



TEST REPORT

Report no.:
300-KLAB-10-003

Product:
Type: Air to water heat pump (Nilan UVP5)

Customer:
Nilan A/S

Date:
17 March 2010

Consultants:
Rasmus Nielsen & Lasse S e

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Customer: Contact person: Torben Andersen
Company: Nilan A/S
Address: Nilanvej 2
City: DK-8722 Hedensted
Tel.: +4576752500**Component:** Brand: Nilan
Type: Air to water heat pump
Model: UVP 5
Series no.:**Dates:** Component received: 2010-01-18
Component tested: 2010-01-26 – 2010-02-08**Procedure:** DS/EN 14511:2008 part 1, 2 and 3.**Remarks:** Before test number 2, the customer was allowed access to the test sample in order to change the defrost control parameters. No defrost cycles were observed during test number 1 and therefore the change in control parameters does not influence the results.**Conditions:** Testing has been carried out on the conditions stated overleaf in compliance with DTI's General Terms and Conditions Regarding Commissioned Work Accepted by Danish Technological Institute (DTI) February 2009. The test results apply to the tested samples only. This test report may be reproduced in extract only if the laboratory has approved the extract in writing.

Division/Centre: Danish Technological Institute
Energy and Climate
Refrigeration Laboratory, Aarhus**Date:****Signature:****Signature co-reader:**Lasse Søe
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The requirements to be met by accredited laboratories are laid down in the Danish Agency for Trade and Industry (Erhvervsfremme Styrelsens) Statutory Order on accreditation of laboratories to perform testing etc. and GLP inspection. The Statutory Order refers to other documents in which the criteria for accreditation are specified further.

The standards DS/EN ISO/IEC 17025 "General requirements concerning the competence of testing and calibration laboratories" and DS/EN 45002 "General criteria for the assessment of testing laboratories" describe fundamental criteria for accreditation. DANAK uses guidance documents to clarify the requirements in the standards, where this is considered to be necessary. They will mainly be drawn up by the "European co-operation for Accreditation (EA)" or the "International Laboratory Accreditation Co-operation (ILAC)" with a view to obtaining uniform criteria for accreditation worldwide. In addition, DANAK draws up Technical Regulations concerning specific demands on accreditation that are not included in the standards.

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- that the laboratory has established guidelines for traceability and uncertainty calculations,
- that accredited testing or calibration is performed in accordance with fully validated and documented methods,
- that the laboratory keeps records which contain sufficient information to permit the repetition of the accredited test or calibration,
- that the laboratory is subject to supervision carried out by DANAK on a regular basis,
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Reports carrying DANAK's logo are used when reporting accredited services and show that they have been performed in accordance with the rules concerning accreditation.

Unofficial translation for

DANAK, Technical guidelines

No. RL 4 of 20 June 2001

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Objective

The objective of this report is to document the heating capacity and efficiency according to DS/EN 14511, part 1, 2 & 3. The heating capacity and efficiency tests were carried out in the below stated operating points:

Test		1	2	3	4	5	6	7	8 ^(*)
Capacity - %		100	100	100	100	100	100	100	100
Outdoor heat exchanger air temperature - °C	Dry bulb	7	7	2	2	2	-7	-7	10
	Wet bulb	6	6	1	1	1	-8	-8	9
Indoor heat exchanger water temperature - °C	Inlet	30	40	a	b	b	a	b	a
	Outlet	35	45	35	45	55	35	55	35

a: The test is performed at the flow rate obtained during test # 1

b: The test is performed at the flow rate obtained during test # 2

(*): Air temperatures not according to EN14511:2008

Description of the test sample

The test sample is an on/off controlled air to water heat pump without built-in water pump on the indoor heat exchanger. The unit can be applied for both heating and production of domestic hot water. The customer has chosen the test sample himself.

Item	Description	Information from name plate/manual
1	Brand	Nilan
2	Type	Air to water heat pump
3	Model	UVP 5
4	Series number	n.a.
5	Production number	35111305 (outdoor)
6	Production year	n.a.
7	Refrigerant type	R407C
8	Refrigerant charge	2.3 kg
9	Voltage supply	3 * 400 V + N

