

# Certificate

## Passive House Suitable Component

For cool temperate climates, valid until 31. December 2018

Category: **Compact Heat Pump System**  
 Manufacturer: **Nilan A/S**  
**8722 Hedensted, DENMARK**  
 Product name: **Compact P (92 m<sup>3</sup>/h)**

**This certificate was awarded based on the following criteria (limit values\*):**

Thermal Comfort:  $\theta_{\text{supply air}} \geq 16,5^{\circ}\text{C}$   
 Heat Recovery of ventilation system:  $\eta_{\text{WRG,eff}} \geq 75\%$   
 Electric efficiency ventilation system:  $P_{\text{el}} \leq 0,45 \text{ Wh/m}^3$   
 Air tightness (internal/external):  $V_{\text{Leakage}} \leq 3\%$   
 Total Primary Energy Demand (\*\*):  $PE_{\text{total}} \leq 55 \text{ kWh}/(\text{m}^2\text{a})$   
 Control and calibration (\*)  
 Air pollution filters (\*)  
 Anti freezing strategy (\*)  
 Noise emission and reduction (\*)

**Measured values to be used in PHPP (set point 92 m<sup>3</sup>/h)  
 useful air flow rates 52 to 120 m<sup>3</sup>/h**

### Heating

		Test point 1	Test point 3	Test point 3	Test point 4	
Outside Air Temperature	$T_{\text{amb}}$	-7.0	2.1	7.1		°C
Thermal Output Heating Heat Pump	$P_{\text{WP,Heiz}}$	0.49	0.62	0.67		kW
COP number Heating Heat Pump	$\text{COP}_{\text{Heiz}}$	2.43	2.55	2.78		-
Maximum available supply air temperature with Heat Pump only(*)		33.6				°C

### Hot water

		Test point 1	Test point 3	Test point 3	Test point 4	
Outside Air Temperature	$T_{\text{amb}}$	-6.9	1.9	7.2	20.2	°C
Thermal Output Heat Pump for heating up storage tank.	$P_{\text{DHW heating up}}$	0.51	0.72	0.89	1.02	kW
Thermal Output Heat Pump for reheating storage tank	$P_{\text{DHW reheating}}$	0.54	0.71	0.83	0.94	kW
COP Heat Pump for heating up storage tank	$\text{COP}_{\text{DHW, heating up}}$	2.11	2.60	3.08	3.38	-
COP Heat Pump for reheating storage tank	$\text{COP}_{\text{DHW reheating}}$	1.94	2.50	2.80	3.05	-
Average storage tank temperature		50.5				°C
Specific storage heat losses		1.63				W/K
Exhaust air addition (if applicable)						m <sup>3</sup> /h

(\*) detailed description of criteria and key values see attachment.

(\*\*) for heating, domestic hot water (DHW), ventilation, auxiliary electricity in the reference building, explanation see attachment.

### Heat Recovery

$$\eta_{\text{WRG,eff}} = 77\%$$

### Electric efficiency

$$0.43 \text{ Wh/m}^3$$

### Air tightness

$$V_{\text{leak, internal}} = 1.0\%$$

$$V_{\text{leak, external}} = 1.1\%$$

### Frost protection

down to -7 °C

### Total Primary Energy Demand (\*\*)

**54.1 kWh/(m<sup>2</sup>a)**



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## Passive House Suitable Component

For cool temperate climates, valid until 31. December 2018

Category: **Compact Heat Pump System**  
 Manufacturer: **Nilan A/S**  
**8722 Hedensted, DENMARK**  
 Product name: **Compact P (172 m<sup>3</sup>/h)**

**This certificate was awarded based on the following criteria (limit values\*):**

Thermal Comfort:  $\theta_{\text{supply air}} \geq 16,5^{\circ}\text{C}$   
 Heat Recovery of ventilation system:  $\eta_{\text{WRG,eff}} \geq 75\%$   
 Electric efficiency ventilation system:  $P_{\text{el}} \leq 0,45 \text{ Wh/m}^3$   
 Air tightness (internal/external):  $V_{\text{Leakage}} \leq 3\%$   
 Total Primary Energy Demand (\*\*):  $PE_{\text{total}} \leq 55 \text{ kWh}/(\text{m}^2\text{a})$   
 Control and calibration (\*)  
 Air pollution filters (\*)  
 Anti freezing strategy (\*)  
 Noise emission and reduction (\*)

**Measured values to be used in PHPP (set point 172 m<sup>3</sup>/h)  
 useful air flow rates 120 to 205 m<sup>3</sup>/h**

### Heating

		Test point 1	Test point 3	Test point 3	Test point 4	
Outside Air Temperature	$T_{\text{amb}}$	-3.7 °C	2.0 °C	6.9 °C		°C
Thermal Output Heating Heat Pump	$P_{\text{heating}}$	0.61	0.78	0.92		kW
COP number Heating Heat Pump	$\text{COP}_{\text{Heating}}$	2.65	3.18	3.58		-
Maximum available supply air temperature with Heat Pump only(*)		28.6				°C

### Hot water

		Test point 1	Test point 3	Test point 3	Test point 4	
Outside Air Temperature	$T_{\text{amb}}$	-4.0 °C	2.0 °C	7.0 °C	20.2 °C	°C
Thermal Output Heat Pump for heating up storage tank.	$P_{\text{DHW heating up}}$	0.60	0.83	0.99	1.14	kW
Thermal Output Heat Pump for reheating storage tank	$P_{\text{DHW reheating}}$	0.53	0.82	0.95	1.05	kW
COP Heat Pump for heating up storage tank	$\text{COP}_{\text{DHW heating up}}$	2.13	2.87	3.31	3.68	-
COP Heat Pump for reheating storage tank	$\text{COP}_{\text{DHW reheating}}$	1.81	2.72	3.05	3.28	-
Average storage tank temperature		50.5				°C
Specific storage heat losses		1.63				W/K
Exhaust air addition (if applicable)						m <sup>3</sup> /h

(\*) detailed description of criteria and key values see attachment.

(\*\*) for heating, domestic hot water (DHW), ventilation, auxiliary electricity in the reference building, explanation see attachment.

### Heat Recovery

$$\eta_{\text{WRG,eff}} = 80\%$$

### Electric efficiency

$$0.40 \text{ Wh/m}^3$$

### Air tightness

$$V_{\text{leak, internal}} = 1.0\%$$

$$V_{\text{leak, external}} = 1.1\%$$

### Frost protection

down to -4 °C

### Total Primary Energy Demand (\*\*)

**51.4 kWh/(m<sup>2</sup>a)**

