<b>9.0</b>	<b>Grand Total</b>	<b>3.6</b>			

### Comments and result from a blower door test

I guess the number you really need to be think about are the Leakage areas. The Canadian EqLA is between 201.4 and 267.6 square centimetres. What that means is that over the whole house you have effective hole of 15cm x 15cm. Assuming that the log burner flue is 150mm and it has a gap of 5-10mm around it you could drop the effective hole size to 13.5cm x 13.5cm. Contrast this to the first test that had and effective hole size of 24cm x 24cm and I think you have done remarkably well (about a 40% decrease)! Remember that the outside surface area of the house is 405 sqm and you have an effective gap of only 0.15sqm.

On average the ACH@50 is 1.75- again this is a great number.

Gary Robertson

EECA energy Assessor

## Results of Multi Point Depressurisation Test

### BUILDING LEAKAGE TEST

Date of Test: 16/11/2017	Technician: GR
Test File: Depressurisation adj	
Customer:	Building Address: South New Brighton Christchurch, 8062
Phone:	
Fax:	

#### Test Results at 50 Pascals:

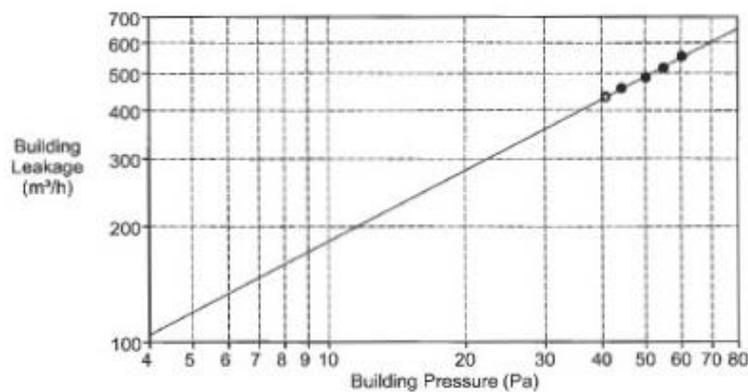
V50: Airflow (m <sup>3</sup> /h)	490 ( +/- 0.4 %)
n50: Air Changes per Hour (1/h)	1.57
w50: m <sup>3</sup> /(h*m <sup>2</sup> Floor Area)	3.53
q50: m <sup>3</sup> /(h*m <sup>2</sup> Surface Area)	1.21

**Leakage Areas:** 204.4 cm<sup>2</sup> ( +/- 4.3 %) Canadian EqLA @ 10 Pa or 0.50 cm<sup>2</sup>/m<sup>2</sup> Surface Area  
112.5 cm<sup>2</sup> ( +/- 6.8 %) LBL ELA @ 4 Pa or 0.28 cm<sup>2</sup>/m<sup>2</sup> Surface Area

**Building Leakage Curve:** Air Flow Coefficient (C<sub>env</sub>) = 44.8 ( +/- 10.5 %)  
Air Leakage Coefficient (CL) = 44.8 ( +/- 10.5 %)  
Exponent (n) = 0.612 ( +/- 0.027 )  
Correlation Coefficient = 0.99717

Test Standard:	EN 13829	Test Mode:	Depressurization
Type of Test Method:	A	Regulation complied with:	
Equipment:	Model 3 (230V) Minneapolis Blower Door		

Inside Temperature:	20 °C	Volume:	312 m <sup>3</sup>
Outside Temperature:	20 °C	Surface Area:	405 m <sup>2</sup>
Barometric Pressure:	101325 Pa	Floor Area:	139 m <sup>2</sup>
Wind Class:	0 Calm	Uncertainty of	
Building Wind Exposure:	Partly Exposed Building	Building Dimensions:	3 %
Type of Heating:	ULEB/ HP	Year of Construction:	2016
Type of Air Conditioning:			
Type of Ventilation:	None		



**BUILDING LEAKAGE TEST Page 2**

Date of Test: 16/11/2017 Test File: \_\_\_\_\_ Depressurisation adj

**Comments**

**Data Points: Depressurization - Data Entered Manually**

Nominal Building Pressure (Pa)	Fan Pressure (Pa)	Nominal Flow (m³/h)	Temperature Adjusted Flow (m³/h)	% Error	Fan Configuration
0.0	n/a				
-60.2	29.9	553	553	0.7	Ring B
-54.9	25.9	515	515	-0.7	Ring B
-50.1	163.6	487	487	-0.7	Ring C
-44.3	144.7	457	457	0.4	Ring C
-40.8	131.0	434	434	0.3	Ring C
0.0	n/a				

Test 0 Baseline (Pa): p01- = 0.0 p01+ = 0.0 p02- = 0.0 p02+ = 0.0