Test results – Heating mode

Test	1	2	3	4	5	6	7	8 ^(*)	
Heating capacity – kW	6.15	5.93	4.96	4.85	4.69	3.87	3.84	6.70	
COP	3.67	3.04	3.08	2.59	2.15	2.52	1.82	3.96	
Effective power consumption – kW	1.68	1.95	1.61	1.87	2.18	1.54	2.11	1.69	
Outdoor heat exchanger	Temperature dry bulb - °C	7.0 ⁽³⁾	6.9 ⁽³⁾	2.0 ⁽¹⁾ 3.0 ⁽²⁾	2.0 ⁽¹⁾ 3.0 ⁽²⁾	2.1 ⁽¹⁾ 2.7 ⁽²⁾	-6.8 ⁽¹⁾ -5.3 ⁽²⁾	-6.9 ⁽³⁾	10.1 ⁽³⁾
	Temperature wet bulb - °C	6.0 ⁽³⁾	6.0 ⁽³⁾	1.0 ⁽¹⁾ 1.5 ⁽²⁾	1.0 ⁽¹⁾ 1.6 ⁽²⁾	1.1 ⁽¹⁾ 1.6 ⁽²⁾	-7.9 ⁽¹⁾ -6.3 ⁽²⁾	-8.0 ⁽³⁾	9.0 ⁽³⁾
	Heat transfer media	Air	Air	Air	Air	Air	Air	Air	Air
Indoor heat exchanger	Inlet temperature - °C	30.0 ⁽³⁾	40.0 ⁽³⁾	30.8 ⁽¹⁾ 30.2 ⁽²⁾	40.8 ⁽¹⁾ 40.0 ⁽²⁾	51.0 ⁽¹⁾ 50.2 ⁽²⁾	31.8 ⁽¹⁾ 30.9 ⁽²⁾	51.7 ⁽³⁾	29.7 ⁽³⁾
	Outlet temperature - °C	34.9 ⁽³⁾	45.0 ⁽³⁾	35.0 ⁽¹⁾ 33.1 ⁽²⁾	45.0 ⁽¹⁾ 42.9 ⁽²⁾	55.1 ⁽¹⁾ 53.2 ⁽²⁾	35.1 ⁽¹⁾ 33.1 ⁽²⁾	54.9 ⁽³⁾	35.1 ⁽³⁾
	Heat transfer media	Water	Water	Water	Water	Water	Water	Water	Water
	Flow – l/h	1079	1042	1081	1046	1045	1079	1051	1082
	Pressure drop – mbar	164.38	148.90	163.38	147.81	143.99	164.21	143.62	163.81

⁽¹⁾ Average readings during heating period

⁽²⁾ Average readings during defrost period

⁽³⁾ Average readings during steady state period

^(*): Air temperatures not according to EN14511:2008

Temperature plot test # 1:

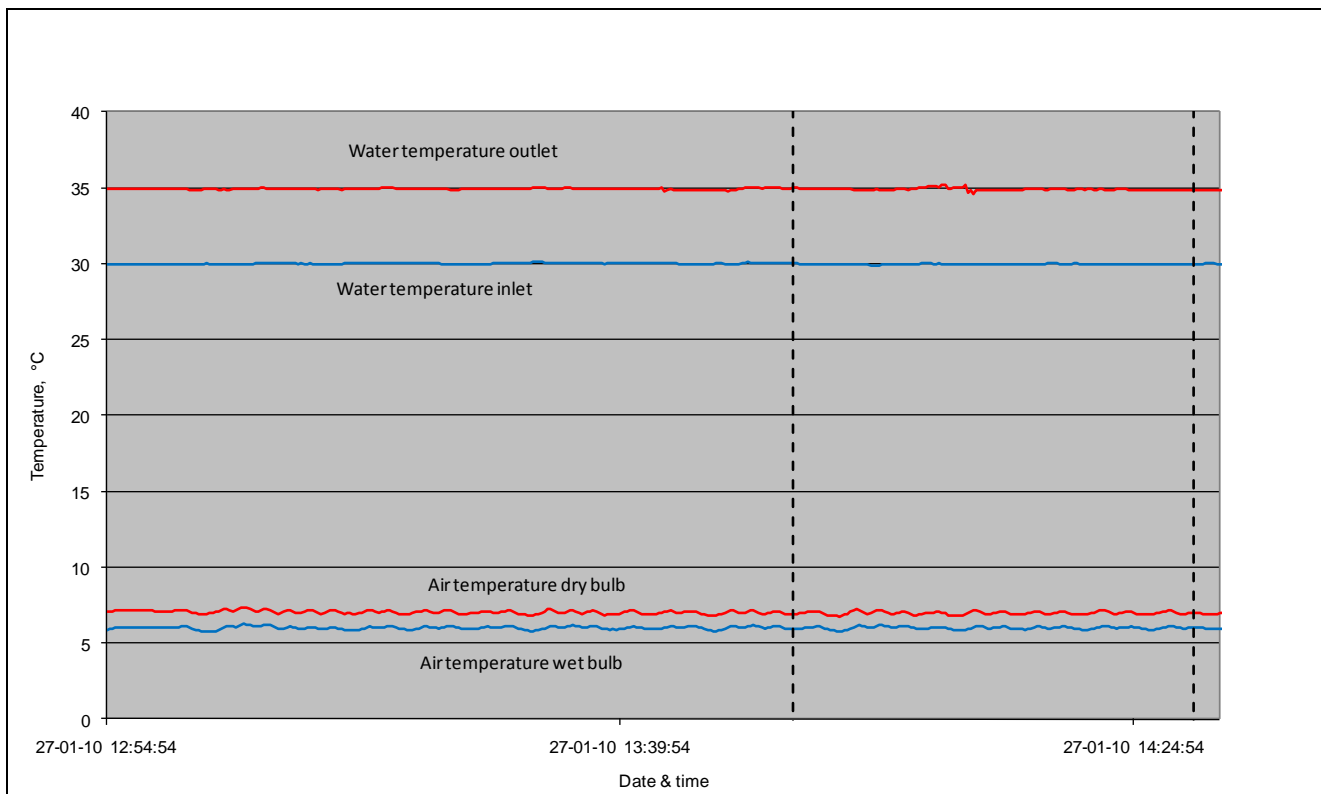
100% capacity

Outdoor heat exchanger air temperature dry/wet bulb: 7/6°C

Indoor heat exchanger water temperature inlet/outlet: 30/35°C

Unit settings:

According to the manufacturer's instruction sheet.



Deviations: None

Temperature plot test # 2:

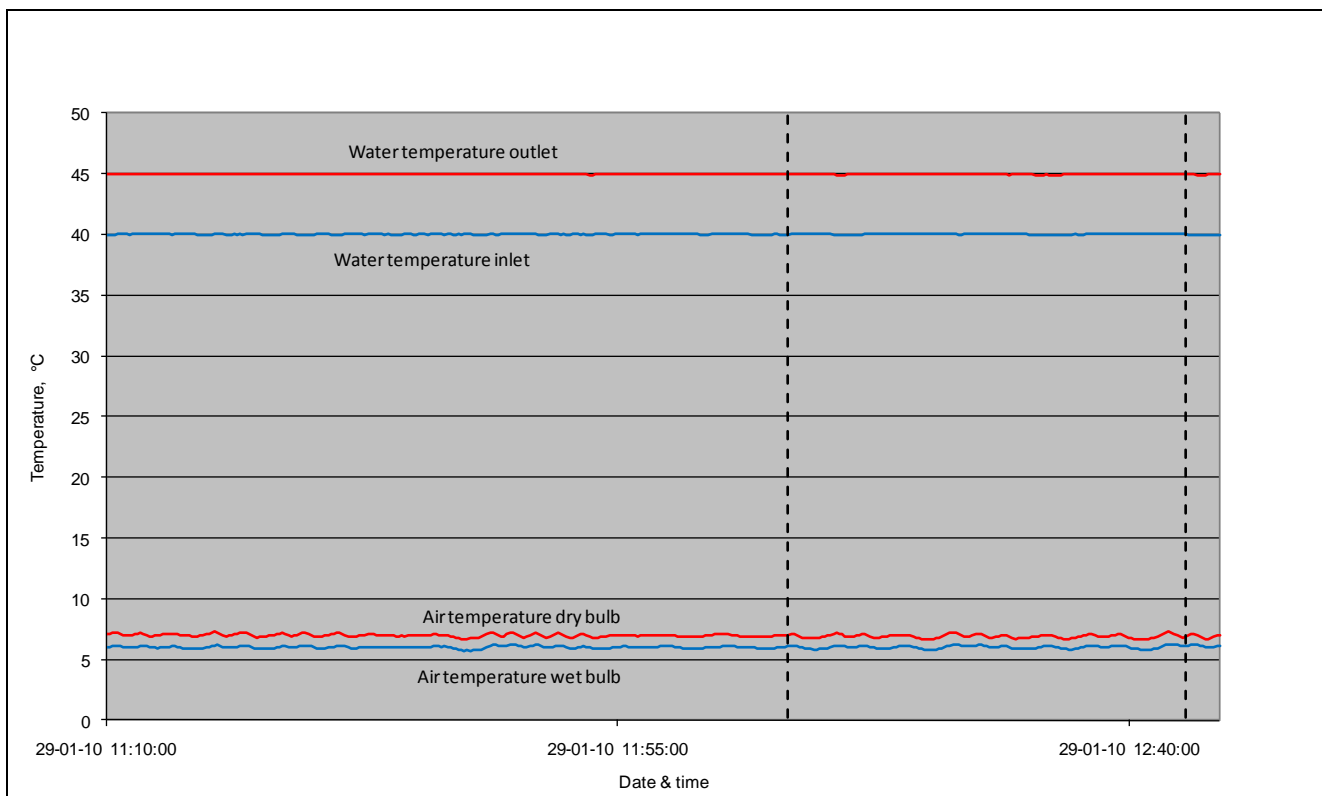
100% capacity

Outdoor heat exchanger air temperature dry/wet bulb: 7/6°C

Indoor heat exchanger water temperature inlet/outlet: 40/45°C

Unit settings:

According to the manufacturer's instruction sheet.



Deviations: None

Temperature plot test # 3:

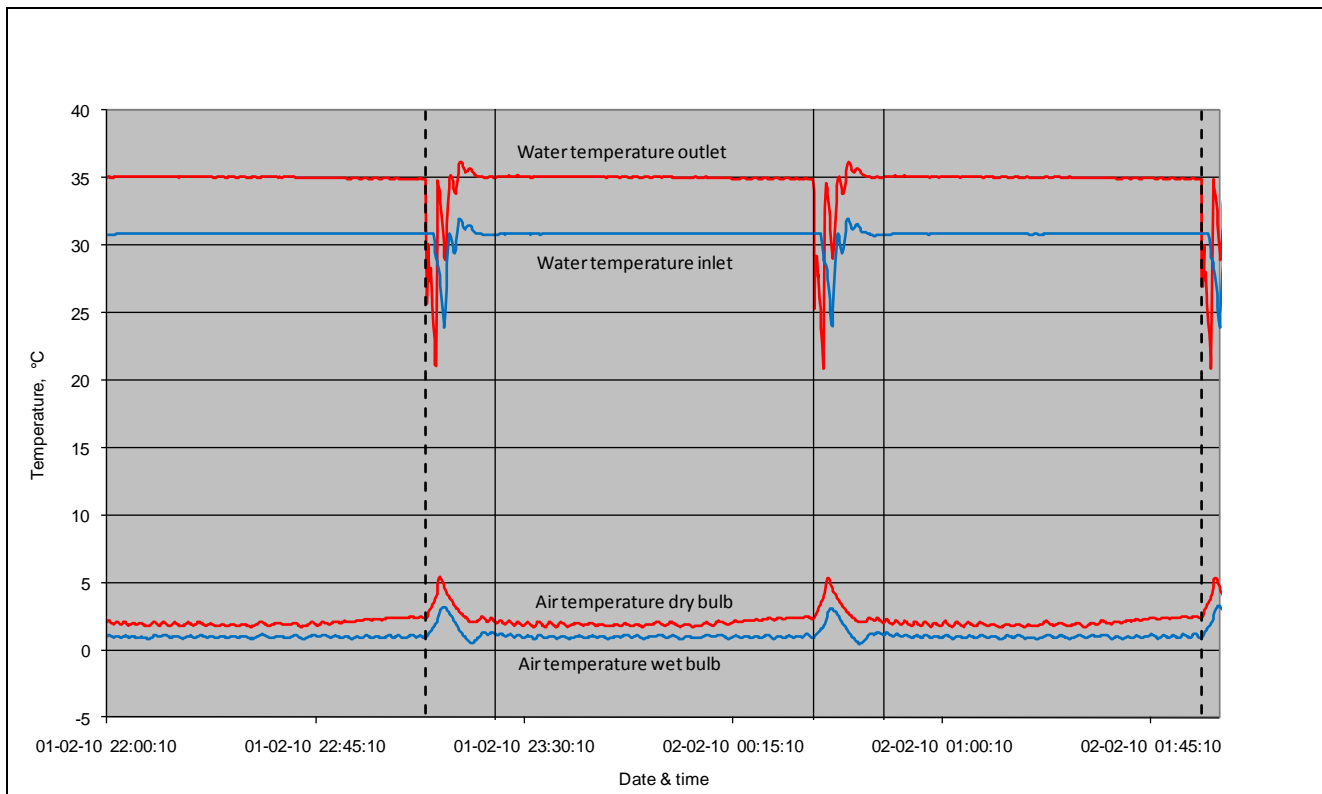
100% capacity

Outdoor heat exchanger air temperature dry/wet bulb: 2/1°C

Indoor heat exchanger water temperature inlet/outlet: -/35°C

Unit settings:

According to the manufacturer's instruction sheet.



Deviations: None

Temperature plot test # 4:

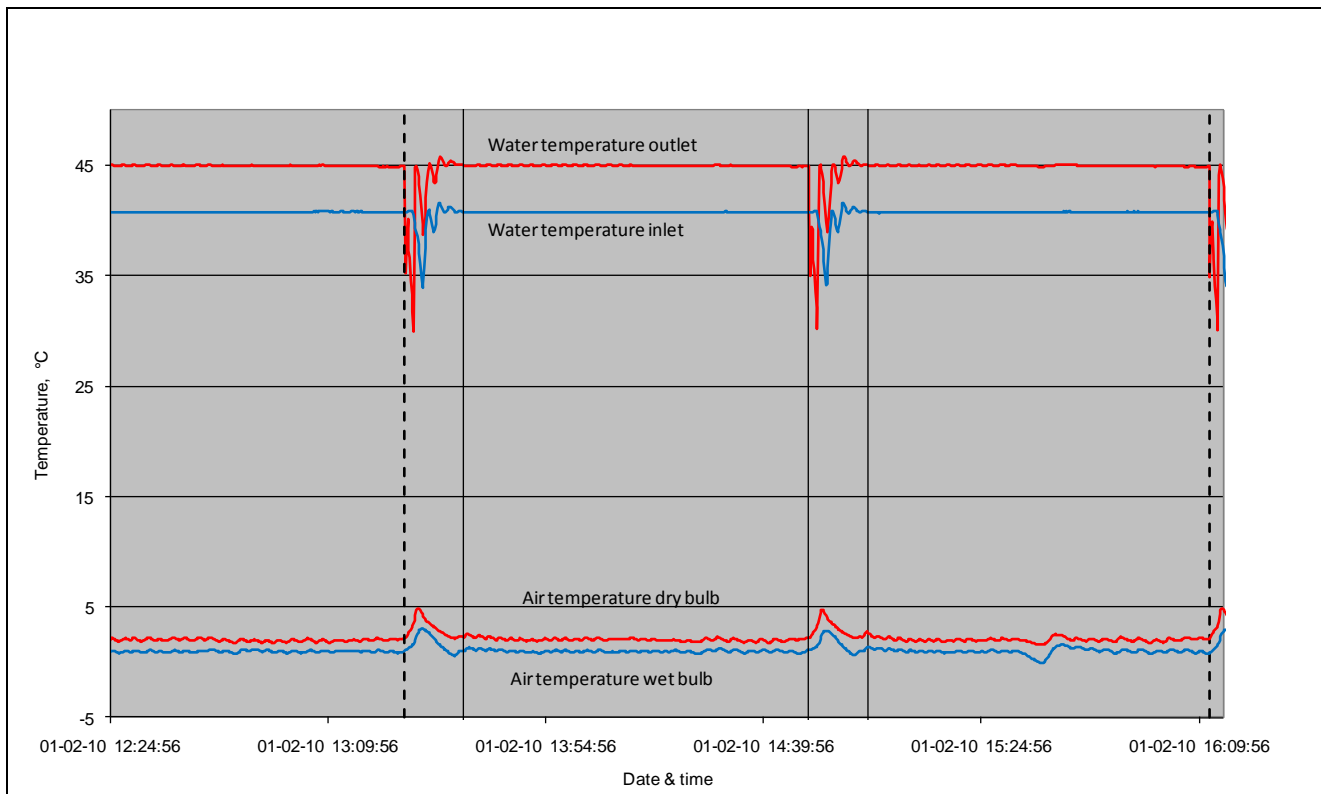
100% capacity

Outdoor heat exchanger air temperature dry/wet bulb: 2/1°C

Indoor heat exchanger water temperature inlet/outlet: -/45°C

Unit settings:

According to the manufacturer's instruction sheet.



Deviations: During the heating period, individual readings of the wet bulb air temperature exceeded the allowed variations by -0.5K . The deviations are evaluated to have no influence on the main test results.

Temperature plot test # 5:

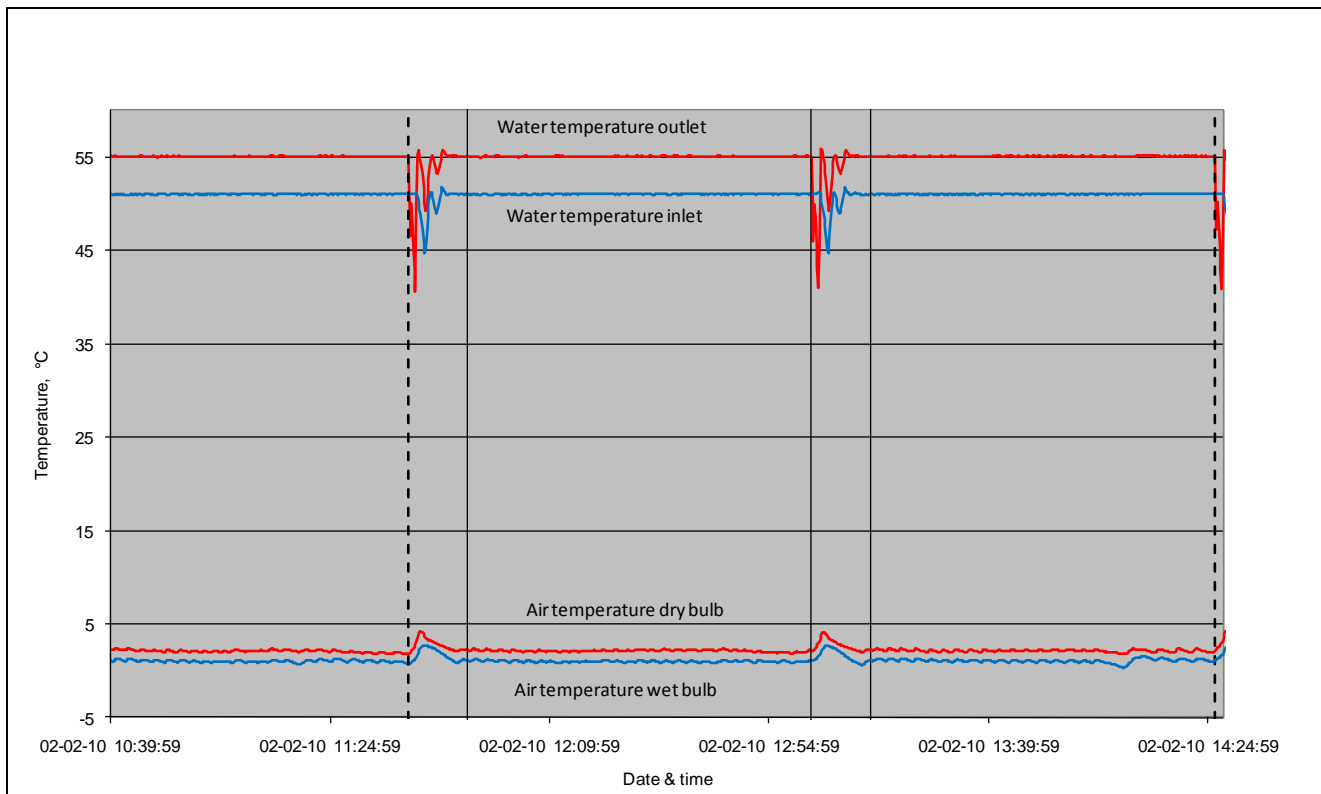
100% capacity

Outdoor heat exchanger air temperature dry/wet bulb: 2/1°C

Indoor heat exchanger water temperature inlet/outlet: -/55°C

Unit settings:

According to the manufacturer's instruction sheet.



Deviations: During the heating period, individual readings of the wet bulb air temperature exceeded the allowed variations by -0.1K. The deviations are evaluated to have no influence on the main test results.

Temperature plot test # 6:

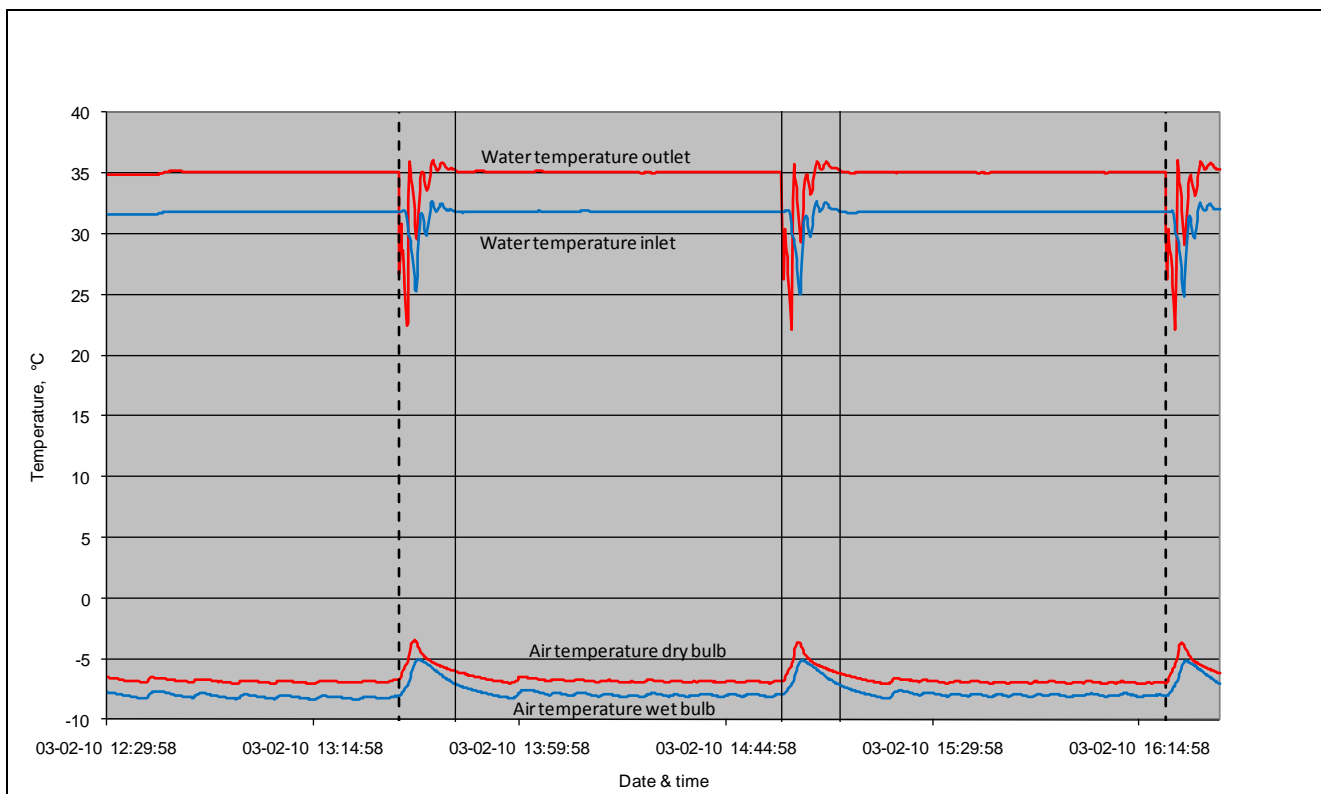
100% capacity

Outdoor heat exchanger air temperature dry/wet bulb: -7/-8°C

Indoor heat exchanger water temperature inlet/outlet: -/35°C

Unit settings:

According to the manufacturer's instruction sheet.



Deviations: During the heating periods, individual readings of the wet bulb air temperature exceeded the allowed variations by +0.3K. During the defrosting periods, mean values of the wet bulb air temperature exceeded the allowed variations by +0.7K and mean values of the dry air temperature by +0.2K. The deviations are evaluated to have no influence on the main test results.

Temperature plot test # 7:

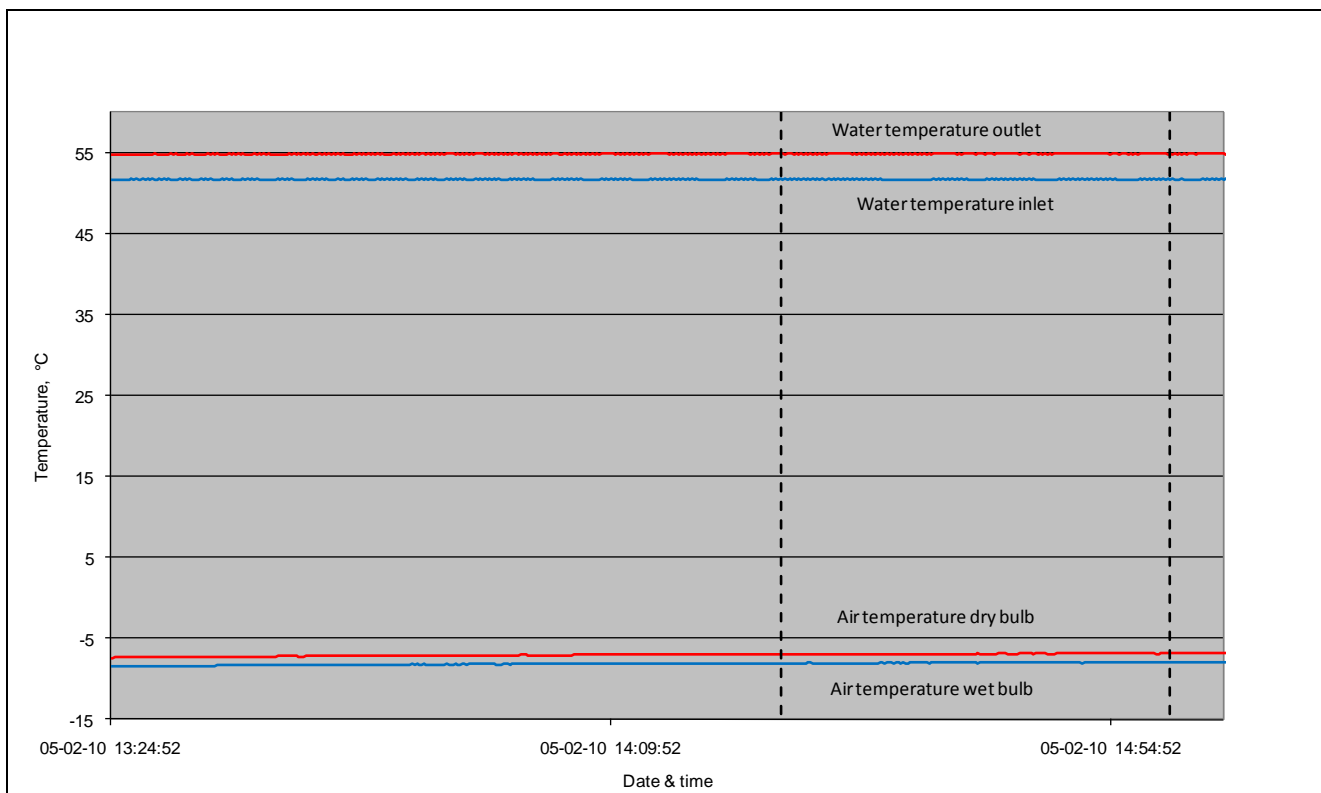
100% capacity

Outdoor heat exchanger air temperature dry/wet bulb: $-7/-8^{\circ}\text{C}$

Indoor heat exchanger water temperature inlet/outlet: $-/55^{\circ}\text{C}$

Unit settings:

According to the manufacturer's instruction sheet.



Deviations: None

Temperature plot test # 8:

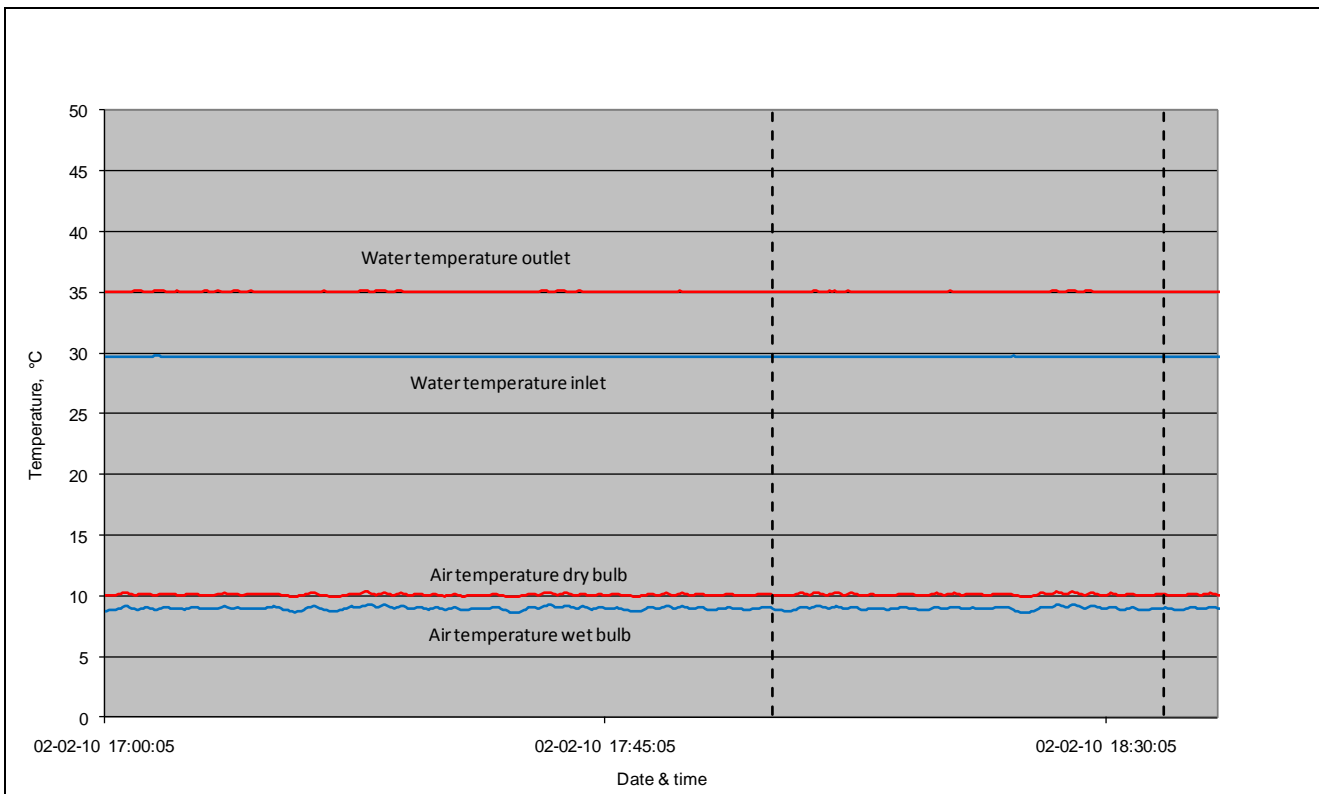
100% capacity

Outdoor heat exchanger air temperature dry/wet bulb: 10/9°C

Indoor heat exchanger water temperature inlet/outlet: -/35°C

Unit settings:

According to the manufacturer's instruction sheet.



Deviations: None

Information on rating plate – outdoor unit

